Kashan University
of Medical Sciences

KASHAN-IRAN
5th International and 24th National Conference on
Environmental Health
December 14-16, 2021
Kashan University of Medical Sciences

Proceedings of the 5th International and 24th National Conference on Environmental Health

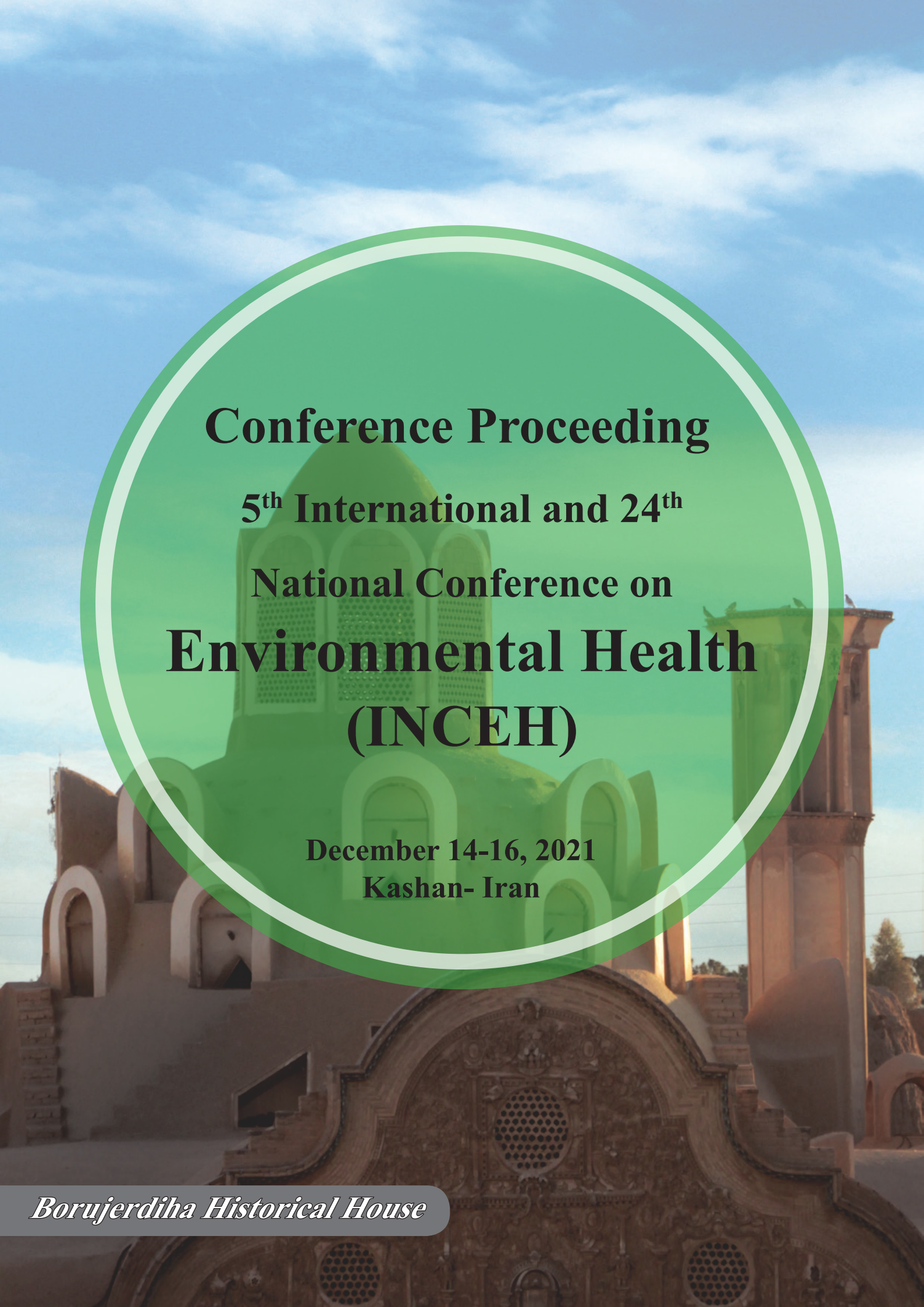
December 14-16, 2021 Kashan- IRAN

Conference Proceeding

5th International and 24th National Conference on

Environmental Health (INCEH)

December 14-16, 2021
Kashan- Iran



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Conference Topics

- The Role of Environmental Health in the Prevention and Control of Diseases (with Emphasis on COVID-19)
- National and Global Environmental Health Challenges
- Biomonitoring of Environmental Pollutants
- Environmental Burden of Disease
- Environmental Pollution Control Technologies
- Creating Wealth, Policy making and Environmental Health Management
- Environmental Health Indexes

The Cnference secretariat has no responsibility towards the possible errors in composition of the abstracts

Keynote speakers

Prof. Joerg Spitz

Founder and Director of the German Academy of Human Medicine, Germany

Prof. Bruce Spittle

Editor-in-Chief of Fluoride Quarterly Journal of the International Society for Fluoride Research, New Zealand

Prof. Torsten C.Schmidt

President of the German Aquatic Chemistry Association, Germany

Dr. Juana Maria Delgado-Saborit

Universitat Jaume I, Perinatal Epidemiology, Environmental Health and Clinical Research, School of Medicine, Spain

Dr. Susana Paixão

The International Federation of Environmental Health President, Portugal

Prof. André Niemann

University of Duisburg-Essen, Institute of Hydraulic Engineering and Water Resources Management, Germany

Dr. Meltem Kutlar Joss

Swiss Tropical and Public Health Institute, Basel, Switzerland

Prof. Michal Krzyzanowski

London's King College Environmental Research Center, England

Prof. Helder Teixeira Gomes

School of Technology and Management (ESTiG) of Instituto Politécnico de Bragança (IPB), Bragança, Portugal

Prof. Ahmad Jonidi Jafari

Department of Environmental Health Engineering, Iran University of Medical Sciences

Prof. Kazem Naddafi

Dean, School of Public Health, Tehran University of Medical Sciences
Director, Institute for Environmental Research, Tehran University of Medical Sciences

Prof. Jahangir Abedi-Koupai

Dean, College of Agriculture, Isfahan University of Technology

Dr. Mohammad Mehdi Gouya

Director, Center for Disease Control, Islamic Republic of Iran and a member in the Iranian delegation to the Regional Committee

Prof. Amirhossein Takian

Department Head of Global Health & Public Policy, and Vice-Dean for International Affairs at the School of public Health (SPH)-Tehran University of Medical Sciences

Dr. Abbas Ostadtaghizadeh

Department of Disaster & Emergency Health, School of Public Health, Tehran University of Medical Sciences

Prof. Masud Yunesian

Department of Environmental Health Engineering, Tehran University of Medical Sciences

Prof. Hamidreza Safavi

Department of Civil Engineering, Isfahan University of Technology

Tuesday, December 14th 2021

Opening Ceremony 08:00 – 10:00

Session 1: The Role of Environmental Health in the Prevention and Control of Diseases (with Emphasis on COVID-19) 10:15 – 12:00

Member of session: Prof. Masud Yunesian
Prof. Alireza Mesdaghinia, Prof. Mahmood Alimohammadi, Dr. Amir Hossein Mahvi, Prof. Ali Asghar Najafpoor

Speaker	Title	Time
Dr. Susana Paixão	**The Role of Environmental Health in the Prevention and Control of Emerging and Reemerging Diseases.**	**10:15-10:30**
Prof. Jörg Spitz	**Environment – One of the Key Factors in Times of Pandemic.**	**10:30 -10:45**
Dr. Mohammad Mehdi Gouya	**The importance of social measures, smart system, and environmental ventilation for control and prevention of COVID-19**	10:45- 11:00
Eng. Seyed Alireza Babaee	Promoting Preventive Behaviors of COVID-19 Spread in Dormitories and Student Centers: A theory-based educational intervention	11:00- 11:15
Dr. Samaneh Dehghan	Safe methods of water treatment in Covid-19 pandemic conditions in areas without centralized treatment system	11:15-11:30
Dr. Fatemeh Yousefian	The effect of COVID pandemic on ambient air particulate matter of areas with different socio-economic status: a case study of Tehran	11:30-11:45
	Q & A	**11:45-12:00**

Session 2: National and Global Environmental Health Challenges **13:30 – 15:00**

Member of session: Prof. Davarkhah Rabani
Prof. Mohammad Ali Zazouli, Prof. Anoushiravan Mohseni-Bandpei, Prof. Hamed Mohammadi, Prof. Mehdi Ahmadi Moghadam

Speaker	Title	Time
Prof. Jahangir Abedi-Koupai	**Environmental Effects of Over-Exploitation of Groundwater Resources**	**13:30- 13:45**
Dr. Abbas Ostadtaghizadeh	**Environmental Actions for Climate Adaptive Cities**	**13:45- 14:00**
Dr. Hoda Ghasemieh	Investigation of Groundwater Quantitative and Qualitative Status in Kashan Plain Aquifer and its Effect on Effect on Environmental Consequences	14:00- 14:15
Eng. Azadeh Binaee Haghighi	Representation comprehensive management components for stray dogs by combining citizenship attitudes and successful world experiences	14:15- 14:30
Eng. Seyedeh Maryam Seyed Mousavi	Challenges of plastic waste management during the COVID-19 pandemic	14:30- 14:45
	Q & A	**14:45-15:00**

Day 2: Wednesday, December 15th 2021

Session 1: Biomonitoring of Environmental Pollutants **08:00 – 9:30**

Member of session: Prof. Mohammad Malakoutian
Prof. Kazem Nddafi, Prof. Mohammad Taghi Samadi, Prof. Bijan Bina, Dr. Mohammad Hosseini, Dr. Hamid Reza Ghaffari

Speaker	Title	Time
Dr. Juana Maria Delgado-Saborit	**Biomonitoring of Environmental Pollutants for Risk Assessment and Management**	**08:00- 08:15**
Eng. Tahereh Rahmatinia	Seasonally varied Proinflammatory effects of urban particulate matter-induced($PM_{2.5}$) on human lung epithelial cells (A549) in vitro at the most industrial cities of Iran	08:15- 08:30
Dr. Zahra Sabeti	Short-term exposure to ambient fine particulate air pollution and sex differences in cardiorespiratory biomarker responses of healthy adolescents	08:30-08:45
Dr. Amir Zahedi	Effects of living in industrial and vehicular traffic areas and increasing blood metal(loids) and allergy pro-inflammatory (IgE and IL-4) biomarkers in children	08:45- 09:00
Eng. Hosna Darabi	Subacute toxic effects of polyvinyl chloride microplastics (PVC-MPs) in juvenile common carp (Cyprinus carpio)	09:00-09:15
Q & A		**09:15-09:30**

Session 2: Environmental Burden of Disease **10:00 – 11:45**

Member of session: Dr. Mohammad Sadegh Hassanvand
Prof. Neamatollah Jaafarzadeh, Prof. Mohammad Hassan Ehrampoush, Prof. Ramin Nabizadeh, Prof. Zabihollah Yousefi

Speaker	Title	Time
Dr. Bruce Spittle	**The fluoride burden of disease.**	**10:00- 10:15**
Eng. Shamim Mosalaei	Risk assessment of polycyclic aromatic hydrocarbons (PAHs) from household dust of Shiraz, Iran	**10:15-10:30**
Prof. Michal Krzyzanowski	**Environmental burden of disease – global, regional and national perspectives**	**10:30- 10:45**
Dr. Amir Mohammadi	Spatial Trend and Health Risk of Heavy Metals from Settled Dust in NW, Iran	10:45-11:00
Eng. Hamed Soleimani	Deterministic and probabilistic procedures to evaluation of human health risk due to heavy metals in groundwater resources; Sensitivity Analysis, and Geographic information system	11:00- 11:15
Eng. Zohreh Kamari	A comparative analysis of high and low risk areas for gastric cancer in Iran in relation to the chemical quality of water resources	11:15-11:30
Q & A		**11:30-11:45**

Session 3: Environmental Pollution Control Technologies **13:30 – 15:25**
Member of session: Prof. Sina Dobaradaran
Prof. Ahmadreza Yazdanbakhsh, Prof. Alireza Rahmani, Prof. Roshanak Rezaei Kalantarim, Dr. Hassan Izanloo, Dr. Mohsen Heidari

Speaker	Title	Time
Prof. Helder Teixeira Gomes	**Removal of contaminants of emerging concern by advanced oxidation technologies using carbon nanotubes**	**13:30-13:45**
Prof. Torsten C. Schmidt	**Is Catalytic Ozonation a Suitable Approach to Treat Wastewater?**	**13:45-14:10**
Dr. Alireza Nasiri	Metronidazole photodegradation by a new nano-biomagnetic photocatalyst ZnFe2O4@Methylcellulosee	14:10-14:25
Eng. Sepideh Tousizadeh	Evaluation of plastic biodegradation with three strains of Bacillus subtilis 6051 ATCC, Bacillus cereus 11778 ATCC, Staphylococcus ATCC 25923 Aureus	14:25-14:40
Eng. Sahar Moradi	Identification of beta-lactam-resistant coding genes in wastewater treatment plant by activated sludge method	14:40-14:55
Eng. Ebrahim Fazeliyan	Decolorization mechanism, identification of an FMNdependent NADH-azoreductase from a moderately halotolerant Staphylococcus sp. MEH038S, and toxicity assessment of biotransformed metabolites in biological degradation process of Reactive Black-5	14:55-15:10
Q & A		**15:10-15:25**
Environmental Health Festival		**15:45- 16:45**

Day 3: Thursday, December 16th 2021

Session 1: Creating Wealth, Policy making and Environmental Health Management
8:00- 9:45

Member of session: Prof. Ahmad Jonidi Jafari
Prof. Kamyar Yaghmaeian, Prof. Mohammad Mehdi Amin, Prof. Mahnaz Nikaeen, Eng. Mohsen Farhadi

Speaker	Title	Time
Prof. Amirhossein Takian	**Good governance for sustainable policymaking in environmental health**	**8:00-8:15**
Prof. Kazem Naddafi	**Social accountability promotion in department of environmental health, school of public health**	**8:15-8:30**
Prof. Hamidreza Safavi	**Requirements and structure of Integrated Water Resources Management (IWRM) in Zayandehrud River Basin**	**8:30-8:45**
Prof. André Niemann	**Promoting a policy based green economy for sustainable water management – European perspectives and challenges**	**8:45-9:00**
Dr. Ali Fakhri	Health Impact Assessment from the perspective of international experts	9:00-9:15
Dr. Samira Yousefzadeh	Electronic waste: from traditional recycling and hidden waste economy to scientific extraction of precious metals and wealth creation	9:15-9:30
Q & A		**9:30-9:45**

Session 2: Environmental Health Indexes **10:00-12:00**

Member of session: Dr. Reza Saeedi

Prof. Meghdad Pirsaheb, Dr. Mansour Shamsipour, Prof. Mohammad Mosaferi, Prof. Edris Bazrafshan, Prof. Mehraban Sadeghi

Speaker	Title	Time
Prof. Ahmad Jonidi Jafari	**Private Sector Participation in Environmental Health Services- case Introducing of Health Services office**	**10:00-10:15**
Prof. Masud Yunesian	**Cochrane library: opportunities and capacity for environmental health review studies**	**10:15-10:30**
Dr. Meltem Kutlar	**New WHO Air Quality Guidelines**	**10:30-10:45**
Dr. Fathollah Gholami-Borujeni	Investigating the Relationship between Gross Domestic Product and Environmental Performance Index (Climate Changes) in Iran and the World in 2020	10:45-11:00
Dr. Zahra Shamsizadeh	Survey of the effect of irrigation with urban wastewater treatment plant effluent on transfer of antibiotic resistance genes in soil and crops	11:00-11:15
Dr. Mostafa Hadei	Comparing the Reported Air Quality Index (AQI) Values Reported in Tehran with the Actual Values Calculated Based on the EPA's Instruction	11:15-11:30
Eng. Sahar Gholipour	Occurrence of human adenovirus in wastewater effluent and wastewater-irrigated soil	11:30-11:45
	Q & A	**11:45-12:00**

Closing Ceremony **13:30-15:00**

14th December 2021

Webinar Title: Entrepreneurship and Knowledge-Based Economics in Environmental Health Engineering **(17:00-20:30)**
Scientific secretary of the program: Dr. Ashraf Mazaheri
Target group: Distinguished faculty members, university students and experts in environmental health engineering, occupational health engineering, public health and Health, Safety and Environmental (HSE)

Lecturer	Topic	Time
Dr. Ashraf Mazaheri	Opening and stating the goals of the program	17:00-17:10
Prof. Alihossein Saberi	Introduction of Ahmadi Roshan plan (applied and problem-oriented research)	17:10-17:30
Prof. Mohammad Reza Samarghandi	Alphabet Start-up of Knowledge enterprise	17:30-17:50
Prof. Mohammad Taghi Ghaneian	Fundamentals of Entrepreneurship and Knowledge-Based Economics	17:50-18:10
	Break	18:10-18:20
Dr. Gholamreza Mahmoodi Kondori	Entrepreneurship in the field of water and wastewater	18:20-18:40
Eng. Ehsan Dadkhah	Entrepreneurship in the localization of new technologies for recycling water and sustainable development	18:40-19:00
	Break	19:00-19:10
Eng. Mehrab Lahijani	Entrepreneurship in the field of air pollution control	19:10-19:30
Eng. Babak Najmi	Entrepreneurship in the field of electrical and electronic waste management	19:30-19:50
Eng. Afshin Heidarkhani	Entrepreneurship and job opportunities in waste management	19:50-20:10
Prof. Mohammad Taghi Ghanian	Determining the approach of the virtual exhibition with HSEE with the aim of empowering environmental health engineering students	20:10-20:30

15th December 2021

Webinar Title: Operation and maintenance of water and wastewater facilities
(17:00-20:30)
Scientific secretary of the program: Prof. Mohammad Bagher Miranzadeh
Target group: Distinguished faculty members, university students and experts in Environmental Health Engineering, Environmental Engineering, Water and Wastewater

Lecturer	Topic	Time
Prof. Mohammad Bagher Miranzadeh	Opening and stating the goals of the program	17:00-17:10
Prof. Davarkhah Rabbani	Exploitation and maintenance of water resources	17:10-17:30
Prof. Davarkhah Rabbani	Operation and maintenance of water transmission pipelines	17:30-17:50
Prof. Davarkhah Rabbani	Operation and maintenance of water treatment plant	17:50-18:10
Prof. Davarkhah Rabbani	Operation and maintenance of water reservoir tanks	18:10-18:30
Prof. Davarkhah Rabbani	Operation and maintenance of water distribution network	18:30-18:50
	Break	18:50-19:00
Prof. Mohammad Bagher Miranzadeh	Operation and maintenance of sewage collection system	19:00-19:30
Prof. Meghdad Pirsaheb	Operation and maintenance of wastewater treatment plant	19:30-20:00
Dr. Ashraf Mazaheri	Familiarity with specialized water and wastewater software	20:00-20:30

16th December 2021

Webinar Title: Introduction to MATLAB software and its work environment **(17:00-18:40)**
Scientific secretary of the program: Dr. Ashraf Mazaheri
Target group: Distinguished faculty members, university students and experts in environmental health engineering, occupational health engineering, public health, HSE, environmental engineering, water and wastewater

Lecturer	Topic	Time
Dr. Ashraf Mazaheri	Opening and stating the goals of the program	17:00-17:10
Dr. Mansour Baziar	•Familiarity with various models of artificial intelligence in MATLAB •MATLAB and its application in environmental health	17:10-17:30
Dr. Mansour Baziar	Defining matrices in MATLAB and getting acquainted with graphics and charting in MATLAB	17:30-17:50
	Break	17:50-18:00
Dr. Mansour Baziar	How to save graphs for articles	18:00-18:20
Dr. Mansour Baziar	Optimization of a Grade 2 Model with Genetic Algorithm	18:20-18:40

16th December 2021

Webinar Title: The Role of Environmental Health in the Covid-19 Pandemic **(19:00-21:00)**
Scientific secretary of the program: Dr. Ashraf Mazaheri
Target group: Distinguished faculty members, university students and experts in environmental health engineering, occupational health engineering, public health, HSE, general practitioner, occupational medicine and social medicine specialist

Lecturer	Topic	Time
Dr. Ashraf Mazaheri	Opening and stating the goals of the program	19:00-19:10
Dr. Hamid Reza Shamsollahi	The role of environmental health in the transfer and management of COVID-19	19:10-20:00
Dr. Masud Yunesian	Necessary and unnecessary measures in the management of COVID-19 pandemic	20:00-21:00

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Environmental Health

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The Role of Environmental Health in the Prevention and Control of Diseases (with Emphasis on COVID-19)

Fin Garden

The Role of Environmental Health in the Prevention and Control of Diseases (with Emphasis on COVID-19)

Oral Presentations

Promoting Preventive Behaviors of COVID-19 Spread in Dormitories and Student Centers: A theory-based educational intervention

Yaghoub Hajizadeh [1], Mohammad Sharif Hosseini [2], Seyed Alireza Babaee[1*]

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[2] Department of Occupational Health and Safety, School of Public Health, Qazvin University of Medical Sciences, Qazvin, Iran.

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Abstract

COVID-19 has spread globally and swiftly with major impacts on health, economy, and quality of life of communities. New coronavirus spreads mainly from person to person. The best strategy to deal with the infection is prevention aimed at reducing transmission in the community. Public places (such as student dormitories) play an important role in the spread of the virus. Adopting preventive behaviors among the residents of these places is very important in managing and controlling the disease. This experimental study was performed on 100 dormitory Student covered by two dormitories who were randomly divided into experimental and control groups. The data collection tool was a researcher-made questionnaire, including demographic characteristics, knowledge, Health Belief Model constructs, and performance measurement that were completed before and one month after the educational intervention by the experimental and control groups. The training program was held in 4 sessions of 50 to 55 minutes in the hall of Dormitory. The collected data were analyzed by SPSS 26 statistical software using Chi-square, independent t-test, paired t-test. Results showed that before the intervention, there was no significant difference between the experimental and control groups in terms of knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived self-efficacy and performance($p>0.05$). But the one months after the intervention, the experimental group showed a significant increase in all of the constructs of HBM compared to the control group ($p<0.05$). The results showed that Health Belief Model based education has a positive impact on the COVID-19 Preventive Behaviors among Dormitory Students.

Keywords: Coronavirus, COVID-19, Health Belief Model, Preventive Behaviors.

Oral Presentation

Safe methods of water treatment in Covid-19 pandemic conditions in areas without centralized treatment system

Samaneh Dehghan[1], Fatemeh Mortezazadeh[2], Narjes Yaghoubi[2*]

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Abstract

One of the most important challenges in most developing countries is the protection of water resources against pollution. Given the prevalence of Covid-19 in the world, the presence of viruses in water and wastewater should be carefully studied to determine appropriate approaches to remove them in the treatment process, especially in the water cycle. Due to the need for all communities to have safe drinking water, especially communities without efficient treatment facilities, in this study, safe methods of water treatment in the pavilion of Covid-19 in areas without centralized treatment system have been investigated. The present study was a narrative review. Articles reviewed by searching for articles published between 2000 and 2021 in science direct databases, PubMed, Google scholar, Springer, using the keywords water treatment, Covid-19, SARS-CoV-2, Covid-19 pandemic, decentralized treatment system were obtained. Since clean water is the most important source of fighting infections, immediate action is needed to ensure safe water supply in communities without a centralized water treatment system. The new coronavirus is not resistant to disinfection processes, so conventional disinfection methods, such as the use of an appropriate dose of chlorine, are recommended to inactivate SARS-CoV-2 and emphasize that ideal doses of residual chlorine remain. Carefully adjusted for the distribution system. In cases where a centralized water treatment system and piped water supply are not available, high-performance ultrafiltration or nanofiltration processes, sunlight in turbid water, ultraviolet radiation, and an appropriate dose of free chlorine for water treatment are recommended.

Keywords: Water Treatment, Covid-19, SARS-CoV-2, Pandemic, Decentralized Treatment System

The effect of COVID pandemic on ambient air particulate matter of areas with different socio-economic status: a case study of Tehran

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Abstract

The outbreak of sever acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has indirectly had both positive and negative effects on the environment, especially in terms of air quality. The aim of our study was to determine the ambient air quality in Tehran by comparing PM2.5 and PM10 levels recorded at 22 air quality monitoring stations during the outbreak (20 February to 2 April 2020) with the same period last year (20 February to 3 April 2019). The average concentrations of PM2.5 and PM10 in the first period were significantly higher and increased by 20.5 and 15.7% in the first month of the outbreak (20 February-19 March 2020) compared to the same period last year, respectively. For the New Year holidays (from late March to early April), we observed an increase in the average concentration of PM2.5 and PM10 for 23.5 and 20.0%, respectively, compared to the Nowruz holiday in the previous year. The results showed that the concentration of particulate matters in both stations (Region 2 and Shahabad), which are in the highest and lowest socio-economic status, have increased. Of course, this rate was higher in the station of region 2 with the highest level of socio-economic status. Uncertain reactions to the pandemic, including the non-closure of administrative centers and in particular the recommendation to maintain social distance by reducing the use of public transport, have worsened Tehran's ambient air quality. Due to the significant association between the lethality of Coronavirus 2019 and exposure to outdoor air pollution, an increase in air PM2.5 during this outbreak may increase SARS-CoV-2 mortality.Crises such as this epidemic provide an opportunity to assess the direct / indirect effects of environmental policies and socioeconomic factors on pollutant emissions and air quality.

Keywords: SARS-CoV-2, Ambient air quality, SES, Socioeconomic Status, Tehran

The Role of Environmental Health in the Prevention and Control of Diseases (with Emphasis on COVID-19)

Posters

Evaluation of the Observance of Health protocol of Bakeries during the Corona Outbreak in Saeedieh town located in Islamshahr city (cross-sectional study)

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Abstract

Bread is a valuable and cheap food that plays an important role in providing the required energy. Bread is also important from an economic and health point of view. In terms of health, bread can cause some diseases and chemical and microbial contamination in society. Observance of hygienic points in bakeries such as using brightly colored robes, having a health card, having soap in the bakery and being aware of the transmission of intestinal parasitic diseases, having soap and a personal towel are necessary. Typically, these tips are in units. Small is not observed and in addition to the contaminants that are unintentionally present in these units, the prepared breads are generally undercooked and do not have the necessary digestion and absorption. According to the issues and the importance of bakery health, the present study was conducted on the health of bakeries in part of Islamshahr in 1400The method of the present study is field and to check the health status of bakeries, the form of Article 13 regulations was used. Factors such as lack of mask, cape, lack of baking soda in bread, cleanliness of the bakery environment, etc. were investigated and recorded. Then the data were analyzed using the form of Article 13 regulations.The form of Article 13 regulations was used to do the work.The results of this study showed that 41.5% of the bakeries studied use baking soda in the preparation of bread, so the need for training programs in this area for bakers who are less knowledgeable is proven. The ventilation and lighting of the bakeries are moderate and 32.5% of the bakeries observe personal hygiene and the health condition is poor. There is also a positive and significant relationship between the health status of bakery spaces and the quality of bread produced.This study showed that the health status of the bakeries in Islamshahr is poor. The personal hygiene of the employees, such as wearing masks, robes and having a health card, was poor. According to the results, most of the bakery problems in Islamshahr were related to personal hygiene. For example, 62.5% of bakers did not have a health card. Also, 67.5% of workers did not have a cap when baking bread.

Keywords: Bakery, Health Protocol ,covid19, Eslamshahr

Poster

The survey of medical waste management in Torbat-e-Jam clinics with the approach of the epidemic effect of cov-19 infectious disease in the first six months in 2021

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Abstract

Background: Health-care solid wastes management is one of the most important issues in solid waste management in each community due to its undesirable effects on human health and environmental. The aim of this study was survey of Health-care solid wastes management in Clinics of Torbat-e-Jam and presentation of improvement approaches.

Methods: This cross- sectional study was conducted in Clinics of Torbat-e-Jam in 2021. The total amount of waste produced in clinics was measured for three months. Waste management pattern was carried out based on a checklist extracted from Ministry of Health and Medical Education. Excel software was used to data analysis.

Results: The total mean of wastes generated in studied clinics were 658.9 kg/d, including domestic waste (397.6 kg/d) and hazardous waste (261.4 kg/d). The highest amount of hazardous wastes were related to operating rooms with 32.9 kg/d. Quantity analysis of total clinics waste showed that food wastes (25%) comprises the highest weight. The status of the waste management practices was determined as average.

Conclusion: The results of this study showed that despite the segregation of clinics wastes, the amount of hazardous wastes were higher than guideline values. Therefore, more attention of the authorities and the correction of clinics waste management are required.

Keywords: Health-care waste, hazardous waste, clinics,cov-19, Torbat-e-Jam

Novel Coronavirus and the Wastewater Treatment Plants Workers: A discussion

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Abstract

Following the emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the world has faced a horrifying pandemic scenario that causes severe respiratory infections. Although it is believed that SARS-CoV-2 is mainly respiratory in nature and is transferred from person to person through exposure to respiratory aerosol/droplets from infected patients; however, currently has been reported that both viable SARS-CoV-2 and fragments of viral RNA can be transmitted through feces and other body excretions of infected people, such as urine and saliva, to the sewage collection network and eventually to wastewater treatment plants (WWTPs). Confirmation of the presence of SARS-CoV-2 in wastewater raises the question of transfer of SARS-CoV-2 through wastewater, particularly in WWTPs, because workers at WWTP can be among the most susceptible groups to expose to SARS-CoV-2. SARS-CoV-2 RNA in wastewater could be a health concern for workers at WWTPs and poses the question of the possible risk of transmission of this virus by wastewater. Information and documents on the persistence and the state of SARS-CoV-2 in raw wastewater and subsequently WWTPs are critical, specifically to understand the potential risks to exposed populations because the wastewater treatment process requires the participation of a lot of workers, operators, transporters, and engineers. The data indicate the need for additional studies on the survival time of the virus under various environmental conditions in WWTPs, as well as the efficiency of individual protection methods.

Keywords: COVID-19, Wastewater, WWTPs, Workers, SARS-CoV-2

Perspectives of Iranian Environmental Health Strategies and its Challenges against COVID-19: A discussion

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Abstract

The COVID-19 is a very infectious disease and has quickly spread globally, is the cause of acute respiratory disease that has infected and killed thousands of people around the world. Environmental health professionals are the main key to implement preventive measures against COVID-19 and it is necessary for controlling the disease. Environmental health challenges are a very important issue that can seriously affect the severity and duration of the COVID-19 pandemic. As the health community is exposed to a highly contagious virus hygienic practices are the simplest and most effective way to prevent COVID-19, Early in the pandemic, and the lack of organization of health scientists to develop practical and operational guidance led to the development of various guidelines on similar topics. Due to extensive and unmanaged activities, part of the time and resources were wasted. Unprofessional measures such as the unnecessary disinfection of cities, roads, and villages caused the waste of resources and their use on a low priority way in the country. Despite growing and developing medical and health technologies prior to and during the COVID-19 pandemic, special attention should be given to primary healthcare with an emphasis on environmental health. Clearly, precautions measures and social distance are binding. To effectively deal with COVID-19 and to prepare for future pandemics, health and government leaders need to take preventive policies and practical steps to provide and develop environmental health infrastructure. In order to achieve these goals, there is a need to address hygiene and health education issues that affect the health of the community, strengthen the framework of the country's health system, and use the perspectives of environmental health professionals and their guidance on preventive measures.

Keywords: Environmental health, COVID-19, Pandemic, Coronavirus, Iran

A Review of Emerging Covid-19 Disease: Investigate the effects, ways to control and treat it

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Abstract

The sudden appearance of Covid-19 shocked the people of the world. It was not long after the outbreak that the World Health Organization (WHO) declared a public health emergency situation around the world. So far, this disease has caused a lot of damage to human societies. The main injuries of Covid-19 include social and psychological injuries following the death of loved ones, as well as home quarantine. On the other hand, it has arisen during the economic crisis and the lack of household income has added to the stress. Some of these economic damage is so devastating that it takes years to repair. One of the main concerns about the new Crona virus is that as the vaccine and drugs are discovered, the virus also undergoes different mutations. It also takes several months for all the people of the world to be vaccinated. There are also people who do not trust the vaccine and are worried about its possible side effects. With that said, prevention is always better than cure, and we need to understand that Covid-19 will continue to be with us, and we need to take health protocols more serious every day, We also manage our stress with management strategies and strengthen our immune system. In order to better manage the crisis of this disease and become more aware of this disease, the authors of the article considered it necessary to study valid scientific documents and articles and extract useful and efficient content.

Keywords: Covid-19, World Health Organization, Emergency Situation, Health protocols, prevention

Poster

Coronavirus disease in developed and developing countries

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Abstract

Worldometer statistics show that Corona's situation in developed countries is more critical than other countries. It seems that the parameters included in this global report need further investigation. In this study, the reported parameters based on population and income of countries until the end of April 2020 were considered. The statistics show the number of total Coronavirus cases, deaths, and recovered cases in high-income countries is more than the sum of total cases in middle and lower-income countries. The total screening test in high-income countries is more than other countries that affected subsequent total cases, deaths and recovered number reports. Based on the fact that middle and low-income countries may not have been successful in case detection using diagnostic tests compared to developed countries, optimism about recovery cases and fewer deaths are undoubtedly encountered in underdeveloped countries. It is important to note that even if the pandemic COVID-19 is controlled, the presence of undiagnosed cases can keep the transmission cycle active for a long time.

Keywords: Pandemic, COVID-19, economic status, mortality, screening

Challenges and role of environmental health to assure health and safety of population during pandemic COVID-19 crisis

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Abstract

The COVID-19 pandemic demonstrated the importance of the role of healthcare workers, especially environmental health professionals, in the management of this crisis around the world, who played an important role in controlling the COVID-19. Nevertheless, as with previous disasters, their intervention has more focused on emergency work and therefore their skills and competencies have not used properly. To resolve this problem and improve efficiency in potential future pandemics, identify and discuss key roles of environmental health professionals by providing a common framework with an emphasis on protocols that can contribute to public health and safety. However, environmental health challenges and activities are an important component of public health emergency response and preparedness. There is now an opportunity to activate interdisciplinary solutions by mobilizing the environmental health workforce to support response, recovery, and resilience activities in controlling COVID-19. This article tries to emphasize the role of environmental health in ways that have a greater impact on supporting the health and safety of the people.

Keywords: Environmental health, COVID-19, Public health, Preparedness, Response

Detection of SARS-CoV-2 in wastewater is influenced by different sampling methods

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Abstract

Wastewater-based epidemiology (WBE) approaches to detect SARS-CoV-2 in municipal wastewater can provide unique information on the incidence or prevalence of COVID-19 in community. However, there are several technical challenges coupled with sewage sampling for SARS-CoV-2, including intermittent shedding of viruses, sampling time, volume, and frequency. Sampling schemes thus may need to be tailored to reach out highly sensitive, accurate, and reliable results. Herein, we compared the accuracy and threshold cycle (Ct) profiles of SARS-CoV-2 in Moore swabs, composite (16-h), and grab samples taken from sewage manholes (n=17) at the Middle Eastern city of Tehran, Iran, on two occasions (November 2020 and May 2021). Samples were concentrated by polyethylene glycol precipitation and the corresponding Ct values for CDC 'N' and 'ORF1ab' assays were derived by means of real time RT-qPCR. Overall, the Moore swabs performed equal to samples composited over 16 h for qualitative monitoring, and 34/34 (100%) were positive for SARS-CoV-2 according to at least one of the assays. The 'N' assay showed the highest detection frequency as compared to 'ORF1ab'. The mean Moore swab Ct profiles were more consistent with 16 h composite sampling as compared with corresponding grab samples, providing hints as to the best sampling protocol to adopt when planning a sewage monitoring campaign particularly under WBE. Furthermore, our analyses on local differences showed somewhat higher virus copy numbers in the southern areas. The experimental design of this study revealed that the Moore swab and composite samples are more sensitive than grab samples, suggesting that the collection of grab samples may be inappropriate for characterizing total number of viral RNA copies in sewage samples. Given the transiently presence of human host-restricted infections such as SARS-CoV-2 and the simplicity and affordability of Moore swab, the method is well suited for disease surveillance in resource poor regions struggling with limited capacity for clinical testing.

Keywords: SARS-CoV-2, Wastewater-based epidemiology (WBE), Sampling method, Moore swab, Composite, Grab

Presence of Coronavirus in raw wastewater and air of wastewater treatment plant

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Abstract

Fecal shedding of SARS-CoV-2 from COVID-19 patients and presence of the viral RNA in wastewater as a result of COVID-19 outbreak have extensively been reported. Some wastewater treatment plant processes generate aerosols which have the potential to transmit pathogenic microorganisms and may be a health risk for exposed individuals. We analyzed the presence of viral RNA of SARS-CoV-2 in raw wastewater of two wastewater treatment plants in Isfahan and air samples of wastewater treatment plant using RT Real-time PCR. SARS-CoV-2 was detected in 9 of 24 (37.5 percent) wastewater samples with a concentration about 104 genomic copies L-1. The viral RNA was also detected in 40 percent (6/15) of air samples. Detection of SARS-CoV-2 in air samples of wastewater treatment plants demonstrated that wastewater aerosols may contribute to the transmission of viral particles to wastewater treatment plants workers. However, due to the lack of data on survival of SARS-CoV-2 in wastewater and its fate in aerosolized state, more research is needed to determine the importance of wastewater in transmission of COVID-19.

Keywords: Wastewater, Bioaerosol, SARS-CoV-2

Poster

Factors affecting the improvement and control of COVID_19 pandemic from an environmental health perspective

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Abstract

COVID-19 disease is one of the most contagious diseases of the 21st century, which has spread dramatically in the world since the end of December 2019. Environmental health, whose role is well known, has been associated with the COVID-19 epidemic through various direct and indirect routes. Modern lifestyles, climate change, environmental degradation, exposure to chemicals such as endocrine disorders, and exposure to psychological stressors negatively affect human health. As a result, many people are exposed to a pandemic with a weakened immune system due to environmental health hazards. In addition, persistent pandemics have been associated with indoor and outdoor air pollution, noise pollution, food security, and plastic pollution issues. Inadequate infrastructure, poor wastewater management, and unequal social vulnerability suggest a greater association between environmental health and COVID-19. Insufficient preparation of the health system, postponement in quarantine and social distancing, the unpreparedness of health instructions, lack of personal protective equipment and disinfectants, delay in starting necessary research activities, unnecessary disinfection of polluted surfaces, unknown transfer mechanisms, inadequate ventilation of hospitals, un-implementation of health guidelines, mismanagement of wastes, and the problem in transportation system were the major environmental health challenges of the COVID-19 epidemic in Iran. In order to effectively deal with the long-term presence of the coronavirus, the authorities, while formulating policy, take comprehensive preventive and sustainable measures to establish and develop environmental health infrastructure, and the people must be seriously and consciously involved in the implementation of programs.

Keywords: COVID-19, Environmental Health, Personal Protective Equipment, Preventive Measures.

Hospital Air Quality in COVID-19 pandemic: An insight into airborne bacterial and fungal diversity

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Abstract

The advent of Covid-19 pandemic has affected the lives of millions. Rising concerns about the spread of the virus in confined spaces due to meteorological factors have further reinforced the need to improve indoor air quality. The aim of this study was to determine the quantity and quality of bioaerosols in the air of different wards of Hajar Hospital in Shahrekord. Sampling of bioaerosols using a single-stage Anderson sampler with a flow rate of 28.3 L.min-1 for 5 min on Sabrod dextrose agar (SDA) medium and 2 min on agar triptych (TSA) was performed for bacterial and fungal bioaerosols, respectively. The predominant genera of detected bacterial bioaerosols in the air of different wards of Hajar Hospital were Staphylococcus, Bacillus, Pseudomonas and the main fungal species were Cladosporium, Alternaria and Yeast, respectively. The highest mean concentrations of bacteria and fungi were observed in the respiratory clinic and ICU, respectively. Monitoring the microbial quality of indoor air, especially during the COVID-19 pandemic, is crucial to control nosocomial infections. Transmission of pathogenic bioaerosols can be prevented by observing the main measures of infection control, including wearing a mask and hand hygiene and environmental health.

Keywords: COVID-19 pandemic, Airborne bacteria, Airborne fungi, Hospital

Poster

Comparison of observing the health protocols of corona virus in the banks of behshahr city (Descriptive analytical study) in 1400

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Abstract

Coronaviruses are a large family of viruses that can infect animals and humans.Many of the known corona cause a range of respiratory infections in humans.From colds to more serious illnesses such as middle east Respiratory Syndrome and acute respiratory Syndrome.The newly discovered coronavirus is the cause of covid 19 infection. The newly discovered coronavirus causes covid 19 infectious disease.The Emerging virus and its resulting disease were unknown until the recent outbreak in December 2019 in Wuhan,China.This research is of descriptive-analytical type and is applied in terms of purpose.The statistical population of this research is Behshahr cite banks from Mazandaran province and 27 banks of behshahr city have been selected from different areas of this city.Using the prepared checklist and after visiting the banks mentioned in the research,statistics and results have been prepares which will be heard and commented on in the following pages.Findings show that the level of compliance with health protocols and procedures in privat banks in behshahr city has been more than state-owned banks.Other electronic methods for eliminating cash exchanges,which is one of the most important reasons for the spread of coronavirus,are much more than other protocols.In the process of preventing the entry of clients and suspicious employees,the least attention has been paid to the Symptoms of Covid 19.The results of this important research in the banks if behshahr city indicate that the observance of health protocols such as wearing a mask and using personal belongings at the time of referral and observing the social distance of at least 1 meter has been well observed in most banks.

Keywords: Covid 19, Bank, Behshahr city

A review of air pollution and its effects simultaneously with the prevalence of COVID-19 in Iran and the world

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Abstract

The COVID-19 epidemic has infected millions of people and killed millions worldwide. Air pollutants can increase the risk of viruses damaging the respiratory system. While the severe health effects of COVID-19 are still a top priority, it is not yet clear how the epidemic could affect other factors, especially air pollution. Therefore, the present study was conducted to investigate air pollution and its effects simultaneously with the prevalence of COVID-19 in Iran and the world. This study is a review. The articles were first selected according to the title related to the research objectives, then the abstract of the study articles and related articles were separated. Finally, after a thorough review of the articles, researches related to the objectives of this study were selected. A total of 294 review sources were selected and finally 75 sources were selected. Air pollution in USA, South Korea, UK, Italy, Bangladesh, Iran, India, China, Chile, Pakistan, Taiwan, Germany, Egypt, Mexico, Singapore, Israel, Japan, Poland, Spain, Canada, Nigeria, Morocco and New Zealand all COVID-19 has been investigated. Particulate matter(PM), nitrogen dioxide(NO2), sulfur dioxide(SO2), ozone(O3), carbon monoxide(CO) and volatile organic compounds(VOCs) are among the pollutants studied. Most studies have been done on the Asian continent and little research has been done in Africa and the ocean. During the lockdown period, the reduction of most air pollutants except O3 has been observed in many countries, but after the resumption of work activities and the abolition of lockdown, the pollutants have increased again. Therefore, lockdown policies can be introduced as a suitable option to reduce air pollution. Also, a significant relationship between PM2.5, PM10 and NO2 with the risk and mortality of COVID-19 shows that air pollution increases the prevalence of this disease. Air pollution control is essential to reduce the COVID-19 epidemic.

Keywords: Air Pollution, COVID-19, Effects, Iran, World

Environmental health measures and recommendations during the COVID-19 outbreak: A review

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Abstract

Sustainable environmental health management is critical to reducing viral infections and other diseases. Policies that promote sustainable development will quickly benefit the public. This article tries to emphasize the importance of environmental health measures and recommendations during the outbreak of Covid-19 by reviewing it. Scientific articles through electronic tools by searching databases PubMed, Scopus, Web of Science, Google Scholar, Magiran, Scientific Information Database (SID) with the keywords Covid-19, ventilation, Air pollution, waste management, environmental factors, Water and wastewater, and SARS-CoV-2 and their Persian equivalents were collected. From a large number of studies, this study collects, presents, and meets data and information on environmental health measures and recommendations during the Covid-19 outbreak. The results of this study showed that the basic strategies for controlling Covid-19 are: hand hygiene, social distance, and mask use, screening and case finding, isolation, disinfection and disinfection, effective ventilation, waste management with environmental health management It is very important in reducing the prevalence of Covid-19. Controlling air pollution, environmental conditions, and monitoring wastewater and sanitary water supply have a significant impact on preventing the Covid-19 epidemic. For air conditioning, an approach based on different methods is recommended. Disinfectants should be selected and used in such a way as to avoid unnecessary contamination of the environment. Therefore, controlling environmental factors in environmental health with effective measures and recommendations plays an important role in preventing and controlling the epidemic and can minimize the economic cost of Covid-19 in areas with a high prevalence of low economic levels.

Keywords: Covid-19, physical distancing, waste management, Environmental Health

The extent of compliance with health protocols in real estate consultants in Chamestan region and the impact of corona holidays on the economy of these families or their employment

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Abstract

In the first few months, the corona outbreak and the quarantine period damaged many businesses, and now the number of people infected with the disease has increased from the first months, and some believe that some cities should be closed again altogether. In terms of the impact of Corona on the business and household economy, part of the value added generated comes from the service sector. The service sector is affected by the disease and the closure again causes serious damage to the service sector; Because the service demand sector is facing problems, and this issue causes some businesses to face serious problems in practice. The purpose of this study is to investigate the extent to which health protocols are observed and the impact of the corona holiday on the economy of these families or their employment. This study is a descriptive analytical-survey type and applied in terms of purpose. The statistical population of this research is 12 real estate consultants in different and high traffic areas of Chamestan city. This research has been done for 6 consecutive days by presenting a questionnaire to each of the real estate consultants and then collecting and analyzing the obtained data and information obtained from objective observations and measurements from each of these places. The findings of the first hypothesis of the research showed that the health protocols in the days of Corona are not followed by most of the real estate consultants of Chamestan city. The findings of the second hypothesis of the research showed that the corona holiday has negative effects on the economy of the families of real estate consultants in Chamestan city. The results of this study showed that health protocols in the days of Corona are not observed by most real estate consultants in Chamestan and also Corona holidays have negative effects on livelihood and household economy.

Keywords: Corona, economics, health protocols, holidays

Poster

Study of the Status of Observing the Protocol (Mask, Social Distance, etc.) in the Tehran City's Pharmacies

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Abstract

The corona virus has had many consequences. Among these consequences has been the loss of health, especially social health. Due to the basic nature of the pharmacy and the pharmacy staff as a health care provider, the health and safety of this range of people is essential. Therefore, it is important to evaluate the precautionary guidelines for public pharmacies. In this article, the status of observing the protocol (mask, social distance, etc.) in the city's pharmacies has been studied. This article is a practical study. It is also a descriptive survey in nature. In terms of the nature of the collected data, it is a quantitative research and in terms of the method of data collection, it is a field study in which a researcher-made questionnaire will be used to collect the research data. In terms of time, the present article is a cross-sectional study that was conducted in the second six months of 1399. Spatially, the present study is limited to city pharmacies. The study population consists of all employees of pharmacies in the city during the research period. The results show the confirmation of the effect of adhering to health protocols in reducing the risk of developing Quid 19 disease.

Keywords: Protocol, Mask, Social distance, Pharmacy, Corona

Corona Prevention Planning in the Kashan Central hospitals

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Abstract

Hospitals were the most important centers of covid19 expansion during the corona epidemic. Therefore, this study was conducted to identify and prioritize internal and external factors affecting corona control in Kashan central hospitals. Based on the swot matrix, effective internal and external factors were identified, prioritized and weighed, then according to available resources, strategies and corrective solutions were presented by health experts. After identifying 53 internal factors and 28external factors, weighting was performed. The final strategy for implementing COVID19 disease control in the studied hospitals was the Conservative Strategy. Finally, six control strategies presented. Identifying and evaluating the factors affecting the corona controlling management in hospitals by swot method and presenting strategies to control this disease by QSPM method, have an important role in improving the health status of hospitals during epidemics.

Keywords: COVID-19, Environmental Health, Hospitals, Research Design

Corona Crisis Health Management in the Rolling Steel Industry

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Abstract

Industries and industrial environments, due to the proximity of people at work, are considered as one of the highest-risk places during the COVID-19 pandemic. Thus, planning with regard to health concerns can decisively help in infection control and continuity of businesses during the pandemic. This study was conducted to evaluate the control measures of Covid 19 using the matrix of strengths, weaknesses, opportunities and threats (SWOT), in one of the steel industries in the north of Isfahan province. After a literature review and field surveys, all internal factors (IFE) and external factors (EFE) affecting the spread of the disease were identified, listed, and then prioritized and weighted. Finally, based on the sum of IFE and EFE scores, and determining the final SWOT matrix, disease prevention strategies in the rolling steel industry and corrective measures related to each strategy were proposed. The results of this study showed a high score of internal strengths against external factors (EFE) of organization, which refers to the strong internal management of the organization. Therefore, based on the results, the establishment of an optimal and coherent health management system has an effective role in corona planning and preventive decisions in the rolling industry.

Keywords: COVID-19, coronavirus, SWOT analysis, work environment

Describing the reasons why people do not use masks in the COVID 19 pandemic crisis from the perspective of health experts A qualitative study

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Abstract

Although various methods have been proposed to prevent Covid 19 disease since the beginning of the pandemic, and despite the discovery of the vaccine, the use of facial masks is still known to be an effective and efficient method. However, having a clear understanding of the determinants of preventive behaviors, especially the use of masks in society, due to negligence and ignoring this, seems necessary. Therefore, this study was conducted with the aim of \"Identifying the causes of non-use of masks by people in the coronavirus pandemic in Kashan and Aran o Bidgol\".This study was performed by a qualitative method and content analysis. Purposeful sampling was performed with the participation of 15 health experts from Kashan and Aran o Bidgol cities. In this study, individuals with maximum diversity in terms of age, sex, level of education were selected. The main method of data collection was semi-structured interviews. Interview texts were written, extracted, and divided into meaningful units. To validate, confirm the results and accuracy of the research, the criteria of data validity or Credibility, accuracy and reliability of data, verifiability, reliability, and transferability were used. In the process of data analysis, 40 basic concepts with the same characteristics were classified into 6 subcategories and then based on common features at a more abstract level were transformed into 3 main levels. The research findings were classified into 3 main categories: individual factors, interpersonal factors, and environmental factors.: The results of this study showed that in addition to individual factors such as people's knowledge and beliefs about preventive behaviors, interpersonal factors, abstract norms, and economic and environmental factors can also affect the use of masks in society that support Makes government organizations necessary.

Keywords: COVID 19, mask, Respiratory Protective Devices, public health

Poster

Investigation of the observance of health protocols and the interventions of environmental health inspectors in the prevention and control of Covid-19

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Abstract

In the last one or two years, the epidemic of Covid-19 disease has affected many families in the world and has an adverse effect on the economic, social and vital infrastructure of the country. From the beginning, environmental health engineers in disasters and crises have been among the first group present on the scene and have always played a key role in providing control, prevention and primary health care measures. This research is a descriptive-analytical cross-sectional study that was conducted in eight cities of Zanjan province from the beginning of winter of 1399 to the end of summer of 1400 solar years. Data related to the observance of health protocols in public places and centers of preparation and distribution, cooking and supply and sale of food in the province (20,600 units) were collected by the checklist. Then, to examine the effect of intervention measures of environmental health inspectors in the form of face-to-face training to managers about the symptoms of the disease and its transmission methods, methods of preventing the spread and disease, the need to maintain personal hygiene, use masks and gloves and deal with The violators and the culprits were introduced to the judicial authorities and the unsanitary centers were closed in order to prevent the spread and development of Covid-19 disease. The results showed that the observance of health protocols in the centers of preparation and distribution, cooking, supply and sale of food, except for personal hygiene items, was more than public places. Among all health protocols, the use of masks was the most observed with 91%. Among the centers of preparation and distribution, cooking, supply and sale of food, reception halls and bakeries had the lowest and highest levels of hygiene protocols, respectively. Among public places, government counters had the lowest and prisons had the highest compliance with health protocols. Among the cities, Soltanieh followed the health protocols more than other cities. The results also showed that according to the ways of transmission of Covid-19, compliance with health protocols is highly related to preventing the spread of this contagious disease. The study of environmental health interventions showed that the observance of all protocols in the summer quarter was much higher than the spring and winter quarters.

Keywords: Environmental Health Inspectors, Health Protocols, Covid-19.

Epidemiology study of corona virus in Neyshabur in 1399

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Abstract

Coronavirus disease-2019 (COVID-19), which started in Wuhan, China, in December 2019 and declared a worldwide pandemic on March 11, 2020, is a novel infectious disease that causes respiratory illness and death. The purpose of this study was to describe epidemiology and clinical features of coronavirus disease 2019 in Neishabour in 1399. This study was performed in Neishabour in 1399 based on collecting patients' information (gender, age, occupation, month of referral, age group, place of residence, education, etc.) And the data was analyzed using Excel software version 2016. From April to March 2016, 11,665 cases of covid 19 were diagnosed in health centers in the city, of which1898 were hospitalized. Most of the cases were in the age group of 30 to 59 years, of which 54.25% were male and 45.75% were female, and in total, based on the total number of patients,3.6 % of the cases resulted in death. Chronic respiratory diseases, diabetes, hypertension and cardiovascular diseases were the most common underlying diseases. The results of this study showed that male gender, place of residence, contact with the sick person, travel, attendance at gatherings, older age and underlying diseases can be affected by the risk of infection and the risk of death in Covid 19 patients. It is very important to pay special attention to elderly male patients with underlying diseases.

Keywords: Coronavirus, COVID-19, epidemiology

Evaluation of plastic waste status during COVID-19 epidemic: A review study

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Abstract

During the Covid-19 epidemic, the production and use of plastics for personal protective equipment and packaging, especially food packaging, increased worldwide. Comprehensive management of plastic waste seems to be overshadowed by the critical situation and has received less attention, especially in the early stages of the epidemic in developing countries. Improper use of plastics and mismanagement in the disposal of the wastes will face the world with serious environmental crises. In this paper, the impact of the epidemic on plastic users' behavior and laws to combat the use of disposable plastics, disinfection methods, and the recommendations for optimal use of plastic waste with the help of artificial intelligence and new technologies have been studied. In addition, policy-making guidelines for safer methods and sustainable technical solutions are provided, along with educating people to prevent plastic from turning into a high-performance protector into pollutants and protecting the environment.

Keywords: Mask, COVID-19, Plastic

Approaches and Monitoring role of environmental health in control of Covid-19

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Abstract

This study examines the approaches and supervisory role of environmental health departments of medical universities in coronavirus control in Iran and the results of other environmental health studies related to COVID-19 in other countries. The study method is in two parts: evaluation and systematic review of articles related to environmental health on the subject of COVID-19 and evaluation of the effectiveness of the actions of environmental health experts of the health departments of medical universities in the COVID-19 program.The results of the study showed that less than 3% of studies refer to COVID-19 by environmental release and transmission from the environment to other areas related to Covid disease and also 70% focus of COVID-19 environmental health studies related to intensive care units. (ICU) Patients with COVID-19, care centers, concentration centers and exposure to environmental pollutants (inhaled air, sewage, contact surfaces, waste, etc.).Identification and environmental monitoring of COVID-19 in air, water resources and environmental levels, control of ventilation process and registration of employers in the health system, respectively, have been the least effective in the monitoring programs of environmental health experts. In contrast, the necessary controls in health practices, including compliance with health protocols (use of masks and personal protective equipment) and monitoring of disinfection of surfaces, respectively, have the highest effectiveness in monitoring.

Keywords: COVID-19 , environmental health, Monitoring

Poster

Investigation of the presence of coronavirus in raw and treated wastewater of Hamadan City

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Abstract

SARS-Cov-2 as a new human coronavirus has become a major global health concern, which can lead to severe respiratory infection and increased mortality in humans. Sewage is considered as one of the ways for transmission of this virus. Therefore, monitoring of this virus in sewage is very effective in determining the necessary and timely strategies to prevent further transmission of this virus through sewage and to cut the transmission chain of this virus. This study aimed to investigate the presence of coronavirus in the wastewater of Hamadan in the wastewater outlets of Sina Hospital (hospitalization and treatment center for COVID-19 patients), sewage collection network, inlet, and outlet of the wastewater treatment plant in Hamadan. Sewage sampling was performed by continuous sampling for seven months between August 26 to March 13, 2021. Molecular rapid viral testing was used to perform coronavirus diagnostic tests. The results showed that three samples from seven samples of incoming sewage (42.8%), zero samples from seven samples of aeration pond and seven samples of the effluent (zero percent), six samples from 24 samples of the sewage collection network (25%), and five of the six samples of Sina Hospital effluent (83.3%) were positive for the presence of coronavirus. Coronavirus was present in the effluent of hospitals under the care and treatment of patients with COVID-19 infection. This virus was obviously present in and due to the exposure of wastewater treatment plant staff, cleaners, and other wastewater-related service personnel, it is essential to consider the necessary measures to prevent further transmission of this virus to the healthcare staff. It can also be concluded that with the increase in the number of patients with COVID-19, a load of this virus in the sewage increases, thus lead to an increase in the risk of infection in the people exposed to municipal sewage.

Keywords: Coronavirus, COVID-19, Wastewater, Hamadan

Study and mental health status of Kashan families during the Corona epidemic in 2021

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Abstract

Coronaviruses were first identified in 1960. Studies have shown that the epidemic of this disease is associated with mental health problems and can disrupt the normal life of people and finding solutions and interventions to reduce these effects is essential. Therefore, this study was conducted to investigate the mental health status of Kashan households during the corona epidemic. The present study was a descriptive-analytical study. In this study, ten comprehensive health service centers and 400 people from Kashan households were randomly selected. Then 40 families from each center were selected in 4 clusters of 10. Then one household member was randomly selected and the general health questionnaire was completed online. The instruments used in this study included a general health questionnaire and demographic information. Independent t-test and analysis of variance were used to determine the relationship between general health score and different areas of general health with contextual variables. The mean and standard deviation of the scores of physical symptoms, depressive symptoms, social dysfunction and general health status during the corona epidemic were calculated based on the underlying variables including age, sex, medical history, daily stress, etc. Also, no significant relationship was found between the scores of social dysfunction, physical symptoms, depressive symptoms and general health status with the variables of mental illness history, sports activities, occupation and education. The results of this study showed that the corona epidemic has reduced the mental health of households and people with poor economic and social status have less mental health than other people. Women also have lower mental health than men.

Keywords: Coronavirus, Mental Health, Kashan

Revision in solid waste management strategies during the Covid-19 pandemic in Iran

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Abstract

Preventing the spread of the Covid-19 epidemic and imposing restrictions on business activities, travel, and increasing the presence of people in homes has significantly affected the characteristics of waste generated and how it is managed. Revision of waste management strategies is crucial for development and health effects, especially during the Covid-19 pandemic. In developing countries such as Iran, lack of attention to proper management of waste contaminated with sars-cov-2 increases the chances of transmitting the virus and spreading the Covid-19 disease. The present study survey the possible problems related to the non-compliance of waste management programs before the outbreak of Covid-19 disease with new changes in waste characteristics in the country and presents and examines the policies needed to address these problems. Increased use of personal protective equipment has increased the entry of plastic waste contaminated with Corona virus into the municipal waste stream. Also, due to changes in people's habits, the use of disposable plastics has increased. Therefore, in order to protect the health of people and the environment, the use of waste incineration and pyrolysis technologies is appropriate. Due to the different characteristics of waste generated in the country compared to the period before the outbreak of coronavirus in Iran, waste management programs need to be reviewed and updated to minimize the adverse effects of this pandemic.

Keywords: Covid-19 Pandemic, Sars-cov-2, Solid Waste, Waste management strategies, Iran

Bibliographic and content analysis of systematic review and meta-analysis articles in the field of environmental health and Covid-19

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Abstract

The aim of this study was to provide a bibliographic and content analysis of systematic and meta-analytical review articles in the field of environmental health and Covid-19. The present study is applied in terms of purpose and Scientometrics in terms of type, which has been done using content analysis and retrospective bibliometric analysis. In order to retrieve systematic review and meta-analysis articles related to this topic, keywords related to this topic were searched in PubMed, Scopus, and WoS databases. After removing duplicates, 26 articles remained for further review. The abstract and full text of these articles were read. Bibliographic information of these articles including publication date, journal (name, journal evaluation indicators), number of citations and citation density were analyzed. In order to analyze the content of these articles, the full text of retrieval articles and information related to the subject, the study population and the number of articles included in the study and the searched databases were extracted. Systematic review and meta-analysis articles aim to evaluate, select and synthesize quality studies in a specific field to provide more accurate results. Therefore, reviewing these articles can provide a high quality of evidence, but also make the decision to review the original studies easier and faster.

Keywords: Environmental Health, Covid-19, Bibliographic Analysis, Content Analysis, Systematic Review, Meta-Analysis

Science Mapping of Environmental Health and COVID-19 Researches using Words Co-occurrence Analysis

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Abstract

The purpose of this study is to analyze subjects clustering analysis and science mapping of published research to identify the current state of sciences in the field of environmental health and COVID-19 in Scopus. The present study is applied in terms of purpose and scientometrics in terms of type, which has been done using the library method, retrospective bibliometric analysis and drawing a science map. First, a search was performed in the Advance search section of the Scopus; In this way, the keywords related to "Environmental Health and Covid-19" were searched in the keywords, title and abstract field. This search was conducted on 30 September 1400. After retrieving 2156 records related to this subject area, articles will be analyzed in terms of author, year of publication, journal, country, institution, type of article, topic and the number of citations. VOSviewer software was used to analyze the co-occurrence of words. In order to perform the co-occurrence analysis, the keywords of the articles were examined. All authors' keywords were extracted from the documents. In the next step, in order to extract the different forms of writing, the keywords are examined more carefully and the items that need to be standardized are corrected. After unifying the keywords, in VOSviewer, co-occurrence 20 was detected and finally the science map resulting from the co-occurrence of words was analyzed. The results showed that the studied keywords were divided into three clusters: school environmental health, Environmental health of healthcare spaces and public environmental health. The most frequent keywords were also identified. The results of this research can identify the subject areas with the most and the least focus on the subject area to target future research in this area.

Keywords: Environmental Health, Covid-19, Science Map, Words Co-occurrence Analysis

Assessment the Bio-Aerosols Type and Density in Various Wards of Imam Reza Hospital, Mashhad, 2020

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Abstract

Bio aerosols are airborne particles that include: pathogenic and non-pathogenic bacteria, viruses, fungi, molds, bacterial endotoxin toxins, fungal toxins, etc. The aim of this study was to determine the type and density of bio aerosols in a hospital setting The study method in this research was descriptive cross-sectional in 2020. The target population includes: intensive care unit (ICU), angiography operating room, microbiology laboratory, hospital tuberculosis diagnosis laboratory. The highest fungal density was observed in the microbiology laboratory (technical room) 89CFU / M3 and in ICU nursing station No. 1 (CFU / M3 55). Aspergillus and Penicillium species had the highest level of infection and Alternaria had the lowest level of infection. Bacterial densities were reported below the ISO 14644 standard in all sampling points. Common bacteria include Pseudomonas, Esnitobacter, Staphylococcus aureus. Factors such as: improper use of air conditioning system due to high noise and shutdown of exhaust systems number of laminar hoods and improper maintenance of heat regulation systems leads to increased fungal density in the microbiology laboratory and failure to replace air conditioning filters, overcrowding in the nursing station and the large number of patients is an important factor in achieving this result in ICU. In this study, the type and density of bio aerosols in different wards of the hospital (intensive care unit for patients with coronavirus, angiography operating room, microbiology laboratory and tuberculosis diagnosis) were investigated.

Keyword: Biological aerosols (fungal and microbial contamination), Imam Reza Hospital, Nosocomial infection

Management Strategy for Health Protocols of Kavid 19 at the Centers for Food and Public Places in Yasuj

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Abstract

Corona New Virus (NCOV-2019) is a major health crisis worldwide with potential economic impacts in modern times. The global effect of corona has been deep virus, and the most important is the threat of general health. Therefore, the overall goal of this research is to investigate the management strategy of the Kavid 19 health protocols in the provision and distribution centers of food and public places in Yasuj. This is a descriptive study that has been examined during 12 months by environmental health inspectors. The research population was all the publication and distribution of food and public places, which were operating from the beginning of the prevalence of corona. Also, in this research, the checklist tool was used to collect data. The final analysis was performed using Excel and SPSS version 22 software. The results of this study showed that disinfectant observation classes were the most valuable in the order, Halim (88%), a grocerator (85%). Also, the percentage of individual protection against different classes was observed in the largest office (98%), banks and offices (90%) and sweets (89%). With cleaning and disinfection, these factors can be reduced. The user-friendly classes of chicken and fish, counter offices (97%) and butchers, the offices (96%) have the highest values. In this research, political research (90%), coffee shop (70%) and women's hairdressers (58%) were the highest introduction to judicial authorities. Recreational gardens (93%), coffee shops (90%) and sports (85%) followed the highest sealed clock. In line with the policies of the Iranian government, the highest percentage of registration in the health system is the climate of ice cream sales (98%), restaurants and confectionery (97%) office, grilled and bank (95%). But considering that high risk groups and occupations are exposed. And the crisis of Cavid-19 in the world, the countries faced with the crisis, tried to provide better health and medical services, and important managerial decisions have been able to control the epidemic of Corona of the new virus.

Keywords: Health Protocols - Kavid 19 - Food - General Places of Yasuj

Evaluation of health performance and the role of training environmental health experts in the prevention and control of Covid 19 disease in the Environmental and Occupational Health Center of Qom city

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Abstract

Background: Due to the emergence of Corona virus, high contagiousness and its impact on people's lifestyle, the present study evaluates health monitoring and the role of expert training on compliance with health protocols in the prevention and control of Covid 19 disease in public places, trade unions, organizations, etc. in Qom. Methods: This descriptive cross-sectional study in the first six months of 1400 after expert inspections, Necessary trainings and completion of questionnaire information were performed. Then the data were analyzed using SPSS and Excel Microsoft software and the results were presented in the form of charts and tables. Results: From a total of 81157 inspections performed, observance of personal hygiene in public places, trade unions, organizations and departments, etc. 74.62%, use of personal protective equipment 71.6%, observance of social distance 74.06%, number of warnings and cases introduced to judicial authorities 1.49%, the number of sealed cases was 13.86%. There is also a statistically significant relationship was observed between the role of expert education in the control of coronavirus disease and encouraging people to follow health protocols (variables of personal hygiene before training ($P < 0.073$), after training ($P < 0.019$), use of personal protective equipment before training (< 0.058), after training ($P< 0.013$), observance of social distance before training ($P > 0.033$), after training ($P < 0.027$)). Conclusion: The results of this study showed that the rate of observance of health indicators in all the above places in Qom city is 67.41%. The role of education in increasing awareness and encouraging people to observing health protocols was considered very constructive and desirable. Since environmental health experts have shown a fundamental and effective role in controlling this disease. Therefore, this amount of index is not desirable and there is a need for the support and participation of all sections of society to deal with the next waves of the disease.

Keywords: Health Protocols, Covid 19, Health Surveillance, Education, Qom

Waste management challenges and solutions during COVID-19 Pandemic: an updated review

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Abstract

The Coronavirus from the Betacoronavirus sub-genus and is the cause of a respiratory disease known as COVID-19. This novel coronavirus began in Wuhan, China, and has now spread to all countries around the world. COVID-19 has been reported to have opposing environmental effects. The effects are intended, nevertheless, not to be constantly. However, there is a possible rise in the generation of municipal solid waste, a possible decrease in selective collection rate and, above all, the rise in the production of medical waste. The growth in medical sector waste is due to the demand for personal protective equipment (PPEs) and other single-use plastics because of rise in hospitalization rates as the infection spread. COVID-19 has had unprecedented impacts on all facets of the global society. Given the urgency of the environmental crisis, it is crucial to pay attention to how the pandemic has impacted sustainability goals, including improved waste practices. The objective of this review article is to highlight the implications of COVID-19 on plastic waste generation and waste management associated with this crisis. Searches were conducted in two databases (using keywords COVID-19, medical waste, and municipal waste), and among the published articles generally from 2019 to 2021, some were selected containing information on the municipal and medical waste management during the COVID-19 pandemic.

Keywords: Waste management, COVID-19, Medical waste, Plastics, Pandemic

Investigation of solid waste management in Iran during the epidemic of covid19

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Abstract

Unsustainable waste management in many developing countries makes them vulnerable to the possibility of spreading the corona virus through waste management practices. The purpose of this study is to investigate the situation of waste management in Iran during the covid19 epidemic. Finally, 10 articles were reviewed. Today, waste management is one of the most essential axes of sustainable development. If not properly managed, discarded materials such as contaminated PPEs can exacerbate environmental and health problems. The results show that the effects of COVID-19 on waste management systems are not well understood and that existing research has focused more on COVID-19-related health aspects and emerging challenges in MSW management during COVID-19 epidemic.

Keywords: solid waste management ,covid-19,Iran

Investigation of the effect of microorganism and airborne bioaerosols in the hospital interior on the progression of infectious and non-communicable diseases with an environmental health approach

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Abstract

Suspended particles include a range of particles, minerals, organic matter, and bioaerosols, the type, concentration, and size of which depend on the type of activity, meteorological parameters, and topography of the area. Contact with bioaerosols is associated with a wide range of health effects including infectious diseases, acute toxic effects, allergies and cancer. Due to recent standards and attention to the effects of suspended particles with aerodynamic stress less than 10μ on health, research on the biological load of these particles has also expanded. Microorganisms present in the hospital are potential sources of infection for patients and staff. Bioaerosols make up about 25% of the volume of airborne particles, and hospital environments from this perspective can cause secondary problems for patients and clients. In this study, the effect and density of microorganisms and bioaerosols in the hospital and their relationship with infectious and non-communicable diseases have been investigated.

Keywords: Microorganisms, bioaerosols, infectious diseases, non-communicable diseases, environmental health.

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Oral Presentations

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Oral Presentation

Investigation of Groundwater Quantitative and qualitative Status in Kashan Plain Aquifer and its Effect on Environmental Consequences

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Abstract

In this study, the quantitative and qualitative status of groundwater resources in Kashan plain aquifer and its environmental consequences were examined. For this purpose, the groundwater level situation was compared with the past results and using water balance equation, balance components and changes of aquifer storage volume was calculated in the water year of 2017-2018. Then, the chemical analysis results of qualitative parameters of 72 water samples taken from wells belonging to the Kashan Water and Wastewater Company and Kashan Water Resources Management were studied and finally, quantitative and qualitative maps of the aquifer were spatially drawn using ArcGIS. The results showed that the groundwater level has decreased quantitatively in March 2018 compared to March 2006 in more aquifer locations; the highest drops belonging to western border of the aquifer near Khozaq is 25.07 m. The results also showed that the aquifer storage volume has declined more than 35 MCM (million cubic meters) in the water year of 2017-2018. The analysis of the balance components showed that the total exploitation of Kashan plain aquifer in the water year of 2017-2018 is equal to 317.17 MCM. In this year, the total share of agriculture, urban green space, livestock and poultry as well as evaporation from fish ponds is 278.85 MCM, which is equivalent to 88% of the total extractions. The share of water abstracted for exploitation in the drinking, industrial, commercial and public and service sectors is 38.32 MCM, which is about 12% of the total exploitation. The results of the qualitative study on the basis of the samples of Water and Wastewater Company and Water Resources Management showed that the west of the aquifer is better than other parts especially compared to the east and northeast parts of the aquifer and 88.89% of the samples were in acceptable to moderate classes for drinking. In terms of suitability for irrigating farms and gardens, the wells no. 60, 61 and 62 are only in the moderate class and other samples are in high and very high salinity risk classes. Therefore, this would be a limiting factor in the yield of agricultural products. The results show that if the current trend of groundwater exploitation continues, the future horizon of the aquifer in terms of quantity and quality will be worse and the biggest decline will occur in the western regions, where agricultural, drinking and industrial wells are more concentrated. Also, a quantitative decrease of groundwater due to excessive exploitation causes environmental consequences such as subsidence and the decline in groundwater quality due to the increase of anions and cations in the water causes a series of diseases in water users, which will be discussed in detail in this article.

Keywords: Groundwater, Quantitative and Qualitative Changes, Kashan Plain, Environmental Consequences

Oral Presentation

Representation comprehensive management components for stray dogs by combining citizenship attitudes and successful world experiences

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Abstract
The role and importance of dogs as the most abundant carnivores on earth in the ecosystem cycle is undeniable. But in recent years, the presence of stray dogs in cities, without controlling their behavior, has led to problems for citizens and the health of the urban environment. On the one hand, in many cases, due to the close relationship between dogs and humans, controlling the dog population and managing them, even in humane ways, is faced with resistance, and on the other hand, there are limitations due to the cultural and religious attitudes of citizens in Iran. Considering that in Iran, despite the compilation of the instructions of the Ministry of Interior in this regard, the problems caused by the presence of stray dogs still persist. In this article, while using the successful scientific and executive experiences of different countries, a citizenship survey was conducted and the components of a comprehensive management program for the management of stray dogs, along with solutions and suggestions, were presented operationally. Obviously, achieving the desired result requires proper planning, the existence of a participatory approach of all responsible institutions, the implementation of the proposed steps in detail, and the cooperation of experts and citizens.

Keywords: Urban environmental health, Stray dogs, Comprehensive management, Citizenship attitude

Challenges of plastic waste management during the COVID-19 pandemic

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Abstract

The pandemic of Covid 19 has emphasized on the essential role of plastic in our daily lives. Plastics have been used extensively to make Personal Protective Equipment (PPE), other single use medical equipment as well as single use items used in daily life and food packaging, etc due to their inherent properties (available Being, flexibility, lightness, durability, etc) during this pandemic. They have played a very important role in protecting the health and safety of health care workers and ordinary citizens. On the other hand, the production of plastic waste has been raised as an important health and environmental challenge due to the excessive increase in their consumption and mismanagement. This review study provides the challenges of plastic waste management during the Covid 19 pandemic. The results of this study showed, the consequences of the Covid 19 outbreak has been an increase in plastic waste due to the use of personal protective equipment (such as masks and gloves) by health care workers and the public, as well as plastics produced from the packaging and purchase of water and food. For example, the monthly consumption of masks and gloves alone has reached about 129 billion and 65 billion in the world, respectively. The plastic waste generated by this pandemic (with the exception of health-care centres) is mostly disposed along with other normal waste. This issue has created a challenge in the waste management system in the short term and is a health and environmental crisis in the long term. Therefore, with the establishment and implementation of the correct rules and regulations, infectious and dangerous plastics caused by health care centers must be safe with the right methods and disposed. In the case of other plastic waste, it is necessary to first reduce their amounts by reviewing the structures, laws and regulations, applying the correct tax policies, encouraging investment, and then recycling and disposing of them properly. Regarding the management and disposal of PPE used by the general public, we can learn from current experiences and strengths and weaknesses points for planning in future possible pandemic.

Keywords: Waste management, Plastic waste, COVID-19, Challenges

National and Global Environmental Health Challenges

Posters

Investigating the causes, foresight, and ways to adaptation and management climate change

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Abstract
The world is warming and the climate is changing due to the accumulation of greenhouse gases. Global warming through climate change at the local, national, regional and trans-regional levels, including rising temperatures, declining rainfall, increasing atmospheric and climatic behaviors, pervasive droughts, dust, severe floods, increasing crop water needs Agriculture, damaged the tourism industry and increased climate migrations, reduced water resources, negative effects on humans health, negative effects on economic and social conditions and damage to the agricultural sector. Therefore, the issue of climate change and its economic, social, political, health and ecological consequences as a global problem needs to be further studied and understood. Thus, solving this problem requires adopting methods to these conditions. Climate change can create opportunities for Iran and other countries through long-term planning tailored to the climate and geographical location. The purpose of this study is to explain the dimensions of climate change, its consequences, threats, opportunities and national and transnational policies to adapt to it in Iran.

Keywords: Environmental Challenge, Climate Change, Climatic consequences, Global Warming, Threats and Opportunities

Estimating ammonia emissions from municipal wastewater treatment plant

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Abstract

Atmospheric ammonia (NH3) found in air, plays a significant role in the fine particulate matter (PM) constitution. Compared to the predominant NH3 sources of such as livestock operations, anthropogenic sources such as wastewater treatment plants (WWTPs) can gain prominence in urban areas. These sources are mostly low in the duration of annual emissions, yet they are numerous and cover a wide range of source parts. In this study, the ammonia emission factors from a WWTP utilizing typical biological wastewater treatment in Tabriz, a city in northwestern Iran, were computed using the TOXCHEM model with one year of raw wastewater mensuration (for the two cold and warm seasons) and information about the facility. The results indicated that in both seasons, there is a potent tendency to biodegradation and volatility. The emission factors calculated for one year were 0.00245 g NH3m-3 sewage. Probably, the pH of the wastewater can be a significant factor affecting ammonia emissions due to by increasing pH, the ammonia emission factor was reductions and the amount of biodegradation was increased.

Keywords: Ammonia emission, Wastewater treatment plants, TOXCHEM model.

Survey of Medical solid waste management in hospitals of Bushehr Province in 2019-2020

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Abstract

This survey was performed to determine medical solid waste and Survey of Medical solid waste management in hospitals of Bushehr Province in 2019-2020.This article is descriptive and cross-sectional study, which was carried out with complete the questionnaire, interview, observation, survey, weighing and Laboratory tests during the 24months in 2019-2020, in ten hospitals in the Boushehr Province. Final questionnaire contain 103 questions and it is based on the guidelines of the WHO, medical waste management programs and expert guidance of health center and work environment. The results indicated that the solid waste generation rate was 5718.34 (kg/day), which including general wastes (59.61%) and dangerous wastes (40.39%) were in hospitals of Province Boushehr. Infectious waste recycling is not done in any of the hospitals. In two hospitals, safe and updated methods are not carried out but the waste separation programs in all hospitals performed. All service personnel in the handling of waste, used of personal protective equipment. All hospitals had a disposal special place. The six hospitals had a hazardous waste disposal special place and in five hospitals transportation to final disposal place were satisfactory. According to great efforts in the management of medical wastes, there are many problems in the management process, particularly segregation, transportation, kept the temporary and safe and updated methods for solids which require continuing education for staff, and strict supervision on safe systems in destruction and final disposal in the field, by taking into consideration environmental factors.

Keywords: Waste Management, Infectious waste, Hospital, Bushehr.

Poster

Environmental health challenges during the corona pandemic worldwide with a special focus on Iran

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Abstract

The Covid-19 pandemic caused by the SARS-CoV-2 virus has led to extensive changes worldwide and has posed environmental, economic, social, and health challenges. Following the disease that began in 2019 from Wuhan, China, there were changes in the world's lifestyle and the environment. This disease globally has infected millions of individuals and resulted in more than 4 million deaths in the world. The Prevalence of Covid -19 has created unprecedented effects worldwide, such as changing air quality, improving public health, reducing fossil fuel consumption, reducing the concentration of greenhouse gases, clarifying seawater, and cleaning beaches. The closure of many industrial centers during the COVID-19 pandemic, quarantine laws, and social distancing reduced the consumption of resources and fossil fuels and reduced the production of pollutants to the environment. The adverse effects of Covid -19 include increasing waste production, especially healthcare waste, stop recycling programs, psychological diseases in society, and alteration of animal behavior. Traffic ban, quarantine, and social distancing globally reduced the 45 percent of air pollution in European countries and reduced the air pollution of the world's cities. The world's countries have responded to this pandemic using social distancing and quarantine, which has impacted economic activity. Environmental health professionals are the key to implementing preventive measures against the spread of diseases, especially contagious diseases. It is necessary to play a fundamental role in controlling these diseases from the beginning. Their influential works accelerate the control of the disease, reduce the adverse effects of the outbreak of the disease and relieve the people's pain.

Keywords: Covid -19, Pandemic, Environmental Health, Environmental Factors.

Development a new index for littered waste assessment in different environments: a study on coastal and urban areas of northern Iran (Caspian Sea)

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Abstract
Littered waste is considered as ubiquitous environmental concern in different countries. The coastal pollution has been evaluated using indexes like Clean Coast Index (CCI) in many countries. In this study, several coasts in northern of Iran along the Caspian Sea, were assessed in terms of number and composition of litters. Furthermore, a developed Clean Environment Index (CEI) was used for the first time to interpret the results. The pollution status in four urban areas was conducted simultaneously to compare the results with the coasts. The results indicated that 60% of the coasts and 50% of the urban areas were in a dirty status and only 22% of the total surveyed areas were in a clean status; none of the studied beaches and urban areas were classified in a very clean status. The highest number of litters observed in the study areas was cigarette butt, whereas plastics were found as the most common wastes among various categories. Moreover, it was obviously clear that CEI offers a more realistic and rigorous interpretation than CCI. Therefore, this new index can be used to evaluate litters pollution in various areas.

Keywords: Litter, Waste management, Coast, Clean Environment Index

Ecological risk assessment of heavy metals in border river sediments affected by anthropogenic activities

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Abstract

Heavy metals in rivers enter through several sources, natural sources, such as erosion and anthropogenic sources, such as mining. Due to their toxicity, nondegradability, bioaccumulation and food chain amplification, heavy metal pollution has become serious environmental problems. To determine the level of contamination, heavy metal concentrations in sediment of the Aras river that affected by anthropogenic activities, were measured. Four sampling sites were selected to determine locations of discharge mineral contaminant. Heavy metal concentrations of Pb, As, Cd, Cr, Cu, Mo and Ni measured by inductively coupled plasma mass spectrometer (ICP-MS). Sediment pollution was assessed using Contamination factor (CF), pollution load index (PLI), geoaccumulation index (Igeo) and enrichment factor (EF). High CF values of Cu and Mo in the second and third sites is precisely due to discharge of tailing dams effluent. The high CF values content of As and Pb metals in the sediment of upstream site indicates the existence of an contamination source before the mining area. PLIs values show that except the first site, all sampling sites have moderate pollution. As, Mo, Cu and Pb had the highest Igeo values respectively. The mean of EF values for all metals except Cr and Ni were higher than 8. This indicates a relatively high level of enrichment of human activities, especially mining in the river sediments.

Keywords: Water Pollution, Environmental Index, Sediment, River, Human Activities

NO2 and SO2 distribution modeling using by AERMOD model and health risk assessment in hot rolled steel industry

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Abstract
Rolling Steel industry is one of the most important polluting industries, which is necessary, predicting and modeling the emission of environmental pollutants for precise control, before the establishment of this industry, to be done. Therefore, this study was conducted in order to the emission modeling of pollutants from the hot rolling steel industry and also its health risk assessment. Preliminary measurements of pollutants were performed from the exhaust, then based on initial measurements and regional information, emissions modeling of pollutant in the region)by AERMOD software(and health risk assessment was performed. The annual average and hourly maximum concentration of NOx pollutants are 2 µg /m3 and 68 µg/m3, respectively. The one-hour maximum concentration of Sox in residential areas is estimated 40 µg/m3, which is less than the allowable limit (196 µg/m3). Although based on the results of the present study, the distribution of pollutants and its health risk assessment is within the allowable range, but it is necessary to establish an air pollution control program in the studied industry.

Keywords: AERMOD, Air pollution modeling, Steel complex, Risk assessment

A Survey on the efficiency of the hybrid system (UF+IX), in the reclamation of oil-refinery effluent as makeup water in cooling towers

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Abstract

One of the most important pillars of sustainable development is access to water resources needed for various purposes. In recent years, for reasons such as population growth, unequal distribution of water resources, periodic droughts and limited access to water resources in a large part of Iran, the reclamation of industrial effluents as a permanent and accessible source has been considered by various industries. The aim of this study was to reclamation the oil refinery effluent using an integrated method including UF+IX to provide the makeup water required for cooling towers as one of the most water consuming units in industry. The designed pilot was installed at the outlet of the oil refinery recycling unit and real effluent was used to supply its feed effluent. Polysulfone (PS) membrane was used in the ultrafiltration process and two types of resins including strong acid cation (SAC) and strong base anion (SBA) were used in two separate columns in IX system. In order to disinfect the treated effluent, sodium hypochlorite (NaClO) is used as a multioxidant (MOX) which can be produced on site using NaCl electrolysis. In the optimum Trans Membrane Pressure (TMP) of 2 bar, the efficiency of Integrated system in reducing impurities including TDS, COD, Turbidity and Oil were reported as 84%, 64%, 95% and 88% respectively. Also, the efficiency of more than 99% removal of HPC as a result of using sodium hypochlorite was recorded. The Efficiency of UF + IX processes on the removal of impurities was statistically significant (P-Value <0.001).The results of this study showed that the present integrated system with a significant reduction of pollutants in refinery effluent, is able to provide the quality standards of makeup water of cooling towers.

Keywords: effluent reduction, ultrafiltration, ion exchange, multioxidant, cooling tower

Abundance of larvae of calyx mosquitoes in paddy fields of southwestern Isfahan province – Iran

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Abstract

Background: Mosquitoes are bloodthirsty bipeds that are responsible for transmitting various diseases to millions of people in different parts of the world every year. Malaria, arbovirus infections and filariasis are among the most important diseases transmitted by mosquitoes. The aim of this study was to identify the larval species of colicidae mosquitoes in the paddy fields of southwestern Isfahan province. materials and methods: This descriptive-logical study was performed during 3 sampling sessions in spring and summer of 2019 in three regions of Lenjan and Mobarakeh counties in the southwest of Isfahan province. Sampling method was standard ladle method. The collected samples were canned with lactophenol solution and transferred to the entomology laboratory with the relevant specifications and codes and were identified using a morphological identification key. results: During this study, a total of 430 larvae including 4 species belonging to the genus Kolex and Anopheles were collected from rice fields. The results of the study showed that 11.1% of the larvae were identified from the subfamily Anopheline and 88.9% belonged to the colicine. The frequency of each species was 81.2% of Cx.theileri, 6.5% of Cx.perexiguus, 1.2% of Cx.pipiens and 11.1% of Ano.maculipennis, respectively. Discussion and conclusion: The results of this study showed that tiller colex is more abundant than other species of colic in the rice planting area in the southwest of Isfahan province. Therefore, control methods should be designed based on the characteristics of this species.

Keywords: Larvae, species, mosquitoes, calyx

Estimate the number of used masks in Asia and challenges of plastic infectious waste management during Covid-19 virus pandemic in Iran, Current guidelines and proposed solutions

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Abstract

The Covid-19 virus pandemic has caused a sudden increase in the volume of plastic waste, especially personal protective equipment and health and home care. The purpose of this study was to estimate the number of masks used in Asia and to investigate the management challenges of plastic infectious waste during the Covid-19 pandemic in Iran, current guidelines, and proposed solutions. In a descriptive-analytical study, estimating the number of masks used in Asia and the management challenges of plastic infectious waste during the Covid-19 pandemic, the current guidelines were identified. The proposed solutions were analyzed at each stage of waste management. The total number of masks consumed during one day among patients in 77317397 cases in the population of 4541263726 people has been calculated. Approximately 60% of face mask acceptance and the number of masks used daily is assumed to be 2 cases. Based on this, the highest and lowest average consumption masks were 10535850.04 and 2321.2266, respectively. After reviewing previous studies and guidelines, this new environmental crisis can prevent if proper management, improvement of infrastructure, and creating awareness in people to reduce and separate waste at the source. Encouragement with educating consumers to safely dispose, and reduce contaminated plastic waste is recommended. Our improved and extremely hygienic lifestyle in fear of transmitting the virus has changed our patterns of behavior like the use of personal protective equipment, increasing demand for plastic-wrapped food, and the use of disposable containers. By inducing behavioural, social, and institutional changes, it is possible to help improve plastic waste management technologies. Creating individual responsibility, increasing corporate performance, and encouraging government policies are essential to prevent disaster.

Keywords: Plastic Waste Management, Disposable Plastics, Pandemic, Covid-19

Occurrence of viruses in sewage sludge: A systematic review

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Abstract
Microorganisms generally tend to attach to solid surfaces. Therefore, the majority of viruses and other pathogens in wastewater utilities are likely associated with sludge particles and are expected to end up in sewage sludge. This review was based on an electronic search of the literature in the Scopus, Web of Science (WOS), and PubMed database published from 2010 to October 12th 2021 using combinations of the following keywords: sludge, sewage sludge, biosolids, wastewater solids, virus, enteric virus, and viral particles. Sources search was performed two times, once with common enteric viruses' names and then without the inclusion of these viruses' names. Studies suggest adenovirus and norovirus as the most prevalent enteric viruses in sewage sludge. Indeed, other viruses include rotavirus, hepatitis A virus, and enterovirus were frequently detected in sewage sludge samples. Untreated biological sludge and thickened sludge showed more viral contamination level than digested sludge and the lowest prevalence of viruses was reported in lime stabilized sludge. In contrast, entirely removal of SARS-CoV-2 was reported in digested sludge samples. The review reveals that land application of sewage sludge may pose viral infection risks to people due to accidently ingestion of sludge or intake of contaminated crops. Moreover, contamination of groundwater and /or surface water may occur due to land application of sewage sludge.

Keywords: Enteric viruses, Sewage sludge, Bio solid.

Investigation of various quantitative modeling methods of municipal waste

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Abstract

The purpose of this paper is to review the types of models currently used in the urban waste management basin and to evaluate more prominent models. The municipal waste management system is complex because it involves related issues and must achieve goals that are often conflicting. It is difficult to evaluate different variables in planning and managing them. Therefore, using mathematical models to provide a tool to describe and evaluate the municipal waste management system is useful. While many models recognize that environmental, economic, and social aspects must be considered to be appropriate and sustainable, no model that considers these aspects together is considered. The modeling methods specified in this paper aim to explain or estimate waste production at present or in the future using economic, social, demographic, or management-oriented data. Each model is analyzed and examined by different parameters.

Keyword: Sustainability, waste management, factors affecting production, modeling

An overview of new technologies in water desalination

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Abstract

More than 1 billion people have no access to clean drinking water, and 2.3 billion people are living in water-scarce areas, in the world. Water scarcity is a serious issue for North Africa, the Middle East, and several countries in Southeast Asia and Latin America. Seawater desalination is one of the best strategies to address water shortages, especially for domestic use. As a result, the number of desalination plants around the world is growing rapidly. At the end of 2015, the number of desalination plants worldwide was about 18,000 units with a total capacity of 86.55 million cubic meters per day, of which about 44% of production capacity was in the Middle East and North Africa. With a 10$ billion investment, the United States plans to double its capacity by 2030 to its current level of more than 11 million cubic meters per day. In 2019, reverse osmosis and multi-stage flash technologies were accounted for 69 percent and 18 percent of desalination facilities, respectively. Due to the limited resources of fossil fuels, it is necessary to provide the required energy for desalination facilities from other sources such as wind and solar energies. Sustainable and greener desalination obviously can be achieved in the future by using renewable energies in desalination plants. This paper provides an overview of emerging desalination technologies. Techniques such as vibratory shear processing, forward osmosis, electrodialysis, and the Ohmic-evaporators are still being developed. Zero liquid discharge is an engineering approach to water treatment in which discharging the effluent into the surface waters is zero. This will completely eliminate the contaminants associated with the treatment. In addition, this method eliminates liquid waste, maximizes water use efficiency, and reduces effluent side effects.

Keywords: Desalination, Renewable Energy, Reverse Osmosis

Poster

Microplastic pollution, a threat to environmental and toxicological effects in human and animal health

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Abstract
Micro plastics are plastic particles with less than 5mm in size that are considered global environmental pollutants. The microplastics present in the environment result from the successive breakdown of larger plastic pieces or from the direct input of micro- and Nano-sized particles used in various industries and products available to consumers. Such microplastics have been found in several wild species and other natural resources, including some consumed as food by humans, with possible adverse effects on ecosystem and human health. Microplastics are composed of toxic additives and monomers which have reasonably large area to volume ratio and thus are effective in absorbing hydrophobic pollutants from the water bodies. All of the marine organism groups such as planktons, sandy and muddy sediments, and vertebrate and invertebrate ingestion, and etc. are at an eminent risk of interacting with microplastics according to the available literature. Unless we are able to develop new technologies, processes or approaches to deal with the persistence of plastics in the environment, we will continue to observe increasing accumulations of these somewhat everlasting substances.

Keywords: Microplastics, pollutant, Environment, Toxicological Effects, Human Health.

Trends of Air Quality Index (AQI) in Isfahan city during 2009-2019

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Abstract
Air pollution is considered to be the most important environmental health risk worldwide. Adverse effects of air pollution on health in terms of premature deaths, years of life with disabilities (DALYs) and reduced life expectancy, reduce economic development and quality of life and ultimately reduce income and productivity. This study was conducted to determine the status of changes in air quality index in Isfahan over a period of 10 years (2009-2010). The results of this study showed that in general, air quality in Isfahan has decreased during the years under study. Percentage of days with clean air (AQI = 50-50) and healthy (AQI = 100-51) in the year from 1393 to 1396, compared to 1388, has a decreasing trend, so that in some years it has reached zero While the number and percentage of days with unhealthy weather for sensitive groups (AQI = 150-110) and unhealthy (AQI = 200-1151) has increased over the years. Fortunately, during the studied years, the days with very unhealthy air quality conditions (AQI = 300-300) were less than 1% and the number of critical days (AQI <300) was only 1 or 2 days. The results of this study showed that in general, the air quality in Isfahan during the years under study is due to vehicles and industries. The air quality index has not been in a good condition and has been unhealthy for sensitive groups and even ordinary people on many days of the year, but the air quality index of Isfahan can be reduced by applying restrictions, proper planning, and creating the necessary coordination.

Keywords: Air Quality index (AQI), Air Pollution, Isfahan

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Oral Presentations

Oral Presentation

Seasonally varied Proinflammatory effects of urban particulate matter-induced(PM2.5) on human lung epithelial cells (A549) in vitro at the most industrial cities of Iran

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Abstract

In ambient air, particulate matter, especially fine particles (PM2.5), can induce irreversible impacts on human health. In this research, cells were individually exposed to three concentrations of PM2.5 (25, 50, and 100 µg/mL) and three times (12, 24, and 48h). We assessed in winter (wPM2.5) and summer (sPM2.5) PM2.5 sample and exposed cells of A549 to concentrations of PM2.5 samples to measure its cell viability and release of pro-inflammatory cytokines. We assessed the liberation of pro-inflammatory cytokines (interleukin-6 and interleukin-8) by the ELISA method and cell viability by MTT assay [3- (4, 5-dimethylthiazol-2-yl) -2, 5-diphenyltetrazolium bromide] .The toxicological outcomes of this research determined that raising the concentration of PM2.5 particulates and contact time with it decreases cell viability and raises inflammatory answers. Seasonal cytotoxicity of PM2.5 particles in the summer season compared to the winter season was lower. The lowest percent viability was observed at two days of exposure and 100 µg/mL exposure in the winter sample. Moreover, PM2.5 particles were important in the value of IL-8 and IL-6 .The medium release level of IL-6 and IL-8 in the winter and the large exposure time and concentrations (48h–100 µg/mL) was much higher than in the summer .These values were double as high for winter PM2.5 samples as for summer samples. The compounds in PM2.5 at varied seasons can cause some biological impressions. The samples' chemical components in two seasons presented that the PMs were various in chemical properties. In general, heavy metals and polycyclic aromatic hydrocarbons were more in the winter samples .However, the samples of wPM2.5 had a lower mass quota of metals such as aluminum, iron, copper, zinc, and magnesium. Concentrations of chromium, cadmium, arsenic, mercury, nickel, and lead were more significant in the sample of wPM2.5.

Keywords: Pro-inflammatory cytokine. Lung epithelial cells (A549). In vitro.

Short-term exposure to ambient fine particulate air pollution and sex differences in cardiorespiratory biomarker responses of healthy adolescents

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Abstract

Although there is evidence regarding PMs associations with cardiorespiratory morbidity and mortality; more studies are needed to understand the biological mechanisms underlying these relations. The main purpose of this study was to determine and compare the associations between short-term exposure to PM2.5 on biomarkers related to cardiorespiratory disease in healthy adolescents (male and female) living in a highly traffic area of Tabriz using a panel study. 50 healthy participants (27 male and 23 female) were followed for five consecutive months, and samples of exhaled breath condensation (EBC) were obtained. The investigated markers included hemodynamic markers and biomarkers in EBC matrix: interleukin 6 (IL-6), tumor necrosis factor α (TNF-α), and total nitric oxide (NOx). We measured daily outdoor PM2.5 mass concentration in a fixed station for all studied period. The linear mixed-effects regression models were applied for data analysis. The 24-hour mean of PM2.5 was 33.22 ± 8.89 µg/m3 in the studied area. An increased IQR of PM2.5 mass was associated with a significant rise in heart rate of female at lags 3 and 4 in with 16.74% (95% CI: 8.42, 25.05) and 35.83% (95% CI: 12.49, 53.17), respectively. We found a positive association between EBC NOx and PM2.5 at lag 3 (6.24%, 95% CI: 2.16, 11.70) and lag 4 (24.83%, 95% CI: 5.47, 50.41) in female. Exposure to PM2.5 can increase the amount of IL-6 in female by 23.31% (95% CI: 2.71, 44.92). In male group, a positive association was observed between TNF-α and PM2.5 at lags 0 and 3, but a negative association for IL-6. Taken together, levels of oxidative stress and hemodynamic markers induced by PM2.5 were greater severity in females, suggesting the important role of gender in cardiorespiratory injury.

Keywords: Air pollution, Inflammation, Exhaled breath condensate, Oxidative stress

Oral Presentation

Subacute toxic effects of polyvinyl chloride microplastics (PVC-MPs) in juvenile common carp (Cyprinus carpio)

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Abstract

Pollution of the aquatic environment by the microplastics (MPs) is one of the most serious environmental issues worldwide and has raised many concerns about their availability and hazards for aquatic biota. Fish is an important source of protein for humans, and the accumulation and toxic effects of the MPs in fish deserve special attention. This study aims to examine the ingestion, tissue accumulation and toxic effects of polyvinyl chloride microplastics (PVC-MPs) in juvenile common carp. Fluorescent-tagged PVC-MPs were found in various tissues of fish only after 4-5 days of exposure. Size of MPs showed the significant role in acute toxicity and mortality of PVC-MPs. 100% mortality was seen after 7 and 10 days exposure to 1000 and 100 µg/L class A-PVC-MPs (100>µm) respectively while 1000 µg/L of class A-PVC-MPs (300-1000 µm) killed only 16.6% of fish after 10 days. Different grades of tissue damage were seen in the gills, gut and liver of fish in proportion to size, time and concentration of PVC-MPs. Epithelial detachment, thinning of the bowel wall and lesions of villi in the gastric wall were the dominant damages in the gastrointestinal tract. Gills also were affected in the form of Necrosis, adhesion and partial fusion of secondary lamellae. Hepatic damages (cellular necrosis and infiltration) were seen only due to exposure of fish to class A-PVC-MPs. Taken together, these findings suggest that common carp intake significant levels of environmental microplastics (intentionally or accidentally), which seriously affect fish health and raise significant concerns about marine ecosystem health and seafood safety due to microplastic pollution.

Keywords: Polyvinyl chloride (PVC), Microplastics, Environmental toxicity, Common carp

Effects of living in industrial and vehicular traffic areas and increasing blood metal (loids) and allergy pro-inflammatory (IgE and IL-4) biomarkers in children

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Abstract

Toxic metal(loid)s can lead to high damages on human. This work was conducted to investigate the levels of metal(loid)s in PM2.5 and a total of 123 male children's (aged 6-9 years) blood chosen from different areas in Ahvaz and their association with the pre-inflammatory (Immunoglobulin E IgE and cytokine IL-4) responses in serum cells. Four metal(loid)s (arsenic, chromium, lead and nickel) in three regions including industrial (Padad), vehicle traffic (Golestan) and reference (Kianpars) areas were studied. Results showed the concentrations of As, Cr and Ni in the ambient air of industrial area (Padad) ($P<0.001$), and Pb in vehicle traffic area (Golestan) were higher ($p<0.001$). Moreover, the mean levels of IgE (mean=146.44pg/200landa, $P<0.003$), IL-4 (mean=548.23pg/200landa, $P<0.001$) in Padad were higher than Golestan and Kianpars. Our results suggest that living in industrial areas leads to accelerated synthesis of IgE, IL-4 in blood. The spatial distribution of children's serum IgE, IL-4 concentrations showed an abnormal increase of 240 to 400 pg/200landa for IgE, 950 to 1400 pg/200landa for IL-4. Our results indicate children in the industrial area are prone to asthma, allergy, miRNA mutation, and other chronic diseases.

Keywords: Industrial area, Children, Pro-inflammatory factors (IgE, IL-4), Spatial distribution, Allergy.

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Posters

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Poster

Airborne fungal and bacterial burden from air conditioner and evaporative cooler exhaust air in different operating conditions

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Abstract

Evaluation of indoor microbial air pollution is important for general health, especially for sensitive groups.This study was performed on the exhaust air of air conditioner and evaporative cooler in Qom School of Health in different working condition. Microbial burden (CFU/m3) of exhaust air of conditioners was investigated by Anderson method with two separate media culture for bacteria and fungi. Then the type and density of the fungi were detected by staining by Lactophenol cotton blue and observation under a microscope. The average fungal burden of the exhaust air of evaporative cooler (54.56) was significantly ($p < 0.01$) higher than the total bacterial burden (20.30). Increasing the fan speed has increased the microbial burden of the evaporative cooler. After changing the water and evaporation pads of cooler a significant increase ($p < 0.01$) in bacterial burden and a significant decrease ($p < 0.01$) in fungal burden were observed. Due to high salinity and TDS before changing the water, bacterial growth is less than when the water of cooler is changed. Among the fungal species Aspergillus versicolor and Aspergillus Niger had the highest frequency in evaporative cooler. In the air conditioner the average bacterial burden of the exhaust air of evaporative cooler (53.55) was significantly ($p < 0.01$) higher than the total fungal burden (33.42). Washing the air conditioner filter has significantly ($p<0.05$) reduced both bacterial and fungal burden in the air conditioner, and increasing the temperature of the air conditioner has reduced ($p<0.05$) the bacterial and fungal burden. Cladosporium and Aspergillus Niger species had the highest fungal density in air conditioner. Comparison of the results showed that the bacterial burden of the air conditioner was significantly ($p < 0.01$) higher than that of the evaporative cooler and the fungal load of the evaporative cooler (with more species diversity) was significantly ($p < 0.01$) higher than air conditioner. Proper operating conditions of air conditioners have a significant impact on the density of microbial pollution of indoor air. In this study, the solution of connecting the evaporative cooler water tank to the flush toilet was proposed as an efficient way to improve the performance of the evaporative cooler and reduce its airborne fungal burden.

Keywords: Airborne microbial pollution, Evaporative cooler, Air conditioner, Fungal burden, Bacterial burden

Biological and environmental monitoring of lead in the battery industry

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Abstract

The use of lead acid batteries (LAB) in Iran has increased with sharp increase of motor vehicles. LAB industry workers are at risk of exposure lead, which leads to the development of lead toxicity. The aim of this study was to determine blood lead level (BLL) in 140 blood samples obtained from workers at risk of exposure to lead processing processes and its relationship with air lead level (ALL) in 60 air samples collected in 12 operational areas in the LAB factory.

This cross-sectional study was conducted among the workers of LAB manufacturing industry located in Semnan. Blood samples were collected and analyzed using the NIOSH 8003 method and Atomic Absorption Spectroscopy (AAS) respectively and air samples were collected and analyzed using the NIOSH 7300 method and Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) respectively.. Statistical analyses were performed using SPSS software ver.19.

The average of ALL in casting(COS) station, assembly line, Elblak and office were 92.01, 85.73, 36.31 and 4.2 µg /m3, respectively. The workers' BLL in the above sections was 32.19, 35.42, 17.33 and 7.78 µg/dl, respectively. According to the results of correlation test, no significant relationship was observed between ALL and BLL (respectively with a significant level of pA = 0.075 - pB = 0.078). Also, to compare the case and control groups, the mean BLL of groups A and B were 55.95 ± 8.24 and 9.0947.81 µg / dl, respectively, The mean BLL of the control group was 11±4.76. All BLL measured in both exposed groups exceeded 30 µg / dL, which is the maximum BLL recommended by the ACGIH, while the BLL in the control group was lower than the recommended level.

Workers BLL more than the biological exposure limit recommended by American Conference of Governmental Industrial Hygiene (ACGIH) was observed. Frequent hand washing and use of personal protective equipment with a health program education are importance factors to reduce BLL in workers of gasoline stations.

Keywords: BLL, ALL, Battery Factory

Microplastics, an emerging crisis due to the disposable respiratory face masks during Covid-19 pandemic

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Abstract

The importance of microplastics, the impacts and control mechanisms of plastic products are presented in various studies. One of the most common personal health care products in the SARS-CoV-2 outbreak is single use surgical face mask that is known as an effective and inexpensive medical equipment that people use frequently. Wearing single use face masks is a new social norm but we should be environmentally responsible for it. Bad disposal of face masks, triggers the production of microplastics in near future. These face masks are made of polypropylene polymers and they will be degraded to microplastics via natural processes. Due to the neglection of the face mask role in microplastics production, the studies show that the microplastics spread rate in still water sources from single face mask is approximately 360 particles and it increases as the turbulence rate increases. The addition of organic solutions, increases the microplastics release speed. Degradation of the face mask enhances the spread rate of microplastic fibers in the environment. After two months of natural aeration, face masks convert to fragile particles and then microplastics. Microplastics smaller than 10 microns, can be easily suspended in the air then they can get in respiratory system via air flow. In addition, due to the 72-hour resistance of SARS-CoV-2 on plastics, it is possible to infect people with infected face masks. A single aerated face mask may release billions of microplastic fibers in marine environment. Entrance of these micro-pollutants in the body of aquatic animals and their food chain is harmful for human health. According to high rate of face mask production and usage, its inappropriate management would be very concerning and it is necessary to understand the environmental risk probabilities of it.

Keywords: Personal health care products, Single use face mask, Microplastic, Covid-19

Poster

A survey of knowledge associated with pesticide use and related health problems among greenhouse farmers in Central Iran (2019-2020)

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Abstract
This descriptive study was conducted in 2019-2020 aiming to investigate the knowledge of farmers and gardeners about the use of pesticides in greenhouses in Tiran - Karvan County, central Iran. In the first stage, a 30-item questionnaire was developed which included parameters such as the application time, the dose, and the side effects of pesticides and the Pre-Harvest Interval (PHI). Out of a total of 450 greenhouses in the area, 50 greenhouses that were selected through the simple random sampling method filled out the questionnaire. The collected data were analyzed and compared in SPSS. According to the results, whiteflies were the most common pests in greenhouses. The pests were mostly identified by an expert. The most important side effects of pesticides among greenhouse owners in Tiran - Karvan County were burning and itching (52%), cough and sneezing (30%), and sensitivity (18%); 76% of greenhouse owners observed the PHI for their products; and 92% of greenhouse owners used Personal Protective Equipment (PPE). Public and private education, increasing the knowledge of greenhouse owners about the hazards of pesticides, the use of PPE, and observing the principles of environmental health by implementing new and up-to-date educational programs are essential.

Keywords: Farmers, greenhouse, health problems, Iran, knowledge, pesticides.

Comparison of residual concentrations of Deltamethrin, Abamectin and Acetamipride in farm-grown tomatoes

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Abstract

Tomato is one of the most widely grown vegetables in the world. It has the high consumption due to high antioxidants, reducing the risk of cardiovascular disease, prevention of diabetes and cancer. Therefore, the aim of this study was to compare the residual concentrations of pesticides Deltamethrin, Abamectin and Acetamipride in tomato crop using the QuEChERS method and liquid chromatography-mass spectrometer (LC-MS). ANOVA test was performed to determine the difference between the mean concentrations of pesticides in different samples and t-test was performed to compare the mean concentrations of pesticides in different samples with standard values. Significance was reported at the level of 0.05. There was a significant difference in the mean percentage of decreasing concentrations of Deltamethrin, Abamectin and Acetamipride in field-grown tomatoes (p = 1.47* 10-13). Also, comparing the difference between the mean residual concentrations of Abamectin (55.04 ppb) and Acetampride (513.32 ppb) and Deltamethrin (145.86 ppb) in tomato product with standard value showed that the standard value (500 ppb) with the mean residual concentration of Abamectin pesticide was significantly different (p = 0.0001) and There is a non-significant difference with idiopathic pesticide (p = 0.89). Also, the standard value (300 ppb) has a significant difference with the average residual concentration of Deltamethrin (p = 0.02). The ranking of residual concentrations followed as: Acetamipride > Deltamethrin > Abamectin.

Keywords: Tomato, Deltamethrin, Abamectin, Acetamipride

Ecological Risk Assessment of Heavy Metals in Soil at the Edge of Kashaf Roud River, Mashhad, Iran

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Abstract

The entrance of heavy metals through human activities causes pollution of soil. Heavy metals due to some features like non-biodegradability and long biological half-life can become consistent in the environment and leads to long-term detrimental effects on human health including endocrinal disorders, immune system problems, and carcinogenic impacts. The aim of this study was to measure the heavy metals concentration (Hg, Pb, As, and Cd) and their ecological impacts on soil, in the Kashaf Roud River basin. Hence, 72 samples of soils were collected and the concentrations of target metals was compared with European standards. Metal concentration including cadmium, lead, mercury and arsenic was determined by atomic absorption spectroscopy (Varian, 240FS, USA). Graphite furnace atomic absorption spectroscopy was used for determining Cadmium and lead metals, and vapor generation accessory (VGA) was employed to determine mercury and arsenic due to low concentrations in samples. The contamination levels were evaluated by several ecological indices including Contamination factor(Cf), Pollution Index(PI), geo-accumulation index (Igeo), Potential ecological risk index (RI) and Pollution load index (PLI). Based on obtained results, heavy metals concentrations in soil samples was in the order of Pb>As>Cd>Hg. Among the soil samples, the Cf average values followed the declining order Cd (7.78)>Pb (6.911)>Hg (4.263)>As (2.675), which Pb and Cd presented high contamination level. Moreover, the all soil samples of study region possessed PLI>1, confirming their heavy metal contamination. The CF index for lead and cadmium showed high levels of contamination (Cf>6) in the soil, which was confirmed by PI (PI>3) results. Heavy metal concentrations in soil samples were within the national and international standard ranges. The utilization of standard quality effluent for agricultural irrigation requires control measures and good organizational performance.

Keywords: Heavy Metals, Ecological Risk Assessment, Kashaf Roud River, Iran

Evaluation of Pb phytoremediation in polluted soil by Portulaca oleracea

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Abstract

Worldwide, more than 10 million regions with an area of more than 20 million hectares are considered as contaminated soils. Soil pollution with heavy metals is one of the most important environmental problems in many parts of the world. Phytoremediation is a method that is recommended for removal of heavy metals from contaminated soils, sediments and waters. The aim of this study was to investigate the purssive plant in removal of lead from contaminated soil. In order to investigate the effect of Portulaca Oleracea phytoremediation on lead removal, 5 pots were prepared which were poured 3 kg of soil in each pot. In each pot, 10 seeds of Portulaca Oleracea plants were planted. Pots were irrigated twice a week for 8 weeks with concentrations of 25, 50, 75 and 100 mg/L of lead solution. After 8 weeks, the lead amount of root, stem and Portulaca Oleracea leaves, was measured by atomic absorption. Results showed that lead accumulation increased with increasing irrigation concentration and in upper extremity i.e. stem and leaf, this accumulation was higher than the roots of Portulaca Oleracea, however the measured data of lead in Portulaca Oleracea were not significant (p=0.357). This study showed that Portulaca Oleracea plant cannot be used for phytoremediation of lead metal. However, due to the absorption of lead by Portulaca Oleracea, precautions should be taken regarding the oral consumption of Portulaca Oleracea grown in contaminated areas.

Keywords: Lead, Portulaca oleracea, Phytoremediation, Contaminated soil

Poster

Association of ambient air pollution with cardiovascular disease risks in Yazd-a province of Iran: using linear and nonlinear models

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Abstract

Air pollution is well recognized as a major risk factor for chronic non-communicable diseases and has been estimated to contribute more to global morbidity and mortality than all other known environmental risk factors combined. Numerous studies have also shown that air pollution is the most important environmental cardiovascular risk factor. Therefore, this study was designed and conducted to investigate the relationship between ambient air pollution and the rate of admission of heart patients in hospitals in one of the central provinces of Iran. In this study, several models (linear and nonlinear) were used to determine this relationship. This study was performed over a period of 5 years. The average concentrations of PM10, CO, NO2, SO2 and O3 in this period were 98.48 µg/m-3, 4.07 ppm, 18.14ppm, 8.57ppm and 19.66ppm respectively. According to the average concentration of pollutants, air quality in this period has not been in good condition. A total of 12,491 cardiovascular patients were admitted to the hospital during the study period, 57% of whom were male and the rest were female. In this study, it was found that meteorological parameters such as air temperature affect changes in the concentration of gaseous pollutants during the year. The highest correlation was found between SO2 concentration and CD (R = 0.4) which was even higher than the correlation between age and CD (p = 0.001). Also, SO2 concentration had the highest effect on the admission of patients with cardiovascular problems in the hospital (R = 0.45). Time series, relationships between variables, and outcomes analysis were done using ANN. In this nonlinear model, a number of neurons were formed in the hidden layers, which created good structures for evaluating the studied contaminants. In these structures, according to the autocorrelation of error in lag=0, the series are stationary, which makes it possible to predict using this model. According to the results, the artificial neural network had a good ability to predict the relationship between the effects of air pollutants on the CD in a 5 years' time series.

Keywords: Air pollution, Time series, cardiovascular disease, Neural network, Indoor air

Application of biosensors in the monitoring of Environmental pollutants

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Abstract
Environmental monitoring is one of the priorities of environmental protection programs because there is a close relationship between the presence of pollutants, human health and socio-economic development. In this context, biosensors are fast, inexpensive and sometimes online detecting tools. The need for portable and simple monitoring tools has led to the development and advancement in the design and manufacture of various biosensors such as nanotechnology, microbial fuel cells and microbial, plant and algal sensors. The microbial fuel cell provides the energy needed for biosensors in remote areas for a long time. Paper biosensors allow easy and inexpensive detection of some heavy metals, toxins and Escherichia coli, while paper is also environmentally friendly. Bioluminescence-based algal biosensors convert heavy metals and herbicides into optical signals with the help of converters. In this paper, the use of biosensors in monitoring water and soil pollutants to measure chemical and biological oxygen demand, heavy metals and toxins is discussed.

Keywords: Pollutant Monitoring, Biosensors, Microbial fuel Cell, Biological Oxygen Demand.

Biomonitoring the exposure to polycyclic aromatic hydrocarbons in a pregnant population and effects on neonatal thyroid-stimulating hormone

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Abstract

Prenatal exposure to polycyclic aromatic hydrocarbons (PAHs) evokes extensive concerns regarding public health. Monitoring the pregnant women's exposure can be considered a suitable alternative to assess the fetus's exposure. This study aimed to monitor pregnant women's exposure (n=126) to PAHs using a biomonitoring approach to evaluate effects on neonatal thyroid-stimulating hormone (TSH) in Shiraz, Iran. PAHs priority compounds were measured by gas chromatography-mass spectrometry (GC-MS) after separating blood serum and liquid-liquid extraction (LLE) method. Information on neonatal TSH levels and data from the respondents was obtained from medical records and questionnaires. The mean PAHs concentrations ranged from 0.29 to 327.91 ng/g lipid. Regression analysis results showed a significant correlation ($p < 0.05$) between exposure to passive smoke and total PAHs concentrations. The results showed TSH decreased by 0.99 units as Acenaphthene increased per unit ($\beta = -0.001$). This study is the first to evaluate relationships between prenatal exposure to PAHs and effects on newborn health indicators, including TSH levels in a Middle Eastern population. Future studies are suggested to perform detailed assessments of PAHs intake sources, especially in vulnerable populations such as pregnant women and children.

Keywords: Biological monitoring, Prenatal exposure, Polycyclic aromatic hydrocarbons, Thyroid-stimulating hormone.

The association of personal care products uses with the urinary concentration of parabens in Iranian Men

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Abstract

Parabens are commonly used as preservatives in various personal care products (PCPs) mainly due to their antimicrobials properties. However, new evidences have shown that higher exposure to parabens could result in endocrine disruption and somehow increase malignancies. In this study, the concentrations of methylparaben (MP), ethylparaben (EP), propylparaben (PP), and butylparaben (BP) in urine samples from 125 men were measured and their relationship with the use of 13 distinct PCPs was examined. Detection frequency of parabens varied in the range of 83-98%. The median concentrations were found 60.12, 8.40, 9.74 and 7.19µg/L for MP, EP, PP, and BP, respectively. The urinary concentrations of MP and PP were found to be significantly ($p<0.05$) differ among low, medium, and high product users with the following order: high users> medium users> low users. Furthermore, the urinary concentration of parabens was found to be dependent on the types of products used. According to the results of MANCOVA, Men who reported the use of sunscreen, lotions and deodorant had significantly higher urinary concentrations of MP (76-185%). body wash user had higher levels of urinary MP and PP (112-160%). The use of mouthwash, toothpaste and perfume / cologne has also increased urinary PP concentration (73-412%) higher than no-users. The use of hand washing products has remarkably increased the urinary levels of parabens (158-520%). According to the results, a strong relationship was observed between the use of PCPs and the urinary levels of parabens among Iranian men. These findings could serve as a basis for more extensive studies to investigate the extent of exposure to parabens and to determine appropriate strategies for reducing paraben exposure.

Keywords: Biomonitoring, Urinary Parabens, Exposure, Personal Care Products, Men

Evaluation of pulmonary function of workers in Arad kouh waste processing and disposal complex

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Abstract

Waste processing facilities are a source of variety of pollutants. Exposure to these pollutants and their effects on human health in municipal solid waste management is a major concern worldwide. In this study, which was conducted in waste processing and disposal complex of Tehran (Arad kouh) as one of the largest waste processing centers in Iran, the pulmonary function was evaluated in three groups of administrative staff, processing and composting workers. In this cross-sectional study conducted in 2019, 25 administrative staff, 21 workers in processing units and 32 workers in the composting plant were included in the study. After receiving their consent form, the personal and professional information was collected. Then, spirometry test was performed by an experienced and trained person to determine the lung function of the individuals. Pulmonary function indices evaluated in this study were FEV1, FCV, FEV1/ FVC, FEF25-75% and PEF. For each participant, at least three acceptable tests were performed (and for some up to 10 tests) and the highest values of FEV1 and FVC capacity was selected. The results showed that the three studied groups were normal in terms of FEV1 and FVC indices, and no differences were observed in their lung performance among the processing and compost groups that were exposed to pollutants compared to administrative group as a control considering 5 studied indices (FEV1 (P value= 0.99), FVC (P value= 0.448) and FEV1/FVC (P value=0.332)). However, it cannot be assumed that there is no effect, and it seems that some factors such as healthy worker effect and intersubject variability can be a serious challenge in this study. Despite the observing no effect on pulmonary function of high exposed workers, due to the exposing of them to various pollutants in waste processing and management site, it is recommended to consider some preventive measures such as using personal protective equipment and measures to control pollutants to reduce the exposure of workers at an acceptable level.

Keywords: Waste management, Pulmonary function, Spirometry

Evaluation of the chemical quality and health risk of groundwater resources around Saravan landfill in Guilan

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Abstract

The penetration of landfill leachate into the subsoil contaminates soil and groundwater and has a negative effect on health. Therefore, the present study was conducted to investigate the quality and health risk of groundwater around Saravan landfill in Guilan province. In order to evaluate the effect of landfill on groundwater, leachate and water sampling of 5 wells around Landfill were performed and then physico-chemical parameters were analyzed and the results were compared with WHO standard and Environmental Protection Organization of Iran. Finally, the water quality index and potential health risks in children and adults were calculated. Based on the findings, the concentrations of chromium, lead and manganese were higher than the allowed amount. The results of non-carcinogenic cumulative risk assessment in children and adults were 4.77 and 2.48 and the result of carcinogenic cumulative risk assessment in children and adults were 11 x 10 -3 and 23 x 10 -3, respectively; And water quality index of 68.935 was obtained which was lower than recommended. Based on the findings, waste burial in Saravan landfill has led to a decrease in the quality of adjacent groundwater, and the results of heavy metal concentrations and their health risk assessment show the potential for pathogenic risk to the health of groundwater consumers in the study area. Therefore, due to the proximity of water wells to Saravan landfills and possible changes in the concentration of heavy metals, their continuous monitoring is necessary.

Keywords: Groundwater, Heavy metals, Risk assessment, Saravan Landfill

Association between maternal urinary parabens and anthropometric birth outcomes

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Abstract

Parabens are suspected to impair fetal growth because of disrupting effect on endocrine. Methylparaben (MP), ethylparaben (EP), propylparaben (PP), and butylparaben (BP) concentrations were measured in 105 maternal urine samples gathered before delivery and their associations with length, weight, and head circumference at birth were evaluated. Prenatal urinary concentration of MP and BP showed a significantly positive association with birth weight in all neonates (β=0.785, 95%CI: 0.161, 1.410 and β=8.56, 95%CI: 3.951, 13.168, respectively), while these chemicals showed a negative significant association with head circumference (β=-0.002, 95%CI: -0.004, -0.000 and β=-0.016, 95%CI: -0.030, -0.002, respectively). Furthermore, a significant positive association between MP and birth length was found (β= 0.004, 95% CI: 0.00, 0.00) in all neonates. In sex-stratified adjusted models, MP and BP were found to be associated respectively with higher birth length and weight in boy neonates (β= 0.008, 95% CI: -0.001, 0.017 and β= 7.948, 95% CI: 1.045, 14.851). In girls, maternal urinary MP, PP, and BP were associated with increased birth weight (β=0.831, 95%CI:0.043, 1.620; β=4.178, 95%CI:0.877, 7.480 and β= 10.821, 95% CI: 3.545, 18.097 respectively) and MP and BP were associated with reduced head circumference at birth (β=-0.003, 95%CI:-0.005, -0.001 and β=-0.035, 95%CI: -0.055, -0.016). Findings reveled a potential impacts between neonatal growth and maternal exposure to parabens. However, these findings should be interpreted considering the limitations of the present study.

Keywords: Endocrine disruptors, Exposure, Urinary parabens, Birth outcomes

Assessment of environmental effects is a step towards Sustainable development with emphasizing the new method of ecological risk assessment (ERA)

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Abstract

Development is factor for optimal changes in the quality of human life that the best mode is syschronize development while preserving environmental values. Assessment of environmental effects introduces the consequences of development activities and for takes steps to preserve and use the environment appropriately. Surveying of common evalution methods shows, environmental issues are always likely to occur during the development process. But, exactly it should help from environmental protection engineering sciences. Minimize The damage caused by the implementation of construction and operational projects. Ecological risk assessment (ERA) methods are one of the patterns of global occurrence, which seeks to find a suitable solution to reduce the effects of a development project by emphasizing the introduction of the end point of effects. In this regard, by introducing the effective factors and recognizing the standards of toxicity of those factors on specific cases has been able introduce the critical extant of the effective factors and how to deal with the ecological endangerment crisis. Environmental threats and hazards indicate an abnormal and irrational trend of human behavior that there is no certain answer for it yet. But at the present time, An impact assessment approach to the protection of the human echological environment in order to achieve human health is an effective and necessary strategy. In this article, the environmental effects with emphasis on the new method of ecosystem risk assessment in sustainable development planning from the desired aspects are discussed.

Keywords: environment, sustainable development, assessment, echological

Study of Heavy Metals content in intestinal tissue of Ulcerative Colitis patients and control group: A focus on their drinking water role

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Abstract

Ulcerative colitis (UC) is one of the most prevalent inflammatory bowel diseases and the cause of which has still remained unknown. Exposure to environmental risk factors such as heavy metals may be associated with this type of disease. The aim of this study was to measure and evaluate the relationship between the concentration of heavy metals including Pb, As, Cu, Zn, Ni, Se, and Fe in the bowel tissue of UC patients, controls, and their drinking water. Consequently, 35 biopsy samples were taken from each patients and controls along with their drinking water. All samples were prepared by acidic digestion and the concentration of heavy metals was measured performed using atomic absorption spectrophotometry. Moreover, data analysis was performed using IBM SPSS Version 23.0. The results showed that Pb, As, Cu, and Fe concentrations in patients were significantly higher than the control group; meanwhile the concentrations of Zn and Ni were considerably higher in the control biopsies. Further, there was no significant difference between Se concentration in patients and control subjects. The Pearson correlation coefficient revealed a significant correlation between some element concentrations in the intestinal tissues and the drinking water samples. Accordingly, exposure to heavy metals through drinking water can affect the body's heavy metal content, and differences in the level of heavy metals in UC patients compared to those controls may be involved in the prevention or development of the disease. Increasing the concentration of Pb, As, Cu, and Fe in patients with UC can exacerbate the disease and exposure to Zn can reduce intestinal inflammation.

Keywords: Heavy metals, Ulcerative colitis, Drinking water, Intestinal tissue.

Atmospheric bioaerosols in the Iran's rooftop Shahrekord: genera and levels

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Abstract

Bacteria and fungi in the air are important components of biological aerosols that have attracted much attention because they affect the ecological balance and pose potential risks to human health.

In this study, the genera and concentration of biological aerosols were measured in the air in the highest city of Iran (known as the roof of Iran). Sampling of bioaerosols was conducted using Andersen single-stage sampler at a flow rate of 28.3 L/min for 5 min on Sabrod dextrose agar (SDA) and Tryptic Soy agar (TSA) media for bacterial and fungal bioaerosols, respectively. The results of this study showed that the mean concentration of biological aerosols in the ostandari block station was higher than the passenger terminal and industrial region stations due to overcrowding and high traffic.The predominant genera of bacteria included Micrococcus, Pseudomonas, Bacillus subtilis and Staphylococcus aureus and the predominant genus of fungi were Cladosporium, Alternaria and Aspergillus. The results of this study can help to promote and implement public health preventive programs and establish recommendations to support healthier outdoor environments, especially for high-altitude cities.

Keywords: Bioaerosols, bacteria, fungi, outdoor air, Shahrekord

Poster

Isolation and determination of triclosan and methyl triclosan in urine samples using Dispersive Liquid-Liquid Micro-Extraction (DLLME) method and gas chromatography-mass spectrometry (Case study: children and adolescents in Kerman)

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Abstract

Triclosan (TCS) is a fat-soluble antimicrobial that is mainly used in personal care products such as shampoos, toothpastes, and cosmetics. Methyl triclosan (MTCS) is the main metabolite of TCS. Exposure to TCS can exacerbate or cause non-communicable diseases such as cardiovascular disease, diabetes, asthma and allergies, as well as endocrine disorders. These analytes are mostly excreted in the urine and are also the best and most accessible matrix for biological monitoring in the human body. The aim of this study was to investigate a new method extraction using Dispersive Liquid-Liquid Micro-Extraction (DLLME) method to identify and measure TCS and MTCS in urine samples of children and adolescents in Kerman. The results showed that the RSD method used for TCS and MTCS was 4.6 and 3.9 percent, respectively. The LOD and LOQ methods used for TCS and MTCS were 1.9-1.8 and 6.3-6.0, respectively. Mean urinary TCS and MTCS (μg/L) were observed at 4.62 ± 2.08 and 1.91 ± 0.88, respectively. In the urine samples of all subjects (79 patients), TCS and MTCS were identified, which indicates that all subjects are exposed to TCS, as a result, it is necessary to limit the Ways of exposure by increasing the awareness of the public and the relevant authorities and the legislature.

Keywords: Bio-monitoring, triclosan, methyl triclosan, micro-extraction

Association of urine concentration of heavy metal with metabolic syndrome: A case-control study in Hoveyzeh, Iran

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Abstract

The incidence of metabolic syndrome (MetS) has been growing at an alarming rate and is rising to pandemic proportions. Among all the pollutants, heavy metals are most dangerous one as these are non – biodegradable and persist in environment. More attention is being given to the potential health hazards such as metabolic syndrome posed by heavy metals. The data was used in this case- control study from Persian Cohort center of hoveyzeh. Sampling was done randomly on a regular basis and urine samples were collected from 150 individuals (75 cases and 75 controls) for analysis of heavy metal concentrations. To make a quantitative comparison between the two groups of case and control, Yuman-Whitney nonparametric test was used. Subsequently, multivariable regression was performed, adjustment for age, demographic, lifestyle factor, physical activity, occupational history and creatinine. The results of logistic regression were showed that after adjusted for creatinine, the OR and 95% CI for Cd, Pb, Sr, As and Fe were still significant. The results were indicated that Cd and Pb have a significant association with WC. After adjustment for creatinine, age, sex, occupation, smoking status, level of education and place of residence, only Pb was showed a significant association with SBP. The subjects with the highest levels of urinary cadmium were at increased odds (OR: 6.273; 95% Cl: 1.783- 22.070) of MetS, as well as low HDL-C. The association between higher As and elevated FBS supports previous experimental and epidemiologic evidence suggesting that As may have a diabetogenic effect. These results suggest that a higher prevalence of MetS is associated with urine heavy metal in the study population.

Keywords: Metabolic Syndrome, Heavy metals, Hypertension, Hyperglycemia, Case-control Study.

Poster

Simulation of climate change impact on PM10 concentration in Zanjan

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Abstract

The importance of climate change studies and its impact on particulate matter emissions, especially PM10, in environmental research is increasing. Therefore, the aim of this study was to simulate the effects of climate change on PM10 concentration in Zanjan city using artificial neural network (ANN) from 2021 to 2050. PM10 hourly data in Zanjan city were analyzed from 2007 to 2018 and daily meteorological data from 1988 to 2018. The output of the HadGM2-ES models of the general atmospheric circulation was utilized to project future climate pattern based on two scenarios of Representative Concentration Pathway (RCP2.6 and RCP8.5). Statistical downscaling was done by LARS-WG 6.0 software to produce high-resolution synthetic time series weather dataset. ANN were applied for simulating the impact of climate change on PM10 concentration. The observed climate variables including maximum and minimum temperatures and precipitation were tagged as predictors in ANN. PM10 was considered as the target outcome variable. Projected future (2021-2050) climate in downscaling step was carried out to assess future PM10. PM10 concentrations are increasing in both scenarios compared to observational data by 2050. The highest increase in PM10 is in May, June and July. The lowest PM10 was observed in December. We observed a significant correlation between minimum temperature, maximum temperature and wind speed with PM10 concentration. As the value of these variables increases, the concentration of PM10 also increases. Simulation results indicated that there is a clear trend of increasing maximum and minimum temperatures under two scenarios by the year 2050 and the highest temperature rise observed based on the worst scenario (RCP8.5). There is strong evidence to show that PM10 is correlated with environment variables, as wind speeds and high temperatures could provide increase the concentration of PM10. Furthermore, ANN is an executive tool to simulate the impact of climate change on dust phenomena to estimate the future trend of increase the concentration of dust particles for adopting preventive measures.

Keywords: Climate change, PM10, Simulation, Artificial neural network, Zanjan

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Environmental Burden of Disease

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Oral Presentations

Risk assessment of polycyclic aromatic hydrocarbons (PAHs) from household dust of Shiraz, Iran

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Abstract

Indoor dust samples were collected from 40 houses in Shiraz and 16 PAHs were analyzed by gas chromatography-mass spectrometry (GC-MS). Data analysis was performed using SPSS and Risk assessment calculations were performed. The total concentrations of PAHs measured in the dust samples ranged from 31 to 453 ng g^(-1) . Moreover, the mean lifetime cancer risk (ILCR) was 2.16× 10-5 for adults and 2.24× 10-5 for children, indicating risk of cancer for both groups. Although comprehensive policies are needed to control PAHs, It is recommended to minimize the production of PAHs indoors to reduce the amount of dust containing these compounds.

Keywords: Indoor air pollution, Dust, Polycyclic aromatic hydrocarbons, Carcinogenic risk assessment

Oral Presentation

Spatial Trend and Health Risk of Heavy Metals from Settled Dust in NW, Iran

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Abstract

Heavy metals in settled dust have become a global concern. The goal of present study is to evaluate of heavy metals values and health risk assessment of Arsenic (As), Cadmium (Cd), Copper (Cu), Lead (Pb), Nickel (Ni) and Zinc (Zn) through oral, skin, and inhalation, in the dust around Lake Urmia in Iran. Assessment of settled dust pollution and source identification was done with enrichment factor and Pearson correlation. Heavy metal concentrations were in the order of Zn > Cu > Ni > Pb > Cd > As with arithmetic mean of 3.5, 4.8, 57, 33, 25 and 83 mg/kg, respectively which are within the range of Iran-EPA soil guideline values. A very weak correlation was found between the studied elements. The average enrichment factor for As, Cd, Cu, Ni, Pb, and Zn was 0.7, 4, 1.8, 0.5, 3.2 and 0.8, respectively. This ranges of EF suggest minor enrichment for metals and influence from anthropogenic activity.

The values of lifetime cancer risk (LTCR) (LTCR) from tree paths exposure by heavy metals were in the negligible risk category. The skin contact route had the highest Hazard Index (HI) between all of exposure paths. The HI was extracted to be less than 1 through tree path exposure. Additionally, the sensitivity analysis by exposure duration (ED) and exposure frequency (EF), reveals that As, Ni, Cd and Pb have the highest cancer risk according to LTCR values.Therefore, this study suggests the continuous monitoring of heavy metals in settled dust around the Lake Urmia as its associated with the high health risk for the neighborhood in the Lake Urmia's basin.

Keywords: Heavy metals, Settled dust, Lake Urmia, Health risk

Deterministic and probabilistic procedures to evaluation of human health risk due to heavy metals in groundwater resources; Sensitivity Analysis, and Geographic information system

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Abstract

Water, as the primary human needs, play a vital role in all aspects of our life, such as social environment, production, the economy, food security, and politics. In the present investigation, Heavy Metals (HM) concentrations including Cr, Pb, and Cd, have been ascertained in drinking water resources. Besides, point estimation using Hazard Quotient (HQ) and Hazard Index (HI) formula and sensitivity analysis (SA) using the Monte Carlo Simulation technique, by 10,000 repetitions in Oracle Crystal Ball®, were applied to demonstrate the non-carcinogenic effects of HMs on different exposed populations (Infant, children, teenagers, and adults groups). According to the results, the concentrations of Cr, Pb, and Cd in water resources ranged from 2.2 to 173.7 µg/L, 0.5 to 10 µg/L, and 0.2 to 0.9 µg/L, respectively. The results also showed that HI values were in the order of Pb>Cd >Cr. The results of SA, to determine the most effective parameter in increasing non-carcinogenic risk, showed that the concentration parameter of studied HMs had the most effect on increasing sensitivity in the four studied exposed groups.

Keywords: Heavy metals, Health risk assessment, Hazard quotient, Monte Carlo Simulation, Sensitivity analysis, Uncertainty analysis, Groundwater resources, Chromium

Oral Presentation

A comparative analysis of high and low risk areas for gastric cancer in Iran in relation to the chemical quality of water resources

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Abstract

Chemical quality of drinking water is considered as an important factor in the development of gastric cancer. The aim of this study was to compare the quality of drinking water in Ardabil province as a region with high risk of gastric cancer and Hormozgan province as a region with low risk of gastric cancer. Physico-chemical properties data of groundwater (wells, springs and aqueducts) were obtained from the Iran Water Resources Management Company. Piper diagram drawn by Aq.QA software (version 1.1) was used to compare the dominant cations and anions and hydrogeochemical characteristics of groundwater resources in Ardabil and Bandar Abbas. In addition, the concentrations of anions and cations were compared with the standard values of Iran National Standards Organization (INSO) and World Health Organization (WHO) guidelines. Based on the typological results obtained from groundwater sources in Bandar Abbas, the most dominant hydrogeochemical type observed was found to be Na-Cl (67.52%) and the most dominant cations and anions were sodium (86.89%) and chloride (71.23%), respectively. Also, in the groundwater resources studied in Ardabil, 44.44% of the water were found to be Na-HCO3 type. The most dominant cation was sodium (68.06%) and the most dominant anion was bicarbonate (70.83%) in this province. According to the results, the concentration of calcium and magnesium (hardness) in the groundwater of Bandar Abbas was higher than the city of Ardabil and the difference in the concentration of these parameters in the groundwater of the two cities was statistically significant ($p < 0.001$). The results support the hypothesis that hardness (calcium and magnesium) of drinking water may protect the person against the development of gastric cancer. Further studies investigating the water quality of other provinces in Iran are suggested.

Keywords: Drinking water, Chemical properties, Hydrogeochemical characteristics, Gastric cancer

Environmental Burden of Disease

Posters

Ultraviolet Irradiance of commercial nail dryer Lamps and Risk Assessment of Skin Exposure

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Abstract

Introduction: The aim of this study was to investigate the ultraviolet leakage (UV A and B) for nail dryer lamps in salons of Saveh, Iran.

Materials and Methods: The UV(A+B) radiation from Nail Dryer devices, which falls into two types of ultraviolet (UV) fluorescent lamps, light emitting diodes (LED) or a combination of both (UV/LED), was investigated by using UV-Meter. The UV levels measured based on lamp type, lifetime of the device, and the different parts of the devices. In addition, the relative risk ratio of potential risk of skin damage (RR) caused by UV radiation (HBEskin) calculated.

Results: The results showed that the most number/percentage of available devices are UV/LED type (56.9% vs 43.1%). There was no significant relationship between the UV emission of UV and UV/LED (P=0.096), but the UV leakage between UV and UV/LED was significant statistically (P<0.001). There were the highest and lowest UV emission for the bottom and right parts of the studied nail dryer deices, respectively (2080.8 vs 14.464 µW/Cm2). There was no significant relationship between the UV emission, UV leakage, and duration of operation; however, the UV emission differences was significant based on the model of devices (P<0.001).

Conclusion: The RR for all measured points was higher than 1 that represents skin damage risks due to UV irradiance exposure. It can be concluded that the integrated UVA and B emission/leakage were higher than the acceptable level that can damage users skin. The establishment of monitoring schedule and suitable education for operators and users can decrease the side-effects of the nail dryer UV.

Keywords: Nail Dryer lamp, UV, Radiation, Nail Salon, Irradiation, UV-A Irradiance

Evaluating the Level of Lighting Satisfaction and Determining Degrees of Visual Fatigue, Mental Task Load, Sleepiness, and Sleep quality in Students

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Abstract
Objective: The present study aimed to evaluate the levels of lighting satisfaction, mental task load, visual fatigue, and sleep quality in students at the Saveh University of medical sciences.
Methods: The present cross-sectional study examined 100 students of Saveh Faculty of Nursing and Midwifery in 2020, and collected their levels of lighting satisfaction, mental task level, visual fatigue, and sleep quality using standard questionnaires. After the data management by SPSS 21, we evaluated them using the descriptive and analytical statistics.
Results: The research results indicated that the students' scores of satisfaction with existing lighting were at the level of indifference. Visual fatigue was low and sleepiness was mild. The subjective task load and sleep quality were respectively moderate and low for the students. The results of statistical tests indicated a significant inverse relationship between visual fatigue and lighting satisfaction ($p<0.001$). Also, visual fatigue and task load had a significant direct relationship ($p<0.001$). The results also indicated that the average number of hours of sleep per night was 6.72 hours for students and was less than the normal recommended amount. In general, the average quality of sleep was 11.06 and low in the population.
Conclusion: According to the results, the students' mental task load, and sleep quality were medium and low. It seems necessary to pause and rest between training, increase the variety of educational activities, appropriate training, and lighting intervention.

Keywords: Visual Fatigue; Satisfaction; Sleep Quality; Mental task load; Student

Poster

Modeling and health effects of BTEX in indoor air of the big multi-storey car parking of Qom city

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Abstract

The aim of this study was to measure the concentration of BTEX in the indoor air of one of the largest multi-storey car parking in Iran (in Qom). Samples were taken on different days of the week in three main locations of parking. To estimate the BTEX concentration, the novel wavelet-based random forest model (WRF) with maximal overlap discrete wavelet transform (MODWT) function were performed according to temperature, day, week, sampling location and relative humidity data. The results show that the WRF model can estimate BTEX trends and changes based on high R2 values of 0.96, 0.95 and 0.98 for training, validation and test data, respectively. The results of lifetime cancer risk (LTCR) and non-cancer risk assessment (HI) showed that there is a carcinogenic risk of benzene (LTCR = 2.22E -4) and a high risk of non-carcinogenicity (HI = 4.5) from BTEX emission. The results of this study indicate the importance of BTEX in closed and poorly ventilated spaces and the application of machine learning and WRF in predicting air pollution in various spaces such as parking.

Keywords: Indoor Air Pollution, BTEX, Health Impact Assessment, Parking Pollutants, WRF

Health risk assessment of heavy metals exposure through drinking water consumption in Karaj

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Abstract

This investigation has been conducted to evaluate the concentrations of heavy metals, including Nickle (Ni) and Cadmium (Cd) in drinking water in Karaj city, Iran. In this descriptive cross-sectional research, there have been 40 samples of tap water collected. The atomic absorption spectrophotometer has been used to measure the concentrations of Ni and Cd and the United States Environmental Protection Agency (USEPA) indexes have been used to evaluate the human health risk. The results showed that the mean concentrations of Ni and Cd in tap water have been lower than the recommended quantity based on the standards of the World Health Organization (WHO) and USEPA. Although there is no potential risk of carcinogenic detrimental health effect in children and adult groups. It is recommended that the heavy metals concentrations in drinking water are periodically monitored to minimize the environmental pollutions and health risks in consumers.

Keywords: Human health risk assessment, Heavy metal, Nickle, Cadmium, Carcinogenic, Non-carcinogenic

Simulation of health risk for exposure to nitrate in drinking water resources by Monte Carlo method (MCS); a case study from Qazvin province

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Abstract

Groundwater is one of the main resources of drinking water supply in Qazvin province. As human activities cause the entry of a wide range of chemical contaminants, including nitrate, into these resources, it is essential to use methods to control drinking water quality and assessment of health risk. The present study was performed in order to investigate the possibility of nitrate contamination and its health effects on human by Monte Carlo simulation method in addition to SPSS v26 software by 100,000 times repeat for all age groups. To do this study, in 1398 and 1399, 246 drinking water samples were collected from the distribution system of urban areas in Qazvin province. Nitrate concentration was determined by UV-visible spectrophotometer DR 5000. Results revealed that nitrate concentration was in the range of 1.78-1.12 mg / l and the average was 23.5. Monte Carlo simulation results showed that the average hazard quotient for infants, children, adolescents and adults were 0.48, 0.45, 0.35 and 0.15, respectively. In the other word, in 11.4% of the target population, there was a possibility of adverse health effects due to exposure to nitrate in drinking water (P = 0.03-0.08). The results of this study provide useful information on nitrate concentration in drinking water resources in urban areas of Qazvin province and the health consequences of nitrate exposure to drinking water suppliers and highlight the importance of the monitoring and supplying of safe drinking water for consumers.

Keywords: Nitrate, Monte Carlo simulation, drinking water, risk assessment, Qazvin province.

Health risk assessment attributed to nitrate in groundwater resources of Ghaemshahr-Juybar aquifer in Mazandaran province

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Abstract

Today, groundwater pollution with nitrate is one of the most dangerous and widespread environmental problems that may have adverse health effects on human health. Therefore, it is important to assess the health risk associated with nitrate in drinking water sources to ensure that drinking water does not have long-term adverse health effects. In this study, nitrate concentrations in different groundwater resources of Ghaemshahr and Juybar districts in Mazandaran province were investigated and the associated non-carcinogenic risk was assessed based on the Monte Carlo simulation method. It was found that the average nitrate concentrations in springs, semi-deep (or shallow) wells and deep wells were 21.9, 34.8 and 31.1 mg/L, respectively. In addition, the probabilistic health risk assessment showed that, if the water of these sources be used for drinking, the level of non-carcinogenic risk (HQ) attributed to nitrate in spring water, semi-deep wells and deep wells for adults and spring water for children would be in the safe range (less than 1). However, the health risk for children would be higher than the safe threshold for the water of semi-deep (1.37) and deep (1.22) wells. Therefore, if these sources be used for drinking water, it is necessary to pay attention to their nitrate level and to control their polluting sources in order to minimize the adverse health effects of nitrate, especially on children's health.

Keywords: Nitrate, Groundwater, Health risk assessment, Ghaemshahr-Juybar aquifer

Global poisoning of aluminum phosphide with its emphasis in Iran: a review

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Abstract

Background and aim: Aluminum phosphide poisoning (AIP) often occurs with the intention of suicide and sometimes accidentally caused by occupational exposure and rarely with the intention of criminality. Therefore, this study aimed to investigate the Global poisoning of aluminum phosphide with its emphasis in Iran. Materials and Methods: This study was conducted as a narrative review on websites related to reputable journals in scientific databases. Articles from 1996 to 2020 with an emphasis on chemical properties, toxic values, epidemiology in Iran and other countries were reviewed. Results: The cases of poisoning reported in articles during 2000-2019 were 3150 cases and the number of deaths was 606 in Iran. The highest reported statistics in Tehran are the country's young population and women. According to the statistics reported in the Forensic Medicine Organization of Iran from 2008 to 2019, the death toll has been increasing and only in 2014 and 2015 these statistics have decreased. Conclusion: Acute poisoning due to aluminum phosphide is more common in Asian countries and its incidence is lower in other countries, especially in European and American countries. This can be due to the use of this toxin due to its inexpensiveness and availability in the mentioned countries. The lack of an antidote is the most prominent problem available, however, updating the knowledge of experts and the general public will help reduce the risk of poisoning caused by aluminum phosphide.

Keywords: Aluminum Phosphide, Rice Tablets, Poisoning, Iran, Other Countries

Investigate the nitrate and nitrite concentration in drinking water of Shiraz rural areas and Non-carcinogenic risk assessment by using Monte Carlo simulation

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Abstract

The aim of this study was to investigate the nitrate and nitrite concentration in drinking water of Shiraz rural areas and Non-carcinogenic risk assessment by using Monte Carlo simulation.

In this study, 33 chemical samples were collected from rural water distribution. Nitrate and nitrite concentration in samples were measured by spectrophotometer and health risk assessment of existing nitrate was estimated by model of US Environmental Protection Agency and the World Health Organization. The results showed that NO3 concentration in drinking water of Shiraz rural areas ranged from 2.80 to 25.80 mg/L with an average of 10.02± 0.0052 mg/L. The nitrite concentration range was 0 to 0.015 with an average of 0.0052 ± 0.0044. According to the results, in rural areas located in the southern countryside of Shiraz plain, nitrate concentration was higher than other areas. The results showed that the Hazard Quotes (HQ) for children and adult group on average was 0.36 and 0.22, respectively. According to the Monte Carlo simulation results, the values of HQ nitrate for the 95th percentile were 0.79 in children and 0.45 in adults. The results of sensitivity analysis showed that the nitrate concentration in the drinking water distribution network was the most important factor in the non-carcinogenic health risk assessment caused by nitrate ions. It seems that the southern regions of Shiraz plain are affected by the entry of pollutants from urban areas and the development of residential landuse upstream of this plain and there is a need requires more protection of water resources in these areas

Keywords: Nitrate and Nitrite ions, Drinking water, Rural areas, Health risk assessment, Monte Carlo simulator.

Determination of Heavy Metals in hair dyes sale in Iranian Market: Dermal Sensitivity and Carcinogenicity Assessment

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Abstract

Despite the high consumption of cosmetics especially hair dyes in Iran, limited studies have measured human exposure to heavy metals in these products. therefore, due to the sensitivity of the issue from a health perspective, this study was performed for the purpose of dermal risk Assessment of heavy metals in different brands of hair dyes in Kashan region. The present study is an analytical-observational study. in this study, 36 samples of hair dyes from four best-selling brands in Kashan market (Iran) were selected. then the concentration of lead, cadmium, nickel, chrome, and cobalt were measured by ICP-OES and reported as µg.g-1 of dry weight, and finally, a health risk assessment was performed. the heavy metals concentrations in the hair dyes samples were (1.825), (0.525), (48.15), (2.975) and (0.575) µg.g-1 for Pb, Cd, Cr, Ni and Co respectively. that were lower than the permissible limit. Both of HI and LCR were below of 1 and 10-6 that indicated heavy metal in this study had not probable non-carcinogenic and carcinogenic risks for the consumers of these products. An exposure-based sensitization quantitative risk assessment determined an absence of skin-sensitizing potential. However, Cr, Ni and Co were found at concentrations above the allergenic limit of 5 µg.g-1. According to the results, although due to low concentrations of toxic metals, there is a low levels of exposure to heavy metals in hair dye users, but can cause potential health damage to users.

Keywords: Heavy Metals, Risk Assessment, hair dye, ICP-OES.

Determination of heavy metals in Cream Foundations and Assessment of Their Dermal Sensitivity, Carcinogenicity, and Non-Carcinogenicity

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Abstract

Lightening creams are among the most frequently used cosmetic products applied to the face to obtain a lighter tone or as an anti-spot. Heavy metals are the most common ingredients in powder creams that are sometimes present in impurities or added to improve the quality and shine, which these metals can threaten human health. The current study aimed at determining the concentration of heavy metals in cream foundations. For this purpose, the concentration of five heavy metals including lead, cadmium, nickel, chromium, and cobalt, were measured in four brands of cream foundations selected from the Iranian market (two domestic and two imported brands). Measurements were performed using inductively coupled plasma optical emission spectrometry (ICP-OES) in 36 samples in three colors of dark, beige, and light. According to the obtained results, the lead concentration was 1.45-398.5, cadmium ND-4.77, nickel 1.75 - 16.92, chromium 3.52-30.9, and cobalt 0.45-3.77 µg/g. The total content of heavy metals was higher in two Iranian brands than the two imported ones. In terms of color, the results indicated that heavy metals' distribution did not follow a certain pattern in different colors. According to the guidelines, all the tested samples were within the safe range in terms of non-carcinogenicity, carcinogenicity, and dermal sensitivity. However, due to the high concentration of trace elements in the samples, consumers' health consequences should not be overlooked.

Keywords: Heavy Metals, Risk Assessment, Cosmetic cream, ICP-OES

Evaluation and analysis of Covid-19 in Iran based on current data

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Abstract

Iran was among the first countries with a major outbreak outside China. The purpose of this study is to analyze the Covid-19 trend in Iran and find its possible causes. In order to prepare the required information, a list of the desired sources was prepared and a large number of these sources were removed after many studies. The reason for deleting many of these sources was due to incomplete or inconsistent information with official information. The information that we needed was the daily new cases, the daily new deaths, number of vaccinations, number of tests were taken and etc. After finding the required data, we turned this data into charts so that we can examine and analyze them. Most of the charts were made by myself and some of them were taken from other sources. The first cases were identified on February 19, 2020, and then the first wave of the disease was formed in Iran, and by April 2020, the number of cases was increasing and then decreased. The second wave of the disease started in May 2020 and we saw an increase in the number of coronavirus cases, and this upward trend continued until June 2020. From June 2020 to September 2020, the trend of coronavirus cases was balanced, and from mid-September 2020, we saw an increase in the number of coronavirus cases, which formed the third wave of the corona. The upward trend in coronavirus cases in the third wave continued until December 2020 and decreased until January 2021. The fourth wave of the coronavirus began in March 2021 and was accompanied by a sudden increase in coronavirus cases and continued until the end of April 2021, after which it continued its downward trend until June 2021. After June 2021, we witnessed an increasing trend of coronavirus cases, which introduced us to the fifth wave of coronavirus. Iran's inability to control Corona is rooted in poor management and the country's economic situation. There are multiple reasons that coronavirus goes out of control like the government did not vaccinate its people in time, or the people did not follow the protocols for this situation, some waves of coronavirus were caused after restrictions were lifted and people travel around the country because of vacations.

Keywords: Covid-19, current data, analysis, evaluation.

Carcinogenic and non-carcinogenic risk assessment by arsenic content of the bottled water in Iran

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Abstract
The purpose of this study is Carcinogenic and non-carcinogenic risk assessment by arsenic (As) content of the bottled water to all age groups in Iran. 71 valid brands of bottled drinking water were collected and analyzed for heavy metal As. The average concentration and standard deviation of As was 0.59±7.64E-19 µg/l. The average of hazard quotient (HQ) As for both men and women in all ages was 7.58E-02. Also, the average of carcinogen risk (CR) As for men and women of all ages was 3.56E-05 and 3.42E-05, respectively, which was higher than the value recommended by the EPA (≤ 1E-06). The results showed that in this study the As carcinogenic risk potential was high and the non-carcinogenic risk potential was low.

Keywords: Bottled water; Arsenic; Carcinogenic risk assessment; Non- carcinogenic risk assessment.

Poster

Associations of combined short-term exposures to ambient PM-2.5 air pollution and traffic noise on mental health disorders: A panel study of healthy college students in Tehran

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Abstract

A few studies are available on the simultaneous effects of air pollution and noise annoyance on human mental health. The aim of this study was to evaluate the effect of short-term exposure to PM2.5 and noise annoyance on mental disorders at the same time. To this end, in this panel study, 110 students of Tehran University of Medical Sciences were evaluated in terms of depression, anxiety, and stress symptoms using DASS-21 questionnaire in three selected time periods based on a range of PM2.5 concentrations. Participants were also self-reported in terms of the severity of noise annoyance. To estimate the concentrations of air pollutants participants exposed to, the data was obtained from measurement stations of Tehran Air Quality Control Company were used. The Random intercept mixed effect model was used to analyze the relationship between PM2.5 and noise annoyance with the study outcomes. The results showed that increased exposure to the environmental PM2.5 was associated with intensification of depression, anxiety, and stress scores which were 2.727 (1.480, 3.973), 2.363 (1.080, 3.647), and 2 (0.647, 3.352), respectively. The estimated effect of PM2.5 on depression was higher in men group than that in women; there was a positive and significant relationship between stress only in women and anxiety only in men. Low-income participants was found to experience higher levels of depression and stress compared to high-income ones following exposure to particles. However, the level of anxiety was higher in the latter case. The results showed that the increased noise annoyance was associated with an increase in the scores of depression: 3.512 (1.759, 5.264), anxiety: 5.381 (3.702, 7.059), and stress: 3.629 (1.788, 5.470). Noise annoyance also intensifies the effect following exposure to particles on mental health. Overall, the results obtained from the present research revealed evidence confirming an association between short-term exposure to environmental PM2.5 and increased outcomes of depression, stress, and anxiety. In addition, a non-negligible effect of concomitant PM2.5 and noise annoyance on the study outcomes was observed in the present study.

Keywords: Suspended particles; Noise annoyance; mental health; Panel study.

Assessment of Health Effects and Economic Costs attributed to PM2.5 using AirQ+ and BenMap-CE

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Abstract

Air pollution is considered as the most prominent public health. Economically, air pollution imposes additional costs on governments. The aim of this study is to survey health and economic effects of PM2.5 using AirQ+ and BenMap-CE in Qom in 2019. The hourly PM2.5 was obtained from Qom Province Environmental Protection Agency and population data was collected from Qom Province Management and Planning Organization website. The number of deaths due to stroke, lung cancer, chronic obstructive pulmonary disease, ischemic heart disease and acute lower respiratory infection attributable to PM2.5 were estimated using AirQ+ and BenMap-CE based on control scenario of 10 µg/m3. The economic effect of premature deaths was estimated through VSL approach. The average annual of PM2.5 concentration found to be 16.32 µg/m3 (SD: 9.93). The highest concentration have been occurred in August, September and October. 65 and 116 premature deaths attributable to PM2.5 were estimated in overall, using AirQ+ and BenMap-CE, respectively. The total cost was calculated to be 15504510 USD. The highest mortality was related to ischemic heart disease. The results of both health and economic assessment indicate the importance of solving problem of air pollution in Qom, as well as other big cities in Iran. Elimination of the limitations such as insufficient data should be included in future studies.

Keywords: Air Pollution, BenMap-CE, Health Impact Assessment, AirQ+

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Environmental Pollution Control Technologies

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Oral Presentations

Oral Presentation

Metronidazole photodegradation by a new nano-biomagnetic photocatalyst $ZnFe_2O_4$@Methylcellulosee

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Abstract

Metronidazole (MNZ) is a non-biodegradable synthetic antibiotic that is used to treat a range of infectious diseases. Its discharge into the environment has resulted in antibiotic resistance, algal plant growth, and genotoxicity. The effective parameters such as pH, nano-photocatalyst loading, initial MNZ concentration, and UV-C irradiation period on antibiotic removal efficiency were optimized. A microwave-assisted technique was used to produce ZnFe2O4@methyl cellulose (MC) nano-biomagnetic photocatalyst in this work. The structure of as-prepared ZnFe2O4@MC was characterized using FESEM, EDS, and XRD. Under ideal circumstances, the elimination effectiveness of Metronidazole (MNZ) degradation was 92.65% in synthetic samples. We offer a new magnetic nanocomposite and a unique approach for removing antibiotics from aqueous media in this paper.

Keywords: ZnFe2O4@MC, Methylcellulose, Nano-biomagnetic, Metronidazole

Evaluation of plastic biodegradation with three strains of Bacillus subtilis 6051 ATCC, Bacillus cereus 11778 ATCC, Staphylococcus ATCC 25923 Aureus

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Abstract

Nowadays, with the increasing development of technology synthetic polymers have been produced all over the world. Plastics are the synthetic polymer that are derived from nonrenewable and petrochemical materials such as coal, natural gas, and oil and consist of compounds liked hydrogen, carbon, chloride, nitrogen, sulfur, silicon, oxygen and other various organic and inorganic materials. Due to the remarkable properties of these compounds such as versatility, weightless, persistence, flexibility and stability, durability, low production expense, ease of production and resistance to environmental factors are extensively used. Increased consumption of garbage bags in recent years and reduced capacity of landfills, as well as problems with the plastic recycling system and low biodegradability of plastics in nature have led to the accumulation of large amounts of plastic waste. The purpose of this study is to use standard strains to decompose freezer plastics made of polypropylene, which is one of the most widely used plastics for human consumption. In this study, standard strains of Bacillus.subtilis ATCC 6051, Bacillus.cereus ATCC 11778 and Staphylococcus.aureus ATCC 25923 were used for plastic analysis. 0.1 g of plastic was made in mineral medium and heated at 30 ° C at 150 rpm for 20 days. The results of this study showed that Bacillus subtilis, Bacillus cereus and Staphylococcus aureus have the ability to decompose 31%, 26.7% and 19.4% of plastic, respectively. The results of morphological analysis of plastics decomposed by SEM microscopy showed that cracks, irregularities and wells were formed on the surface of fermented plastic samples compared to the control sample. In fact, these standard strains have the ability to use plastic as the only source of carbon in harsh conditions. Therefore, this method can be used to reduce and decompose plastics in the environment.

Keywords: Plastics, biodegradation, microorganisms, polymers.

Oral Presentation

Identification of beta-lactam-resistant coding genes in wastewater treatment plant by activated sludge method

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Abstract

Wastewater treatment plants are the most important factor in the release of antibiotic-resistant genes into the environment. The aim of this study was to identify common antibiotic resistant genes in raw wastewater and municipal wastewater and also to determine the effect of municipal wastewater treatment plants with different processes on reducing / eliminating these pollutants. The seedlings were harvested according to standard conditions and transferred while maintaining temperature conditions. Nine genes resistant to the antibiotic group beta lactam were selected. PCR test was used for identification (presence / absence) as well as real-time (Real-Time PCR) for quantitative measurement of three resistant genes in wastewater and effluent samples. According to the results, the highest deletion rate belongs to blanps-1 gene with 90.61 percent and the lowest belongs to ctx-m-32 with 65.93 percent, but the decreasing trend in these two genes in oxa-1 is the increase in output unit by 45 / 12 percent indicates the inefficiency of the chlorination unit for this gene.

Keywords: Resistant genes, beta-lactam, antibiotics, PCR processes, wastewater and water treatment plan

Decolorization mechanism, identification of an FMNdependent NADH-azoreductase from a moderately halotolerant Staphylococcus sp. MEH038S, and toxicity assessment of biotransformed metabolites in biological degradation process of Reactive Black-5

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Abstract

Application of halotolerant microorganisms with decolorization ability for textile wastewater treatment is attractive nowadays. Thus, the present study was conducted with the aim of the investigation of decolorization mechanism, effective parameters on decolorization efficiency and toxicity assessment of Reactive Black-5 before and after biological treatment. Decolorization efficiency for live cells of Staphylococcus sp. strain MEH038S was more than dead cells, which proved that Reactive Black-5 was decolorized through degradation process. The results of the present study showed that FMN-dependent NADH-azoreductase was responsible and effective in decolorization and degradation process. Also, the gene encoding azoredutase was characterized and submitted at the gene bank data base as Staphylococcus sp. EFS01 azoreductase from a moderately halotolerant Staphylococcus for the first time. Maximum decolorization efficiency of 98.15% was observed at pH 6.5, 35 °C for 50 mg/L of Reactive Black-5. It should be noted that more than 90% decolorization efficiency was observed in the presence of 5-40 g/L of NaCl. The results from Gas chromatography–mass spectrometry and Fourier transform infrared spectroscopy revealed that Reactive Black-5 was broken to the low molecular weight compounds with any azo chromophoric bonds. Also, the results of phytotoxicity and fish toxicity proved that biotransformed metabolites (produced in biological treatment of Reactive Black-5) were more toxic than original Reactive Black-5.

Keywords: decolorization mechanism, Azoreductase enzyme, Moderately halotolerant Staphylococcus, Reactive Black-5, Toxicity analysis.

Environmental Pollution Control Technologies

Posters

Evaluation of the efficiency of magnetic activated carbon modified by ionic liquid in the removal of Tetracycline from aqueous solutions

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Abstract

Tetracycline (TCy) is currently recognized as one of the most widely used antibiotics that can be released into the environment from municipal wastewater treatment plants or agricultural effluents. Due to low metabolism, poor absorption, overuse and misuse, it is considered a serious threat to the environment and its removal from wastewater is an inevitable necessity. In this research, a novel ionic liquid modified magnetic activated carbon nanocomposite (IL@mAC) was synthesized, characterized, and the adsorption efficiency of IL@mAC for removal of TCy was investigated under different operational parameters of pH (3-11); dose of IL@mAC (0.01-0.1 g/50 mL); reaction time (30-240 min), and initial TCy concentration (50-1500 mg/L). The IL@mAC characterization was done using XRD, VSM, SEM-EDX, BET, and FTIR. Results of equilibrium experiment showed that the highest removal efficiency (~98%) was obtained using 0.06 g of IL@mAC in 135 min at pH 7 and temperature 303 K. Considering the correlation coefficients (R2) for different adsorption models, it can be deduced that adsorption of TCy onto IL@mAC is better followed by Langmuir (0.9977) in comparison to Freundlich (0.9412), and Temkin (0.9536) models. Furthermore, Langmuir adsorption capacity was observed to be 666.7 mg/g. The regeneration study showed that IL@mAC retained around 85% TCy adsorption efficiency after 6th cycle. Finally, the present study indicates that the IL@mAC is of a high applicability and has extremely high adsorbent capacity to remove TCy from water compared to most of other benchmark adsorbents reported in literature.

Keywords: Antibiotics; Tetracycline; Langmuir; Ionic Liquid modification; Magnetic activated carbon.

Food industries and control of bioaerosols

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Abstract

At 1861, in Annales des Sciences Naturelles' journal, Louis Pasteur reported the microbial agents' present in the air for the first time. after a century, researchers focused on bioaerosols and transmitting pathogens such as Salmonella, Listeria, Escherichia coli, Yersinia, Campylobacter, Staphylococcus aureus, Clostridium and spoilage agents such as yeasts, fungi and spores, noroviruses, and mycotoxins. There are also some studies about the exposure of food to aerosols, which shows the importance of sampling and monitoring techniques, followed by the importance of monitoring methods and air conditioning systems. Considering the imporance of monitoring the aerosols and total microorganism, the food industry, considers air monitoring as part of the HACCP system. There is some factors influnced on quantity and identification of bioaerosols such as air required for sampling, sampling equipment efficiency, particles ratio, and particle size range. Some pathways of entering bioaerosols are doors and valves, disinfection tunnels, compressed air, droplets, and washing operations, or during product packaging. As a result, to prevent such problems, there is some methods like separation of work areas and sanitary zoning, filters, temperature and humidity control and microbiological monitoring. The present study has been investigated the methods to controlling the biological agents and bioaerosols in the food industry. Even in ideal conditions, it is possible to bioaerosols exposure; so, it has been suggested to controlling the employees' movement, proper factories designing, and planning to air inlets, and optimizing air. In addition, periodic microbial monitoring is very useful; therefore, intervention should be made to keep the health requirements of the food product.

Keywords: Food industry, bioaerosols, food hygiene, control

Energy Demand in Electrochemical Process to Remove Organophosphorus Compounds from Synthetic Wastewater

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Abstract

Although Electrochemical Process (EP) has been developed successfully for phosphorous removal from wastewater, the energy demand needs to be investigated more. So, this research was conducted to determine the energy consumption in electrochemical process to remove organic phosphorus from synthetic wastewater. This experimental bench-scale study was carried out in a batch system on 180 samples of synthetic wastewater of organic phosphorus (36 concentrations with 5 duplications). The synthetic wastewater samples were prepared by addition of Adenosine Mono-Phosphate salt to the dechlorinated tap water in the range of 2-32 mg/l-P. Electricity power was immobile 0.6 Ampere DC (1.15 mA/cm2) and the electrodes were steel type. The phosphorous was examined by 4500P.D method in 21st edition of Standard Methods for Examination of Water and Wastewater. A mixed design ANOVA test with repeated measurements by spss16 software was applied for data analyzes. The results showed that, the EP by steel electrodes is capable to remove organic phosphorus up to 98%. For diminution of phosphorous from 2-32mg/l-P polyphosphate solutions to less than 1mg/l-P (the standard of Iran) the mean of maximum energy demands was about 0.59 kWh/g of removed phosphorous. The energy demand and suitable reaction time can be determined by the suggested graphs depending on the initial concentration.

Keywords: Energy, Electrochemical Process, Organic Phosphorus

Polyphosphate Removal from Wastewater: Energy Demand in Electrochemical Process

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Abstract

Due to possibility of eutrophication in surface water resources phosphorus removal from effluents is vital. Electrochemical Process (EP) has been studied successfully for this purpose but more studies on the energy demand should be done. So, in this research it has been investigated for polyphosphate and organic phosphorus.This experimental bench-scale study was conducted in a batch system on 360 synthetic samples of polyphosphate and organic phosphorus (36 concentrations for each compound, with 5 duplications for each concentration). The synthetic wastewater was individually prepared by Sodium Hexametaphosphate and Adenosine Mono-Phosphate salts (2-32 mg/l-P). The EP was practiced by constant 0.6 Ampere DC (1.15 mA/cm2) by steel electrodes. The phosphorous was examined by 4500P.D method in 21st edition of Standard Methods for Examination of Water and Wastewater book. A mixed design ANOVA test with repeated measurements by spss16 software was applied for data analyzes. The results showed that, the EP by steel electrodes is capable to remove polyphosphate and organic phosphorus up to 98%. For diminution of phosphorous from 2-32mg/l-P polyphosphate solutions below1mg/l-P (the standard of Iran) the mean of maximum energy demands is 0.36 kWh/g while at the same conditions it's about 0.59 kWh/g for organic phosphorous. The energy demand (kWh/g) for organic phosphorous removal is averagely 1.5 times of polyphosphate. In practice depending on the initial concentration and type of phosphorous compound the energy demand and suitable reaction time can be determined by the suggested graphs.

Keywords: Energy, Electrochemical Process, Organic Phosphorus, Polyphosphate

Investigation of the Efficiency of the New Micro-electrolysis Reactor in the removal of organic matter from textile industry

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Abstract

Acid red 18 is one of a variety of azo dyes that is widely used in the textile industry. Outgoing wastewater dyes may include some toxic, carcinogenic or mutagenic substances that are harmful to marine life. Degradation of acid red 18 was investigated by hybrid micro-electrolysis process including iron (Fe) and carbon (C) in the presence of ultrasonic (US). Effective factors, including contact time, initial concentration of acid red 18, Fe/C concentration with 1: 1 ratio and initial pH of the solution, on the removal efficiency of acid red 18 was investigated. The highest removal efficiency by the system (98.86%) was in pH 7, initial concentration of dye 25 mg/L, Fe/C concentration at 1: 1 ratio of 10 g/L over a period of 60 minutes. Hybrid micro-electrolysis process in the presence of ultrasonic (Fe/C/US) is used as an electrochemical oxidation process with advantages such as high performance, lower cost, and effective simple operation in eliminating and degradation of organic pollutants such as acid-red 18 from aqueous solutions.

Keywords: Acid red 18, Ultrasonic, Micro-electrolysis system, Galvanic cells

Poster

Study of combined Ozonation and UV Irradiation process efficiency for Ibuprofen removal from aqueous solutions

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Abstract

ibuprofen, a prevailing NSAID,and one of the most consumed medicament is widely used primarily in musculoskeletal treatments and secondarily as a broad spectrum analgesic.This drug is frequently detected in hospital effluents, surface waters, STP effluents as well as soil matrices.This study set out with the aim of assessing the efficiency of O_3/UV in a semi-batch plug-flow reactor in order to remove IBU from Aqueous solution. This study used semi-batch ozonation system to investigate and evaluate the degradation of ibuprofen by O3/UV the operating variables have been optimized Work was carried out to optimize the four operating variables: pH, Ozone Dose, hydraulic retention time, and initial Ibuprofen concentration Ibuprofen that might affect the¬ degradation¬ Ibuprofen. All the trials were conducted in a purpose-built pilot-scale reactor. The pharmaceutical concentrations were determined using a HPLC Working under optimal operating conditions (pH = 8, HRT = 60 min,C=5 mg/L and Ozone Dose 3/5 g/h), a degradation and mineralization value of 91% and 48 %was obtained ,Results also show that the degradation of IBU could be expressed in a parallel pseudo-first-order rate constant. The operating variables of pH, ozone dose, initial Ibuprofen concentration, HRT and the use of a maze of pipes improve contact between dissolved ozone and the drug were optimized. The most significant variables were found to be pH and HRT. predictive model was obtained that allows us to predict the percentage of IBP degradation as a function of pH and HRT under the tested experimental conditions.

Keywords: non-steroidal anti-inflammatory drugs, Ibuprofen, Ozonation, Hydraulic retention time

Performance of a submerged anaerobic membrane bioreactor (SAnMBR) with hollow fiber membrane for phenol-containing wastewater treatment

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Abstract
So far, many methods have been proposed for the removal of phenol from wastewater, among which the membrane bioreactor process has been considered in the last decade. Since most of the phenol sewage is treated with anaerobic method, this study was conducted to investigate the effectiveness of anaerobic membrane bioreactor in the treatment of synthetic sewage containing phenol. In this study, a submerged anaerobic membrane bioreactor with hollow fibers membrane was operated at 36±1 °C for the treatment of synthetic wastewater. Organic loading rate increased from 0.125 to 0.803 kg/m3/day during the operation period and Phenol at concentrations of 25, 50, 100, 200, 300, 400, 500 and 600 mg / L in the presence of glucose (degradable organic matter as an auxiliary substrate) and COD at concentrations of 1000, 2000, 3000, 4000, 5000 and finally, 6430 mg / L, and the bioreactor was tested under anaerobic conditions. All sampling and testing procedures in this study were carried out in accordance with the guidelines of the standard methods book. The results showed that this bioreactor was efficient in anaerobic treatment of wastewater containing phenol (COD removal up to 99.63% and removal of phenol to 99.85% at concentrations of 5000 to 6000 mg / L degradable COD) as well as increased phenol concentrations up to 600 mg had no significant impact on the performance of reactor. And the effluent generated during the operation of the bioreactor conformed to discharge standards of such wastewater into the receiving waters.

Keywords: Anaerobic processes, Submerged membrane bioreactors, Phenol-containing wastewater, Hollow fiber membrane, Wastewater treatment

Comparison of Cefixime Removal Using UV/O_3 and UV/H_2O_2 Oxidation Methods

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Abstract

Wastewater from hospitals and health centers contains potentially toxic and infectious substances and compounds such as antibiotics, that are not fully metabolized in the human body after consumption. Their metabolized part is sent to wastewater treatment plants through waste materials and the non-metabolized part is discharged to the environment as an active compound. Cefixime is a semi-synthetic antibiotic, including third-generation cephalosporins. Due to the low degradability and high solubility of Cefixime antibiotic in water, this antibiotic is not removed from water by conventional methods and its accumulation in aqueous media will cause side effects in humans and the environment. One of the methods of removing antibiotics is the use of advanced oxidation methods. Effluent treatment with advanced oxidation processes greatly improves its quality such as odor, color and amount of organic matter. Advanced oxidation processes such as UV/O3 and UV/H2O2 have the ability to decompose and dramatically reduce resistant and toxic organic compounds. The basis of these reactions is the production of OH radicals by the catalytic decomposition of O3 and H2O2 in the environment. In this study, the efficiency of UV/O3 and UV/H2O2 methods in reducing the amount of cefxime in synthetic effluents under the influence of pH variables (3, 5, 7, 9, 11), cefxime concentrations (25, 50, 75 and 100 mg/l), contact time (5, 10, 20, 30 and 60 minutes) and addition of O3 (concentrations 5, 10, 15, 20 and 30 mg/l) and H2O2 (1, 2, 3) , 4 and 5%) were examined. The results showed the highest percentage of removal efficiency in UV/O3 method at pH = 7, initial concentration of cefxime 20 mg/l, reaction time 90 minutes and ozone concentration of 20 mg / l and in UV/H2O2 method at pH = 5, initial concentration Cefexime was obtained at 20 mg / L, reaction time of 90 minutes and oxygenated water concentration of 3%. The results also showed that both UV/O3 and UV/ H2O2 processes, as effective and economical methods, are able to remove contaminants from aqueous solutions, but by optimizing the effective operating factors, the UV/O3 method is more efficient.

Keywords: Antibiotics, Cefixime, UV/O_3 and UV/H_2O_2, Hospital Effluent, Removal

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Investigation of photocatalytic removal of pentachlorophenol using $FeNi_3/SiO_2/ZnO$ nanoparticles in the presence of simulated sun from aqueous solution

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Abstract

Pentachlorophenol is an organic compound and one of the leading carcinogens. Widespread use of PCP in the world has caused many contaminants in water and soil. The aim of this study was to evaluate the removal efficiency of pentachlorophenol using FeNi3 /SiO2 /ZnO photocatalytic process in the presence of sunlight and to evaluate the effect of effective parameters on its removal. This is a basic-applied study that has been performed on a laboratory scale in continuous flow (Batch) with the aim of synthesizing and evaluating the efficiency of magnetic nanocomposites in removing pentachlorophenol from aqueous solutions. In this research, first FeNi3 /SiO2 /ZnO magnetic nanocomposite was synthesized and using transmission electron microscopy (TEM), field emission scanning electron microscope (FESEM), energy dissociation spectroscopy (EDS), vibrating sample magnetometer (TEM) (VSM) and X-ray diffraction spectroscopy (XRD) were identified. Also, various factors including pH, pentachlorophenol concentration and nanocomposite dose were evaluated at different contact times for pentachlorophenol removal. The amount of pentachlorophenol in the samples was also measured by HPLC. The results showed that with decreasing pH (92.47% for pH = vs. 44.01% for pH = 11) and decreasing the concentration of pentachlorophenol, the removal efficiency of pentachlorophenol increased and with increasing the dose of nanocomposite, the removal percentage first increased and then decreased. The results of XRD and SEM showed that the diameter of the synthesized magnetic nanocomposite is 49.28 nm. The simulated sunlight alone had little effect on the removal of pentachlorophenol (about 12%) and its irradiation on the nanocomposite synthesized in the present study for a concentration of 10 mg / l pentachlorophenol increased its removal efficiency by 100%. The reaction kinetics follow the Langmuir-Hinshelwood model. According to the results, PCP removal from water sources can be proposed using FeNi3/SiO2/ZnO magnetic nanocomposite in the presence of sunlight.

Keywords: Photocatalytic; Pentachlorophenol; Magnetic nanocomposite; Sunlight

Green synthesis of magnetic nanocomposite: using as a catalyst in the photocatalytic process of tetracycline removal and investigation of antibacterial properties

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Abstract

Pharmaceuticals compounds are one of the types of pollutants that enter surface and groundwater resources mainly through the discharge of pharmaceuticals and industrial wastewater and effluents. The presence of drugs in the environment due to their high stability, not only disrupts the normal processes of wastewater treatment in treatment systems, but also has toxic effects on humans and other living organisms, and therefore it is necessary to remove them before entering the environment. This study is an experimental study that was performed on a laboratory scale and at ambient temperature with the aim of green synthesis of magnetic nanoparticles based on MnFe2O4 to investigate the photocatalytic degradation of tetracycline pollutant in the presence of simulated sunlight. For this purpose, magnetic nanoparticles were first synthesized by green synthesis using plantego major leaves. Then properties of synthesized nanocomposites were characterized by XRD, DRS, EDS and FTIR analyzes. In order to investigate the photocatalytic process, the experiment was performed at room temperature on a 100 mL sample with a mixing speed of 350 rpm in the presence of a 500 watt xenon lamp. Then, the sample was taken after a specified time and after separating the nanoparticles by a magnet, the residual concentration of tetracycline was determined using a spectrophotometer at a wavelength of 358 nm. In order to evaluate the antibacterial effect of synthesized nanocomposite, 100 µL nanocomposite, a concentration of 20 g/L nanocomposite was used for broth microdilution method. The removal efficiency of tetracycline antibiotics using photocatalytic process was obtained 85.53 % at a concentration of 10 mg/L contaminant, nanocomposite dose=0.35 g/L, pH=7.5 for 70 minutes under stimulated sunlight. The MIC (Minimum Inhibitory Concertation) value was 3000 µg/mL for nanocomposites synthesized against Staphylococcus aureus and the values were 5000 µg/mL against Escherichia coli and Klebsiella. The amount of MBC (Minimum Bactericidal Concertation) value against Escherichia coli and Staphylococcus aureus was determined to be 5000 µg/mL. The synthesized nanocomposite could have an appropriate effect as a catalyst on the decomposition of the tetracycline antibiotics and inhibit the growth and killing of bacteria.

Keywords: Magnetic nanocomposite, tetracycline, Minimum Inhibitory Concertation, Minimum Bactericidal Concertation

An overview of chemical oxygen demand removal methods from dairy effluents

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Abstract

Dairy effluents contain many pollutant compounds, especially chemical oxygen And if these effluents enter the environment without treatment, they will cause negative effects on the environment. Therefore, considering the importance of reducing COD from wastewater, the purpose of this study is to review and compare different methods of removing COD from dairy industry effluents and determine the best method. This study is a narrative review using the keywords of dairy industry, COD, physicochemical method, biological method. The study has been done by searching valid medical and health journals and related valid Web sites of Science, Ovid PubMed, Systematic Review, Google Scholar. Surfing the total number of 160 review sources, finally 106 resources were selected focusing on studies in Iran and the world. Numerous studies have been conducted to remove COD from dairy effluents from 1976 to 2021; The highest removal rate was 100% using a combination of AnMBBR and microalgae reactors. Most of the methods used to remove COD have been anaerobic reactors. This study showed that although various methods have been used in COD removal so far, the most effective method in COD removal was the use of a combination of AnMBBR and microalgae reactors, which had a 100% removal rate, and among the methods used, anaerobic reactors were used more than others.

Keywords: Dairy factory, Chemical Oxygen Demand, Physicochemical method, Biological method

Poster

Modification of microbial cellulose charged with magnetite nanoparticles (MC/Fe3O4) for adsorption of tetracycline from Aquatic media

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Abstract

In the present study, the magnetic nanocomposite is constructed using bacterial cellulose and Fe3O4 nanoparticles (MC/Fe3O4) and modified in the furnace. Tetracycline (TC) adsorbtion onto MC/Fe3O4 adsorbent investigation by factors such as pH, TC concentration, MC/Fe3O4 contact and reaction time. To determine the properties of the nanocomposite (MC/Fe3O4) was used SEM, BET, XRD, FT-IR, TGA and EDX technologies. The adsorption of Langmuir and pseudo-second-order models were found to be the best-fit models to predict isotherms and kinetics of adsorption, respectively. After modifying the adsorbent at 400 °C for 60 min, the specific surface area of the adsorbent increased and reached from 8 to 38.45 m2 g−1.The results of BET analysis confirmed that the nanocomposite has a mesoporous structure and the highest Experimental adsorption capacity of 131 mg/g was at the optimum conditions of 0.6 g adsorbent dosage, 30 mg/l TC concentration and pH 9. Results demonstrated that MC/Fe3O4 nanocomposite was an excellent adsorbent material with magnetic properties, which allowed the separation as well as recovery of the adsorbent from aqueous solution using external magnet for effective industrial applications.

Keywords: Adsorption, Tetracycline, Bacterial cellulose, Iron nanoparticlea

Preparation and characterization of N,S-codoped TiO_2 nanoparticles and its application for the degradation of Ofloxacin from aqueous solution under visible light

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Abstract

The objective of this study was to synthesize an N,S-codoped TiO_2 nanoparticle, as a photocatalyst, by a facial sol-gel method and use for the photodegradation of Ofloxacin in an aqueous solution. Materials and Methods: N,S-codoped TiO2 was characterized by powder X-ray diffraction, (XRD) UV-Vis Diffuse reflectance spectroscopy (DRS), field emission scanning electron microscopy, (FESEM), energy dispersive X-ray spectroscopy, (EDX) Brunauer-Emmett-Teller, (BET), and Barrett-Joyner-Halenda (BJH), analysis. The photocatalytic activity of nanoparticles was evaluated through degradation of Oflo as model organic pollutants under simulated sunlight irradiation. Result and Discussion: In the XRD pattern of nanoparticle, clearly, the peaks of anatase and rutile are observed. The band gap value has decreased in nanoparticle to 2.85 eV. In optimum conditions, the maximum photocatalytic degradation efficiency of ofloxacin was 72%. The high photocatalyst activity of the N,S-codoped TiO2 can be attributed to the strong absorption of the visible light and large specific surface area of the catalyst. The photocatalyst has a relatively high reusability. The mineralization rate for Oflo is 39 % under optimal conditions. Conclusion: The results show that the N,S-codoped TiO2, mesopores nanoparticle with narrow band gap, can be applied as an effective photocatalyst for the degradation of Oflo from aqueous solutions.

Keywords: N,S-codoped TiO2, nanoparticle, Ofloxacin, simulated sunlight, photocatalyst.

Production of potassium ferrate and its effect as an oxidant on the removal of humic acid

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Abstract

Euphrates ion (FeO4-2) has long been known in water treatment for its high oxidizing and coagulating power. However, due to problems in its preparation and instability in water, it has not been widely studied. This study describes an improved method for making potassium ferrate. This study is an experimental-interventional study that was performed on a laboratory scale. Solid potassium ferrate was made as an oxidizer to remove humic acid in vitro. Effect of various pH indicators (3,6,9,12), initial concentration of humic acid (5,10,15,20 mg / l), The dose of potassium Ferrate (3,6,9,12 mg / l), contact time (20,40,60,80) minutes, on the removal of humic acid was investigated. At an initial concentration of humic acid equal to 5 mg / L, potassium ferrate equal to 12 mg / l, pH equal to 8, and a contact time of 80 min, potassium ferrate was obtained as a strong oxidizer in the removal of humic acid from solution Be effective.

Keywords: Natural organic Matter (NOM), Humic Acid, Ferrate (VI), Oxidation

Photocatalytic Process in Removal of Acid Red Dye Using Magnetic Nanocomposite based on Bentonite

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Abstract

Acid Red is an Azo dye that is frequently found in the wastewater coming from textile industries. This study is an experimental-applied one that has been discontinuously implemented within laboratory scale for bentonite nanocomposite synthesis and characterization in the removal of Red Azo Dye in the presence of UV light. In this study, the intended magnetic nanocomposite has been synthesized for the first time and its properties have been discovered using EDX, XRD, VSM, FESEM, FT-IR, and DRS. The results illustrated that in a pH value of 3, the nanocatalyst dosage equals 0.25 g/L, t=120 minutes, and concentration of 40 mg/L Acid red, the efficacy of photocatalytic destruction was %92. On the other hand, the photocatalytic destruction of Red 206 Azo Dye within the intended procedure followed well from the pseudo-first-order kinetic model with a determination coefficient of R2>0.9.

Keywords: Photocatalytic, Acid Red, kinetic.

Decolorization of industrial and municipal wastewater by a consortium of thermophilic bacteria

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Abstract

Today, water is available for drinking and industrial use. With The water treatment process can be used in industries, especially the textile industry Which is one of the major consumers of water, recycle and return to the industrial cycle. Using bacteria that decompose color compounds, it is possible to decompose and remove dyes, especially azo group dyes.In order to isolate heat-loving and heat-tolerant bacteria with the ability to decompose textile dyes from the effluent of a textile factory in Kashan, sampling was done. Samples were cultured in TSB medium. Using a culture medium containing textile effluent dye compounds, the ability of dye to grow and decompose by isolated strains was investigated. Incubation conditions at 50 ° C and aeration for three days were used for comparative evaluation of isolates. Among the strains isolated from the effluent, a consortium of the top three strains was used to decolorize the effluent. By creating a consortium separated from the three strains, the possibility of decolorization of the real sample of textile effluent was achieved up to 90%. These three strains have the ability to decolorize the effluent at a temperature of 36 to 51 ° C and pH values of 5.5 to 9.5 and a salt content of 0 to 7%. Temperatures above 80 ° C when entering the pond balancing the treatment plant and the presence of salts in the color solutions, has provided a suitable place for the separation of thermophilic and heat-tolerant bacteria and salt-tolerant. Isolated bacteria have three characteristics: color degradability, high temperature growth and salt tolerance.

Keywords: Thermophilic bacteria and high temperature tolerant, Decolorize, azo dyes, textile

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Poster

Risk Assessment of Organophosphate Pesticide Residues in Greenhouse Cucumber in Tabriz using Monte Carlo Simulations

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Abstract

In this study, the samples of greenhouse cucumbers were collected from the Central Fruit and Vegetable Market of Tabriz between June and December 2017. In the twenty-four cucumber samples (unwashed, washed, peeled), the residue of 18 organophosphates pesticides (OPPs) was analyzed using gas chromatography-mass spectrometry (GC-MS) following the modified quick, easy, cheap, effective, rugged, and safe (QuEChERS) method. Chronic non-carcinogenic risk assessment from pesticide residues in the samples was also performed for age groups of adults (women and men) and children using the Monte Carlo Simulation (MCS). Amongst the eighteen studied pesticides, eight pesticides including dimethoate, diazinon, methyl parathion, fenitrothion, chlorpyrifos, profenofos, ethion, and azinphos-methyl were detected. Pesticide residues were detected in 100% of unwashed, washed and peeled samples in the range of 0.08 to 0.37 mg.kg−1, 0.03 to 0.17 mg.kg−1 and 0.01 to 0.08 mg.kg−1, respectively. The maximum and minimum values were found for diazinon pesticides with 0.37 mg.kg−1 and profenofos and fenitrothion with 0.01 mg.kg−1. The results showed that at least three pesticide residues (dimethoate, diazinon, and methyl parathion) were found in all samples, while 87.5% of the samples contained more pesticides residues. The residues of dimethoate, diazinon, and methyl parathion were above Maximum Residue Limits (MRL) in 100%, 83.33%, and 66.66% of samples, respectively. The identified residues were more than the EU MRLs and the IR MRLs in 100% and 95.83% samples, respectively. The mean reduction of pesticide residues in the washed and peeled samples was in the range of 37.74 to 56.52% and 66.66 to 92.30%, respectively. According to the performed risk assessment, there is no significant non-carcinogenic health risk due to the consumption of cucumber for the age group of adults. Hence, there is a considerable non-carcinogenic health risk to children due to the consumption of unwashed (HI=2.22) and water-washed (HI=1.36) greenhouse cucumbers.

Keywords: Pesticide residue; Greenhouse cucumber; QuEChERS; Monte Carlo Simulation; Risk assessment; Tabriz

UV/Chlorine process for removal of direct red 83 from aqueous solutions: Effect of coexisting anions

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Abstract

In present study, the effeciciency of the UV/chlorine process for dye removal was evaluated.
The experiments were conducted in a 1 L, Plexiglas reactor. The oxidation of DR 83:1 was initiated by adding a known chlorine dose and turning on the UV-C lamps. In order to determine the residual concentration of DR89:1, the reactor was sampled periodically. The residual concentration of DR83:1 was immediately determined by a visible spectrophotometer at 526 nm wavelength.
The results showed that with increasing pH of the solution from 3 to 11, the degradation efficiency of UV/chlorine process was reduced from 96.2% to 62.9%. The main inhibitor and promotor anions on the DR83:1 removal were HCO^- and Br^- ions, respectively. The relative contribution of Cl• is higher than that for HO• and UV and is about 3 times higher than that for HO•.
In the case of dark chlorine, and UV/chlorine process, with increasing pH of the solution from 3 to 11, the degradation efficiency of DR83:1 was reduced from 98.4% to 12.1% and from 96.2% to 62.9%, respectively. The relative contribution of Cl• is higher than that for HO• and UV for all of the pH and is about 3 times higher than that for HO.

Keywords: Ultraviolet radiation, chlorine, coexisting anions, direct red 83

Preparation and application of activated carbon from Beech wood residues for the adsorption of tetracycline antibiotics from aqueous solutions

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Abstract

Tetracyclines (TC) antibiotic are metabolized or absorbed in small portion by humans and animals treated with it, and most fraction of this antibiotic is excreted through urine and feces as unchanged parent compounds. They have potential to create adverse health effects such as acute and chronic toxicity. In addition, they can adversely affect the photosynthesis of aquatic organisms and have the ability to be converted to antibiotic-resistant genes in microorganisms. Therefore, it is essential to treat the effluents containing this type of antibiotics by an appropriate technique to minimize their adverse effects. Thus, in this study, the efficiency of activated carbon prepared from Beech wood residues was investigated for the adsorption of tetracycline antibiotic from aqueous solutions. This study was performed on a laboratory scale. During the study, the effects of various operational parameters such as pH, contact time, adsorbent dosage, temperature, and initial TC concentration were investigated. In addition, the adsorption kinetics and isotherms were also evaluated using nonlinear form of the most common models available. The results showed that pH did not significantly affect the adsorption of TC and natural pH of the solution was selected as the optimum pH. With increasing the contact time and adsorbent dosage, the removal efficiency increased. However by increasing initial TC concentration, the adsorption percentage decreased. The general order kinetic model and Langmuir and Liu isotherm models well described the experimental data.

The present study showed that activated carbon prepared from beech residues can be used as an effective and environmentally friendly adsorbent for the adsorption of tetracycline antibiotics from aqueous solutions.

Keywords: Antibiotic, Tetracycline, Adsorption, Isotherm, Kinetics.

Comparison of methods of waste decontamination in decentralized healthcare centers in Iran

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Abstract

Healthcare waste management is one of the most important problems in decentralized healthcare centers (such as Physicians and Dentists office, Medical laboratories, Injection centers, research centers, and etc.) for which there are different methods. The aim of this study was to compare and prioritize different methods of decontamination of healthcare waste in decentralized healthcare centers in Iran. In this descriptive-analytical study, different methods of decontamination of healthcare waste in decentralized healthcare centers in Iran from the point of view of health, economical, social and environmental acceptability have been studied using a researcher made questionnaire. Also, the opinions and priorities of experts for selecting each method were collected and analyzed. The results showed that health issues are the most important priority for decontamination of decentralized healthcare centers. Also, Autoclave decontamination (56 percent) and then the use of centralized incinerators (20 percent) had the highest degree of desirability for environmental health experts compared to other decontamination methods. On the other hand, according to them, uncontrolled landfill has the most and autoclave/hydroclave has the least damage to the environment (water, air and soil). the health aspect (54 percent) was the most important priority in the waste management of decentralized healthcare centers according to environmental health experts, also autoclaves that their size is based on production quantity scales is the most appropriate way to decontaminate this type of waste at the point of production. It is suggested that further studies be conducted on different methods of decontamination along with localization and determining health policies in the workplace to control the amount of production and proper management of this type of waste.

Keywords: Waste decontamination, Healthcare waste, Decentralized healthcare centers

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Poster

Mineralization of real wastewater containing phenol by a combined process of electrocoagulation and catalytic ozonation: Investigation of kinetic coefficients

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Abstract

The Olive Oil Mill Wastewater is one of the most polluted wastewaters, which is an important economic activity in the world. The wastewater produced in this industry contains high concentrations of organic pollutants, resistant and toxic compounds, which can threaten the health of the environment and living things. In the present study, the mineralization of the olive oil mill real wastewater was investigated by a combined process of electrocoagulation and catalytic ozonation. The parameters studied in the process of electrocoagulation, type of electrode (iron and aluminum), the effect of current density (0.07, 0.2 and 0.67 A/dm3) and reaction time (5-45 minutes) and in the catalytic ozonation process catalyst concentration (0, 1, 2 and 4 g/L) and reaction time (10-90 minutes) were measured. The effect of these parameters on TOC removal efficiency and turbidity was measured. The results showed that the maximum TOC removal efficiency in the process of electrocoagulation by each of the iron and aluminum electrodes at a current density of 0.67 A/dm3 and a reaction time of 45 minutes were obtained %77.8 and %76.22, respectively and Turbidity decreased to 2 and 3.1 NTU, respectively. Then, in single ozonation process and catalytic ozonation process, the maximum mineralization of organic compounds has been performed 26 and 81.5%, respectively. According to the results of GC/MS analysis, phenol and toxic compounds were decomposed into compounds such as oxalic, formic and acetic acid. Also, the results of pseudo-first-order kinetics indicate a constant increase in the reaction rate with increasing catalyst concentration.The results obtained in this study confirm the application of electrocoagulation process with combined catalytic ozonation for effective treatment of wastewater of this industry and similar industries.

Keywords: Olive oil, Wastewater, TOC, Electrocoagulation, Catalytic ozonation process, Kinetic

Synthesis and characterization of magnetic Iron Sulfide (Fe-S)/CuS nanocomposite as a novel recyclable catalyst in photocatalyst removal of tetracycline from aqueous solutions

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Abstract

Drugs, especially antibiotics, as a group of emerging contaminants, pose a serious threat to the environment and aquatic ecosystems due to their adverse effects, cumulative properties, and developing drug resistancy. Therefore, this study aimed to evaluate the removal efficiency of tetracycline (TC) antibiotic from aqueous solutions using photocatalytic process in the presence of magnetic iron sulfide (FeS/CuS) nanoparticles on a laboratory scale. The magnetic nanocomposite was first characterized by TEM, XRD, VSM, FESEM, FT-IR, DRS, and EDX techniques. Factors, such as pH, reaction contact time, nanocomposite dose, and contaminant concentration on the removal efficiency were studied. All experiments were performed at room temperature under UV-A light. The results of this study indicated that the highest removal efficiency of TC was obtained at optimum pH of 7. The results also showed that in the initial concentration of TC antibiotic (20 mg/l), the removal efficiency increased by increasing contact time and also by increasing the dose of the desired nanocomposite, the removal efficiency first increased and then decreased. Moreover, the synthesized nanocomposite had the ability to be reused with an 18% reduction in removal efficiency in five consecutive cycles. Finally, the results of this study showed the acceptable efficiency of Fe-S/CuS nanocomposite in photocatalytic removal of TC antibiotic.

Keywords: Photocatalytic Process, Tetracycline, Magnetic Nanocomposite, UV-A Light

The Effect of Magnetite and Carbon Black Nanoparticles on Increasing the Effect of Protection against Electromagnetic Interference

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Abstract

X-band electromagnetic waves have various applications such as navigation, air traffic control, radar and marine functions. The use of shielding as an engineering standard is a priority for radiation control. In the present work, the protective properties of electromagnetic interference of polymer nanocomposites with different weight percentages of nano-magnetite and carbon black were investigated. Nanocomposites have been successfully prepared using the melt method. Their protective effectiveness was measured by a vector network analyzer in the frequency range of 8.2 ~ 12.4 GHz. The maximum EMI SE was 36.26 dB at 8.2 GHz for 15% by weight Fe3O4 and 50% by weight carbon black (0.7 mm thick) composites. The results showed that with increasing the sample thickness from 0.7 mm to 3.2 mm, the value of EMI SE decreased. In addition, it had the most protective effect at low frequencies. It is common for a good combination of both electrical and magnetic losses to cause excellent wave absorption. The results also showed that reflection is the main mechanism in the overall protective effectiveness. These findings indicate that epoxy resin with a combination of the appropriate weight percentage of magnetite nanoparticles and carbon black can be used as a suitable microwave shield in the workplace.

Keywords: electromagnetic shielding properties, Nanocomposites, Nano magnetit, Carbon Black, vector network analyser

Copper ferrite nanoparticles performance evaluate in treatment of textile waste-water in presence of peroxymonosulfate and US

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Abstract

The textile industrial wastewater contains different chemicals. Discharge of this wastewater in acceptor natural environment causes serious bioenvironmental pollution problems. The aim of this study was to evaluate the catalytic performance of copper nanofrites in the presence of proxy monosulfate and ultrasonics in textile wastewater treatment. This study is done on a laboratory scale in two stages: The first stage: Preparation and synthetized of copper ferrite nanoparticles, and determination of the characteristics of synthetized nanoparticles using X-Ray Diffraction (XRD), Field Emission Electron Microscopy (FESEM), equipped with an energy dispersive X-ray spectrometer (EDS), N2 adsorption/desorption, magnetic hysteresis loops, UV-Vis diffuse reflectance spectroscopic (DRS), second stage: Oxidation tests. In order to simulate the treatment of dye wastewater, the efficiency of the process in the treatment of real wastewater samples of the textile industry evaluated under optimal conditions. The results of various analyzes to determine the characteristics of copper ferrite nanoparticles showed that nanoparticles were with characteristics SBET (m2/g) 201.89, Total pore volume (cm 3/g) 0.19, Average pore diameter (nm) 2.6, Pore structure Mesoporous and Color Black. According to the results, the higest degradation rate of the pollutant (95.8) were observed at pH=7, CuFe2O4= 25 mg/L, PMS=1.5 mM, US=200 W, and 30 min. The dye removal efficiency of the actual textile sample of the textile industry after 30 minutes in optimal conditions was 45%. Based on the overall results, the proposed US/CuFe2O4/PMS process was able to successfully remove the yellow sunset dye from aqueous solutions. So, this process can be chosen as an efficient method for the treatment of wastewater containing azo dyes.

Keywords: Textile industrial effluent, Copper ferrite, Peroxymonosulfate, Ultrasound.

Removal of azo dye from aqueous solutions under LED by synthesizing sugarcane bagasse magnetic graphene oxide

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Abstract
At this present investigation, sugarcane bagasse magnetic graphene oxide (SCBMGO) was synthesized in several stages and used to remove acid red 14 dye under LED visible light. XRD, FT-IR, SEM, VSM, and PHPZC analyses demonstrated the structural characteristics. The effect of variables like the pH, catalyst dose, dye concentration, radical scavengers, and reusability on AR14 removal efficiency were investigated. The most removal efficiency occurred under ideal situation: [AR14]0 = 10 mgL-1, SCBMGO dosage = 0.5 gL-1, pH = 3 and contact time equal to 120 minutes. AR14 photocatalytic removal obeyed the pseudo-second-order reaction kinetic. In addition, recycling test efficiency was the same at the beginning, and the 6th stage. The removal efficiency of AR14 in drinking water was (71.45%). SCBMGO, as an effective and environmentally friendly catalyst, can be used in removing AR14 color and organic pollutants of aqueous environments under the LED visible light.

Keywords: Synthesize, Sugarcane bagasse magnetic graphene oxide, Photocatalyst, Acid Red 14, Visible light.

GIS-Based DRASTIC and Composite DRASTIC Indices for Assessing Groundwater Vulnerability in the Baghin Aquifer, Kerman, Iran

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Abstract

The present study estimated the Kerman–Baghin aquifer vulnerability using DRASTIC and composite DRASTIC (CDRASTIC) indices with the aid of geographic information system (GIS) techniques. Factors affecting the transfer of contamination, including water table depth, net recharge, soil media, aquifer media, the impact of the vadose zone, topography, hydraulic conductivity, and land use were used to calculate the DRASTIC and CDRASTIC indices. A sensitivity test was also performed to determine the sensitivity of the parameters. Results showed that the topographic layer displays a gentle slope in the aquifer. Most of the aquifer was covered with irrigated field crops and grassland with a moderate vegetation cover. In addition, the aquifer vulnerability maps indicated very similar results, identifying the northwest parts of the aquifer as areas with high to very high vulnerability. The map removal sensibility analysis (MRSA) revealed the impact of the vadose zone (in the DRASTIC index) and hydraulic conductivity (in the CDRASTIC index) as the most important parameters in vulnerability evaluation. In both indices, the single-parameter sensibility analysis (SPSA) demonstrated net recharge as the most effective factor in vulnerability estimation. According to the results, parts of the studied aquifer have a high vulnerability and require protective measures.

Keywords: Vulnerability; Sensitivity Analysis; DRASTIC; Composite DRASTIC; Kerman–Baghin Aquifer.

Removal of Cu (II) ions using agricultural wastes as adsorbents from aqueous solutions

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Abstract

Heavy metals are known as toxins that pose a serious threat to human health, even in low concentrations. According to US Environmental Protection Agency, heavy metals are classified as human carcinogens (known or probable). On the other hand, the adsorption process is one of the common methods for removing heavy metals from water and wastewater. All tests were done in batch conditions. The residual Cu (II) concentration was measured by Atomic Absorption System. Upon increasing the adsorbent dosage, pH, and contact time and decreasing Cu (II) concentration, the removal efficiency of Cu (II) ions increased. In optimum conditions, 50% of copper was removed by modified maize hull. The aim of this study is to provide a suitable, low cost and efficient method for the removal of Cu (II) ions.

Keywords: Cu (II) ions, Heavy metals, Maize hull.

Determining the frequency of different types of microplastics in the soil landfill in Hamedan (a case study)

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Abstract

Microplastics (MP) pollution has become a matter of global concern because of its several deleterious effects on environmental health, especially on the terrestrial environment. The evidence of MP contamination in terrestrial environment is less explored compared to aquatic bodies. However, in Iran despite having high possibility of MP contamination, there is lacking of available research-based evidence. Urban areas soil is subjected to act as a major environmental reservoir for MPs. Thus, this study was carried out to investigate the presence of MP contamination in landfill site near Hamadan city, Iran. 18 samples composed of 6 soils from different areas were collected from Hamedan landfill and after extracting microplastics, they were analyzed by stereomicroscope. In all samples, microplastics were identified. The highest and lowest frequencies of microplastics were related to leachate and virgin region with 76,600 and 3266 microplastics per kilogram of dry soil, respectively. Also in this study, microplastics with black, white, blue, red, green and other colors, respectively, accounted for 49, 29, 6, 4, 1 and 11% of all microplastics, and microplastics in the shape of fibers, pieces, films and pellets, respectively, accounted for 71, 16, 12 and 1% of all microplastics. Hence, the results show that the procurement and discharge of MPs in the landfills is an overlong process. The results of this study provide an initial evidence and affirm that landfill can be a potential source of MPs. This study indicates that MPs are comparatively overlong outcome of human induced activities which can significantly cause changes in terrestrial ecosystems.

Keywords: microplastic, soil, landfill, Hamadan

An overview of Electron Accelerator Applications in environmental protection with an emerging pollutants decomposing approach

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Abstract

Problems related to environmental damages and natural resources degradation are receiving increased attention from researchers throughout the world in recent years. This happens mostly, because of un-eco-friendly technology used to produce industrial products. Therefore, an eco-friendly science and technology (green technology) which can empower and control the existing coal power plant for the virtue of society and the earth is needed. This literature addresses the various applications of electron accelerators in order to modify the physical, chemical, or biological properties of industrial pollutants in the liquid, solid, and gas phases through treatment by ionizing radiation in order to control environmental pollution. Many advantages can be achieved through this method, which is known as radiation processing.

Keywords: Electron accelerator; flue gas treatment; wastewater treatments; biological sludge disinfection, emerging pollutants.

Survey of the effect of Galleria mellonella larvae on biological biodegradation of new and recycled polyethylene

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Abstract

With the advancement of technology and the increase of the world's population, the global production of plastics has increased over the years due to the wide applications of plastics and the global use of plastics is increasing by 12% annually. Due to the sustainability of plastic bags in the environment and the negative consequences of plastic accumulation for ecosystem and human and animal health and the need for an environmentally friendly method for plastic decomposition, this study was performed to investigate the biological degradation of plastic with Galleria mellonella moth larvae. In this interventional-experimental study, infected bees were collected from Fin and Ghamsar regions and several waxy moths, larvae and cocoons were isolated from them and separately in glass containers under laboratory conditions (dark environment at 25 ° C). They were kept until the spawning stage and then the eggs laid in the incubator were kept for larvae. The produced larvae were counted, and 8 larvae were transferred to a container containing plastic strips. The plastic strips were first weighed to the nearest 0.001 g and after the larval period and feeding of the larvae, the plastic strips were removed and washed with distilled water and weighed again. Data were analyzed using SPSS software and t-test or man-Whitney test was used to examine the possible relationships between variables and the significance level was considered less than 0.05.

The results showed that Galleria mellonella wax moth larvae are able to decompose plastic and the difference in plastic weight was significantly higher in the garbage bags than in the freezer bag. With the larval stage remaining constant, the difference between primary and secondary weight in the garbage bag was 3.405 g more than the freezer bag. Due to the increasing consumption of plastics and the problems that exist in their disposal in other methods, biodegradation of plastics by wax moth larvae Galleria mellonella is an environmentally friendly method and is effective in reducing plastic contamination.

Keywords: Galleria mellonella wax moth, Biodegradation, Plastic.

Evaluation of the efficiency of the advanced oxidation process of ferrate/peroxy-monosulfate in removing chlorpyrifos pesticide from aqueous solution after pre-treatment of raw water by coagulation process

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Abstract

Chlorpyrifos (CPF), an organophosphate pesticide, has been widely used in the agricultural industry and may cause environmental damage. The present study was aimed to evaluate the potential application of Fe(VI) and Fe(VI)/PMS processes for oxidation of CPF in water treatment. Hence, this study was performed in two phases including coagulation and flocculation process and advanced oxidation process (AOP). In the first phase, the coagulation process was performed for turbidity removal by ferric chloride (FeCl3). In this phase, using a central composite design (CCD), the combined effect of four variables including initial turbidity, initial pH, coagulant dose and contact time was investigated. The supernatant from this process was transferred to the next phase for further analysis. In the AOP phase, the effect of Fe(VI) and Fe(VI)/PMS oxidants were investigated separately. In the first phase (coagulation and flocculation), FeCl3 showed the highest efficiency (95.79%) at alkaline pH (pH=8). In the next phase (AOP), the results showed that the degradation efficiency of Fe(VI)/PMS process after coagulation processes was higher compared to Fe(VI) process at all pHs. However, the highest removal efficiency in both processes was obtained at pH=7. Also, by examining the reaction kinetics, it was found that after the coagulation process by FeCl3, the removal rate in the Fe(VI)/PMS process is 1.5 times higher than the Fe(VI) process.

Keywords: Water treatment, Advanced oxidation, Chlorpyrifos, Ferrate(VI), Peroxymonosulfate

Ciprofloxacin removal from Aqueous Media by Adsorption Process: A Systematic Review and Meta-analysis

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Abstract

In this study, adsorption of ciprofloxacin was reviewed from aqueous media (water and wastewater) in studies published over the last years (1990 to 2020). The objective of this research was to analyze ciprofloxacin removal from aqueous media by adsorption process through a systematic review and meta-analysis. It was found that the ciprofloxacin adsorption data were well fitted on the Langmuir isotherm and the Pseudo-second order kinetic models. The review further showed that the optimum pH ranged from 6 to 8.5 in the most articles. Based on the reported results, the temperature and standard enthalpy change (ΔHo) varied in the range of 273 to 388 oK and -1212.6 to 170.21 kJ/mol, respectively. The maximum reported adsorption capacity for ciprofloxacin was 1575 mg/g for C@silica core/shell nanoparticles. Also, the minimum adsorption capacity was related birnessite (47 ng/g). The most effective adsorbent for ciprofloxacin removal was C@silica core/shell nanoparticles from ZIF–8. The results of meta-analysis revealed that the adsorption process could remove ciprofloxacin with an acceptable mean efficiency of 59.32% (95 % CI: 44.66–73.97). It can be suggested to apply the novel hybrid processes, adsorbent modification, composite adsorbent development, neural network modeling to increase ciprofloxacin adsorption.

Keywords: Ciprofloxacin; Adsorption; Aqueous solution; Systemic review; Meta-analysis.

Optimization of ammonium adsorption from landfill leachate using montmorillonite/hematite nanocomposite: Response surface method based on central composite design

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Abstract
In this study, the adsorption of ammonium ion from landfill leachate (LL) was examined using montmorillonite/hematite nanocomposite (M/HNC). Parameters affecting ammonium adsorption such as pH (3–11), adsorbent dosage (0.05–0.25 g/L), mixing speed (75¬¬–175 rpm), and contact time (25–125 min) were assessed. The central composite design (CCD)–based response surface methodology (RSM) was employed to design the experiments and find optimal conditions. M/HNC was synthesized under green conditions and structurally investigated using X-ray powder diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), Brunauer-Emmett-Teller (BET), and scanning electron microscopy (SEM) techniques. M/HNC was synthesized with a particle size of about 26 nm, magnetic properties, and a high specific surface area. The efficiency of ammonium adsorption from LL was increased by enhancing parameters such as pH, adsorbent dosage, mixing speed, and contact time. The pH of 8.05, adsorbent dosage of 0.167 g/L, mixing speed of 117.42 rpm, and contact time of 81.99 min were presented as optimal conditions according to the results of the CCD method. In addition, the efficiency of ammonium adsorption from LL using M/HNC was 80% at optimal conditions. The data of ammonium adsorption on M/HNC fitted well with pseudo-second-order kinetic and Langmuir isotherm models. It should be noted that the interactive effects of the parameters had an increasing impact on the ammonium adsorption efficiency. Based on the results of the present study, M/HNC had an effective potential for the adsorption of ammonium from LL.

Keywords: Ammonium; Landfill leachate; Montmorillonite/hematite nanocomposite; Central composite design.

$CoFe_2O_4$@Methylcellulose Synthesized as a New Magnetic Nanocomposite to Tetracycline Adsorption: Modeling, Analysis, and Optimization by Response Surface Methodology

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Abstract

In this study, CoFe2O4@methycellulose (MC) was prepared as a novel magnetic nanocomposite by a facile, fast, and new microwave-assisted method using iron and cobalt salts in the presence of MC as a green biopolymer in alkaline medium and was then structurally evaluated by FESEM, EDS, Mapping, BET, VSM, XRD, TGA, and FTIR. Effective parameters on tetracycline (TC) removal such as pH, initial TC concentration, adsorbent dosage, and contact time were examined. The central composite design (CCD)–based response surface methodology (RSM) was employed to design the experiments and find optimal conditions. CoFe2O4@MC was synthesized with the particle size of about 50 nm, magnetic properties, and high specific surface area. The maximum TC adsorption efficiencies using CoFe2O4@MC from synthetic and real wastewater samples under optimal conditions were 79.45% and 74.85%, respectively. The data of TC adsorption on CoFe2O4@MC were fitted well with pseudo–second order kinetic and Langmuir isotherm models. The results of thermodynamic data indicated the exothermic and spontaneous nature of TC adsorption process using CoFe2O4@MC. CoFe2O4@MC showed high efficiency and chemical stability after 5 runs. Therefore, CoFe2O4@MC nanocomposite can be applied as a good and practical adsorbent for removing TC from synthetic and real wastewater.

Keywords: Tetracycline; Methylcellulose; Magnetic nanocomposite.

Investigation of removal of arsenic from aqueous solutions using Advanced Oxidation Process (AOP)

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Abstract

Due to the fast industrial growth, arsenic in inorganic and organic forms is one of the most common and harmful pollutants. World Health Organization (WHO) has classified it as a priority toxic substance in the ecosystem. So, the aim of this work was to indicate a photo-catalytic process to decomposition of arsenic from aqueous solutions. The tested parameters were H2O2 concentration, initial arsenic concentration, ZnO dosage, pH, and contact time. The intensity of the output light was equivalent to 600 mJ cm -2. The degradation of arsenic performance by UV and H2O2 alone was 15% and 8%, respectively. In acidic conditions, the combined process had a higher removal efficiency for arsenic. pH zpc for ZnO was approximately 9. The optimum dose of ZnO nanoparticles was 1 g L-1 . The average diameter of ZnO was from 52.27 to 304.8 nm. The optimum contact time was selected for 45 min.

Keywords: Arsenic, Hydrogen peroxide, Photo-catalyst, Ultraviolet radiation, Zinc oxide.

Ageing of Titanium Dioxide Nanoparticles after Consecutive Application in Photocatalysis Process to Remove Diazinon from Aqueous Solutions

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Abstract

The surface of nanoparticles undergoes physical and chemical changes during the photocatalytic degradation of contaminants, which can alter the efficiency of nanoparticles. The aim of this study was to investigate the effect of using titanium dioxide nanoparticles in photocatalysis process on the ageing of these nanoparticles, reducing photocatalytic efficiency, and changing the physicochemical characteristics of their surfaces. In order to compare the physicochemical properties of crude nanoparticles with nanoparticles used in the treatment of aqueous solutions (used nanoparticles), first "used" nanoparticles had to be created. For this purpose, diazinon pesticide was selected as the model contaminant. Titanium dioxide nanoparticles were applied under ultraviolet light and optimal test conditions for five consecutive cycles to decompose diazinon from aqueous solution to obtain used nanoparticles. Raw and used nanoparticles were subjected to TEM, SEM-EDAX, XRD, FTIR and BET analyzes. Also diazinon residue in solution after the first and fifth cycles was measured by LC-MS/MS method. After five cycles of diazinon decomposition, the diazinon removal efficiency decreased from 96.4% (after the first cycle) to 84.9% (after the fifth cycle). There was no obvious difference in TEM and SEM images in used titanium dioxide compared to crude nanoparticles. Also, the histogram of the size distribution of crude and used titanium dioxide nanoparticles showed that the size of used nanoparticles was slightly larger than crude nanoparticles. The specific surface area and pore size of raw nanoparticles were 57.7 m2/g and 0.175 cm3/g, respectively, which were slightly higher than the amount of nanoparticles used: 56.3 m2/g and 0.172 cm3/g. The presence of diazinon elements or intermediates resulting from its decomposition on the catalyst surface was confirmed by EDAX analysis. FTIR analysis of used nanoparticles showed a change in the surface characteristics of used nanoparticles and also the presence of functional groups such as carbonyl, methyl, ammonium, etc. on them. The findings of this study indicated that after using nanoparticles in consecutive cycles, nanoparticles undergo a process of ageing and their efficiency has decreased. These findings can be used before designing full-scale treatment systems.

Keywords: Photocatalysis, water treatment, nanotechnology, nanoparticles.

Fabrication of the microwave absorber composite in wide absorption band using hard magnet of NdFeB with thin carbonaceous layer in the network of MoS_2 plates

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Abstract

The development and improvement of products that can be used to shielding electromagnetic interference has been the subject of much research in recent decades. In this study, NdFeB magnetic powder was used in high-energy wet ball mill method for the synthesis of EMI shielding composites. The aim is improving the magnetic properties of the powder in electromagnetic application. For the synthesis of another composite with higher electromagnetic efficiency, in the last hours of the ball milling operation, the dielectric powder; molybdenum disulfide (MoS2) was added to the milling medium.The study of the physicochemical changes caused in the particles prepared by the ball milling process confirmed that the oleic acid surfactant was converted to a thin carbonaceous layer on NdFeB nanoparticles. In addition, the presence of MoS2 in the process environment, with the carbonaceous layer, formed a network of dielectric materials with enhanced electromagnetic properties. The synthesized NdFeB/C-MoS2 composite showed enhanced electromagnetic shielding performance in X-band, so that the total shielding efficiency for NdFeB/C-MoS2 composite compared to composites produced from NdFeB/C, synthesized before adding MOS2 to the milling environment, on average, it was 30% higher. In addition, the results showed that the presence of the MOS2 layer increased the real and imaginary of the permittivity by 35% and 63%, respectively. It also increased the shielding absorption efficiency by at least 45% and at some frequencies by about 60%. In addition, the results show the presence of MOS2 in NdFeB / C-MoS2 composite improves impedance matching, which leads to a reduction in reflectance loss and an increase in microwave absorption in this composite.

Keywords: Microwave Absorber, Shielding, Composite, Wet ball mill, MoS_2

Photocatalytic efficiency of TiO_2/ZnO-CuO nanoparticles in degrading diazinon from the aqueous solution

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Abstract

Diazinon is one of the most widely used toxins and pesticides, which is responsible for contaminating surface and groundwater sources in many cases. This study aims to determine the photocatalytic efficiency of TiO2/ZnO-CuO in degrading diazinon from the aqueous solution using solar radiation.

This experimental study was conducted from May to August 2020 in Environmental Health Engineering Research Center, Kerman University of Medical Sciences.

First, TiO2/ZnO nanoparticles doped with 0.5, 1 and 2% of copper oxide were synthesized. In order to determine the nanoparticle characteristics, the SEM, EDX, XRD, FTIR, MAP, and Zeta-potential analyses were performed. Then, from the 1000 mg/L stock solution of pesticides, various concentrations were prepared and dopant percent, pH, number of nanoparticles, initial concentration of pesticide, and contact time were examined. The real sample was also examined under optimal pH conditions.

Results showed that the dopant percent of copper oxide was effective for removing diazinon, so that under the same conditions after 120 min, the efficiencies of 0.5, 1, and 2% of copper oxide had the efficiency of 53, 71, and 61%, respectively. The optimal pH in this process was 7. It was also found that with increasing the amount of nanoparticles, the removal efficiency increased. Moreover, increasing the initial concentration of the dopant reduced the removal efficiency, so that with increasing the concentration of diazinon from 10 to 100 mg/L after 120 min, the efficiency was reduced from 94% to 53%. Increasing contact time also raised the efficiency of the removal process. Under optimal conditions of pH=7, 1% copper dopant, and 2 g/L nanoparticles, the toxin removal efficiency of 91% was obtained in 120 min.

The study showed that the photocatalytic process of TiO2/ZnO-CuO nanoparticles could eliminate diazinon toxin by 91% under real conditions.

Keywords: Photocatalyst, Diazinon, Doping, Aqueous solution

Efficiency of ZnO/PS /UV process in methylene blue removal from aqueous solutions

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Abstract

Organic dyes, which are widely used in many industries, are examples of persistent organic pollutants (POPs). Their decomposition and removal from industrial wastewater have become one of the major environmental problems. Therefore, the present study aimed to investigate the decomposition of Methylene Blue (MB) from aqueous solutions by an advanced oxidation process (AOP) using the combined ZnO/PS/UV process. First, the properties and structure of ZnO nanoparticles were investigated using SEM and XRD analysis, which showed that ZnO particles were suitable for use in reactions. The parameters affecting the dye removal rate by ZnO/PS/UV process included the initial concentration of dye, zinc oxide nanoparticles dose, sodium persulfate concentration, the reaction time, and the pH, which were evaluated as a factor at various times. Optimal conditions of ZnO/PS/UV hybrid process at pH 7, ZnO dose 0.3 g/L, persulfate concentration 5 mM, and MB concentration 5ppm during 60 min reaction time. pH and PS dose factors had the highest effect on process efficiency. The results showed that the ZnO/PS/UV process is very fast, efficient, economical, and environmentally friendly in effluents containing MB dye treatment.

Keywords: Methylene blue, ZnO nanoparticles, Sodium persulfate, Advanced oxidation

Poster

Investigation of the effect of different operating parameters on microbial electro-Fenton system performance in degradation of tetracycline antibiotic from aqueous solutions and electricity production

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Abstract

The microbial electron-Fenton system is an effective and environmentally friendly technology that with high efficiency in removing environmental persistent organic pollutants in the cathode chamber, can directly convert the chemical energy stored in biodegradable organic matter in the anode chamber into electrical energy using microbial activity. This study was performed with the aim of investigation of the effect of different operating parameters on the microbial electro-Fenton system performance in the degradation of tetracycline antibiotic and electricity production. During operation of microbial electro-Fenton reactor with 2000 mg/L substrate and anaerobic sludge as inoculum in short electrical circuit conditions and 24 h reaction time, the effect of cathodic chamber pH and iron sulfate concentration on the tetracycline degradation as the target pollutant and electricity generation was investigated. The maximum degradation efficiency of tetracycline in microbial electro-Fenton system under optimal conditions of pH 3 and iron sulfate concentration of 5 mg/L was determined 99.04%. Also, the values of power density, current density and output voltage were obtained 93.13 mW/m2, 1095 mA/m2 and 260 mV, respectively under optimal conditions. Based on resulting obtained, was determined that the microbial electro-Fenton system as a practical and cost-effective method in addition to removing antibiotic, has the ability to generate electricity, and the cathodic pH and concentration of iron sulfate catalyst are important parameters in the removal of contaminants and current generation.

Keywords: Microbial electro-Fenton, Tetracycline, Electricity production.

Evaluation of the performance of nanocomposite shield based on paraffin wax in X frequency band

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Abstract

Exposure to electromagnetic waves will have many adverse effects on humans and equipment. Due to the nature of electromagnetic waves, engineering controls such as the use of shields are one of the best ways to control and reduce exposure to electromagnetic waves. The aim of this study was to investigate the factors affecting the shielding efficiency of Nanocomposite shields. In this study, paraffin wax was used as a matrix and black carbon nanoparticles and Fe3O4 were used as fillers. Nanocomposite were fabricated with different weight percentages of fillers using melt mixing method. The electromagnetic properties of the Nanocomposite were measured using a Vector Network Analyzer in the frequency range of 8 to 12.5 GHz (X) based on the transfer/ reflection method. The SET (Total Shield Efficiency) index was used to assess shield's protection performance. Based on the weight percentages of Nanocomposite constituents, four samples were obtained. The highest average of SET in equal thickness belonged to S4 sample. At different thicknesses, the highest average SET was related to the minimum thickness of 0.8 mm. Also, increasing the frequency decreased the mean SET in the samples. Based on the weight composition of the Nanocomposite, one of the absorption or reflection mechanisms can be the main mechanism in reducing or eliminating electromagnetic waves in Nanocomposite shields. Shield thickness and frequency of electromagnetic waves affect the protective performance of the shield. X-frequency segmentation is a practical method for determining the best thickness and weight composition of Nanocomposite.

Keywords: Electromagnetic waves, Nanocomposite, Total Shield efficiency, Reflective loss.

Removal of lead ions from aqueous solutions by walnut shell nanoparticles as a novel and fast nano-biosorbent

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Abstract

Walnut skin nanoparticles are prepared by an innovative vibratory ball mill (Spex). A suitable amount of walnut skin powder (≈ 100 g) together with 200 hard chromium electroplated balls are filled into the tank of Spex, and vibrated by 1,200 rpm for 10 h. SEM and TEM images of the output powder of Spex show that the milled powder includes uniform nanoparticles with 65 nm average diameters. The prepared walnut nanopowder is used as a new nano-biosorbent for the fast removal of lead ions from polluted waters. The obtained experimental data show that the adsorption of lead ions on the surface of walnut skin nano-biosorbent (WSNBS) is acceptably fitted to the Langmuir isotherm model with a maximum adsorption capacity of 17.39 mg g–1. The optimum conditions for the removal of lead ions from water include solution pH 4, sample volume 500 ml or less, WSNBS weight 50 mg or more, contact time less than 2 s at room temperature. The desorption step can be done by 1.5 ml 0.5 M HNO3. In operation conditions, preconcentration factor, RSD and the detection limit are obtained 200, 4.3% and 0.11 ppb, respectively. The interfering effects of some cations such as Cu2+, Ni2+, Fe2+, Zn2+, Mg2+ and Na+ on the removal efficiency of lead ions are investigated. The presented method is successfully applied for the removal and the determination of lead ions from real samples.

Keywords: Walnut skin; Biosorbent; Nanosorbent; Heavy metal; Ion removal

Degradation of microcystin-leucine arginine by $TiO_2/BiVO_4$/NaY-Zeolite nano-composite under visible light

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Abstract

Background: Microcystin-leucine arginine (MC-LR) is a carcinogenic toxin, produced by cyanobacteria. The release of this toxin into drinking water sources can threaten the public health and environmental safety. Therefore, effective MC-LR removal from water resources is necessary.

Methods: In the present study, the hydrothermal method was used to synthesize a novel ternary BiVO4/TiO2/NaY-Zeolite (B/T/N-Z) nanocomposite for MC-LR degradation under visible light. FESEM, FTIR, XRD, and DRS were performed for characterizing the nanocomposite structure. Also, the Response Surface Methodology (RSM) was applied to determine the impact of catalyst dosage, pH, and contact time on the MC-LR removal. High-performance liquid chromatography was performed for measuring the MC-LR concentration. Results and discussion: Based on the results, independent parameters, including contact time, catalyst dosage, and pH, significantly affected the MC-LR removal ($P<0.05$). In other words, increasing the contact time, catalyst dosage, and acidic pH had positive effects on the MC-LR removal. Among these variables, the catalyst dosage, with the mean square and F-value of 1041.37 and 162.84, respectively, had the greatest effect on the MC-LR removal efficiency. Apart from the interaction between the catalyst dosage and contact time, the interaction effects of other parameters were not significant. Also, the maximum MC-LR removal efficiency was 99.88% under optimal conditions (contact time=120 minutes, catalyst dosage=1 g/L, and pH=5). Conclusion: According to the results, the B/T/N-Z nanocomposite, as a novel and effective photocatalyst could be used to degradation of MC-LR from polluted water.

Keywords: Microcystin-LR, BiVO4/TiO2/NaY-Zeolite, Photocatalytic degradation, visible light, RSM

Fluorometric sensing of pathogen by green synthesized nanocomposite

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Abstract

An E.coli biosensing assay was introduced via SPE by Ag@IO@CS nanocomposite. Here, preconcentration on the green prepared nanocomposite was combined with fluorometric detection to quantify E. coli, and several parameters of the proposed methodology were investigated. The first objective of our study was to use a facile green and cost-effective method for the synthesis of Ag based nanocomposite by using cinnamon extract as a reducing and stabilizing agent. Secondly, a high affinity of nanocomposite to the bacteria was demonstrated. Prepared nanocomposite was characterized by HRTEM, EDX, FTIR and UV measurements. Combination of nanocomposite adsorption and magnetic separation was used to easily extract and desorption of bacteria efficiently, therefore low concentrations of E. coli could be determined. The detection limit as low as 0.6 CFU ml-1 and a wide linear detection was obtained in the range of 1 to 104 CFU ml-1.

Keywords: Pathogen sensor, Ag/Fe3O4/Chitosan nanocomposite, magnetic separation

Evaluation of the efficiency of persulfate/UV process in degradation of pentachlorophenol from aqueous media by Taguchi experiment design

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Abstract
The applicability of the persulfate/UV (PS/UV) process for the degradation of pentachlorophenol (PCP) as an organic contaminant from aqueous solutions was investigated. Effective operational parameters, including the initial PCP concentration (25, 50, 100, and 150 mg/L), PS concentration (25, 50, 75, and 100 mg/L), solution pH (5, 7, 9, and 11), and reaction time (10, 20, 30, and 40 min) were investigated. To identify the influences of experimental factors involved in PCP degradation, an experimental design based on an orthogonal array was proposed using the Taguchi method. Based on the results, 98/78 % of the PCP was removed at the optimal conditions (initial concentration of 25 mg/L, Na-PS (sodium persulfate) concentration of 100 mg/L, pH of 11, and reaction time of 40 min) in the PS/UV process. Moreover, COD and TOC removal rates were 82/3 % and 6 1% in the PS/UV process, respectively. An analysis of variance (ANOVA) indicated that PS is the most effective agent in removing PCP in the PS/UV process.

Keywords: Persulfate, UV, Sulfate radical, Pentachlorophenol, Taguchi

Removal of reactive black-5 dye from textile wastewater using electro Fenton process

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Abstract

Reactive dyes are a highly successful class of modern synthetic dyes, their flexibility in application, and the excellent fastness properties they offer when dyed on wool, silk, cotton, and regenerated cellulosic fibers. The release of some dyes in water streams has serious environmental impacts. Therefore, it is significantly important to remove such compounds from the waste streams before their discharge into the aquatic environment. In this current work, response surface methodology (RSM) with the central composite design (CCD) was used to achieve removal of efficient reactive black-5 dye using the electro Fenton process. Experiments were done under three levels of various operational parameters. The initial concentration of reactive black-5 dye, H2O2 dosage; current density were studied. The independent variables and their interactions were tested using analysis of variance (ANOVA) with a 95% confidence level. Under optimal operating conditions, the removal efficiency was found to be 95.1%. The values of coefficients of determination (R2), predicted R2 and adjusted R2 were found to be 0.9865, 0.9735, and 0.9621, respectively. The kinetic of the developed model follows a pseudo-first-order reaction with satisfactory correlation coefficients of 0.9964. The electro Fenton process as an environmentally favorable treatment method was optimized and applied successfully for efficient removal of reactive black-5 dye from the textile industry.

Keywords: Reactive Black-5 Dye, Electro Fenton Process, Degradation, Textile Industry

Removal of chromium (VI) from synthetic and leather industrial wastewater using electrocoagulation technology

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Abstract
Chromium (VI) is one of the heavy metals in water and wastewater that has the most toxic characteristic. Consequently, it is dangerous for human and environmental health. Various methods are used for the removal of chromium from wastewater. In this work, the electrocoagulation process results were assessed through total chromium removal. The effects of parameters including Cr (VI) concentration, current density, and solution of pH on the treatment process were investigated. Response surface methodology (RSM) was employed for the optimization of the electrocoagulation process. The significance of the developed model was investigated by the obtained F-value and P-value. The obtained lack of fit confirmed that the model was significant, and the obtained experimental results were accurate and reliable. The impact of the variables and their interactions were evaluated by ANOVA. The obtained results confirmed that Cr (VI) concentration and solution pH revealed a greater influence on the removal efficiency of the process. According to the obtained results, the electrocoagulation process was found to be an efficient technique for the successful removal of Cr (VI) from synthetics and real leather industrial wastewater.

Keywords: Removal, Cr (VI), Leather Industrial Wastewater, Electrocoagulation Process.

Photocatalytic Degradation of Atenolol from aqueous solution Using Bi_2O_3/TiO_2 composite

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Abstract

In this study, Bi2O3 / TiO2 composite was synthesized by the solvothermal method and characterized by TEM, BET and EDX techniques. To study the photocatalytic activity of Bi2O3 / TiO2, degradation of atenolol (ATL) as an target contaminant has been performed and the effects of solution pH, reaction time initial ATL concentration and catalyst dosage on ATL removal were studied.

According to the BET results, the mean pore diameter of catalyst was measured about 26.29 nm which indicates the mesoporous sample of Bi2O3/TiO2. EDX analysis confirmed the presence of bismuth (Bi), titanium (Ti), and oxygen (O) in the synthesized catalyst. From TEM analysis, the size of synthesized catalyst was calculated to be about 22-150 nm. Increasing solution pH from 3 to 7, the removal efficiency increased from 12.4% to 54.9% and after that, reduced to 46.2% at a pH of 9. Also, the increase of composite dose from 100 to 400 mg/L led to the ATL decomposition efficiency increase from 62. 7% to 68.9% and after that, declined to 49.56% at catalyst dose of 800 mg/L. The ATL removal efficiency was increased from 22.3% to 62.7% when the contact time was increased from 5 to 60 minutes. With decreasing the initial concentration of ATL from 60 to 10 mg/l, removal efficiency was increased from 24.11% to 68.92%.

Keywords: atenolol, Bi_2O_3, TiO_2, aqueous solution

Investigation of removal and mineralization of parachlorophenol from aqueous solutions using bismuth vanadate and tungsten trioxide process in a laboratory pilot visible-light reactor

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Abstract
Parachlorophenol is widely found in the effluents of various industries such as pesticides, herbicides, petrochemicals, and paper and pulp industries, which discharged into surface and groundwater resources. The aim of this study was to investigate the possibility of parachlorophenol removal using bismuth vanadate and tungsten trioxide nanoparticles in a laboratory-scale reactor consisting of two LED lamps in the visible light wavelength range of 700-420 nm. The effects of the operational parameters i.e., solution pH (3-11), catalyst dosage (0.075-0.15 g), and initial pollutant concentration (25-200 mg/L) were evaluated. At catalyst dose of 0.125 g/L, initial pH of 7.0, and initial parachlorophenol concentration of 25 mg/L, complete degradation (>97%) was achieved in reaction time of 60 min. The degradation of parachlorophenol using bismuth vanadate and tungsten trioxide process was pseudo-first-order kinetics. In optimal condition, 47.5% and 67.5% of TOC and COD removal rates were obtained in 60 min contact time, respectively. According to the results of AOS and COS experiments, it was determined that the process has the ability to oxidize and mineralize in the decomposition of parachlorophenol. The results of this study showed that the bismuth vanadate and tungsten trioxide process under optimal conditions can be used as an alternative technology for industrial wastewater treatment containing parachlorophenol due to high efficiency, and low catalyst consumption.

Keywords: Bismuth Vanadate, Tungsten Trioxide, Parachlorophenol, Photocatalyst

Evaluation of lead removal efficiency from simulated industrial effluent by tea-treated magnetite nanoparticles

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Abstract

Increased production of industrial wastewater containing heavy metals has raised concerns. Lead is a non-biodegradable metal and can cause many diseases and disorders. The use of Magnetic nanoparticles technologies in the removal of pollutants has been considered due to its low cost and easy handling. Therefore, in this study, the removal of lead by tea-treated magnetite nanoparticles was investigated. In this experimental study, the magnetite nanoparticles were prepared by precipitation method through the addition of FeCl3.6H2O into the liquid medium. Then, the effect of pH, initial Pb concentration, contact time, and nanoparticle concentration was determined by the response surface method and the central composite model. The results showed that increasing the pH, led to an increase in the response level and removal of lead by magnetite nanoparticles. Also, increasing the initial concentration of Pb had an increasing trend on lead removal and response level. Increasing the time from 5 minutes to 20 minutes did not have a significant effect on Pb removal and increasing the concentration of magnetite nanoparticles reduced the lead removal rate as well as the response level. In addition, nanoparticle properties including particle structure, size distribution, and specific surface area were determined using XRD, XRF, dBJH methods. Based on the obtained results, magnetite nanoparticles treated with tea have a good efficiency competency for the removal of lead from simulated wastewater.

Keywords: Lead, magnetite nanoparticles, industrial wastewater, adsorption

Simultaneous decolorization/degradation of Acid Blue-113 and chromium (VI) removal by a salt-tolerant Klebsiella sp. strain AB-PR and detoxification of biotransformed metabolites by UV-C/H_2O_2

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Abstract

In this study, a salt-tolerant decolorizing strain was isolated from vermicompost and identified as Klebsiella sp. strain AB-PR. Klebsiella sp. strain AB-PR was presented to simultaneously remove high concentrations of diazo dye and hexavalent chromium under saline conditions for the first time. Maximum decolorization of 95.50% was observed for 800 mg/L of Acid Blue-113 at pH 7 and temperature 35 °C with 5% inoculum size under static conditions. Also, decolorization efficiencies for 13 and 8 g/L of glucose and yeast extract as optimum carbon and nitrogen sources were 94.52 and 94.70%, respectively. Klebsiella sp. strain AB-PR could tolerate 50 g/L of NaCl and decolorize 94.18% of Acid Blue-113. The maximum decolorization and removal efficiencies for 800 mg/L of Acid Blue-113 and 30 mg/L of hexavalent chromium with 50 g/L of NaCl were 90.98 and 89.42%, respectively. Gas chromatography–mass spectrometry and Fourier transform-infrared spectroscopy studies showed that Acid Blue-113 was cleaved to the aromatic amines metabolites with lower molecular weight. The phyto-toxicity study exhibited that Acid Blue-113 was not toxic for Triticum aestivum and Maize. But after biological treatment, the toxicity was increased, and the seeds could not germinate. Therefore, ultraviolet-C/H2O2 was applied for the detoxification of biotransformed metabolites. After application of ultraviolet-C/H2O2, toxic aromatic metabolites were converted to nontoxic and linear organic products, and the seeds were germinated completely. Thus, the combined application of biological–chemical treatment is effective in the detoxification of textile wastewater.

Keywords: Biological decolorization, Detoxification by UV-C/H2O2, Hexavalent chromium, Integrated treatment, Saline condition.

Poster

Synthesis of Ni doped ZnO nanorods for efficient sonocatalytic removal of diazinon from aquatic solutions: optimization of key parameters using RSM (CCD): kinetic study, reaction pathway and toxicity bioassay

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Abstract

Organophosphorus pesticides are regarded as one of the most commonly used pesticides worldwide and these pesticides are widely applied in agriculture to increase production of crops and they are usually entered the water resources through industrial wastewater and agricultural runoff. Diazinon, as most common Organophosphorus pesticides, is used to control of widespread spectrum of agricultural pests, but even at low concentration levels of 350 ng.L-1, it is dangerous to aquatic organisms. Therefore, the purpose of this research, was to investigation the synthesis of Ni doped ZnO nanorods and its efficiency in sonocatalytic removal of diazinon from aquatic solutions: process optimization using response surface methodology (central composite design), determination of reaction pathway and kinetic study. XRD, FT-IR, FE-SEM, EDX, XPS, Raman, VSM, UV-Vis and pHpzc techniques were applied to characterize the prepared nanorods. The effect of parameters such as sonocatalyst dosage, contact time, initial pH, initial pesticide concentration and type of organic compounds (oxalic acid, humic acid and folic acid) were investigated on the removal efficiency of diazinon by US/Ni doped ZnO system. The residual concentration of diazinon were measured by using a UV/Vis spectrophotometer at a wavelength of 295 nm. The FE-SEM analysis showed sheet structure for ZnO and rod structure for Ni-doped ZnO. Under the optimum conditions: initial pH= 5, initial diazinon concentration= 15 mg.L-1, sonocatalyst dosage= 1 g.L-1 and in the presence of organic compounds including of oxalic acid, humic acid and folic acid= 3 mg.L-1, the sonocatalytic degradation efficiency of diazinon in the 15 min was acquired 82.29 %. The experiments data in this study, was well described with first-order kinetic model. In general, the efficiency of the process in the removal of diazinon from drinking water and real wastewater was acceptable. Moreover, proper sonocatalytic activity in the removal of diazinon was maintained even after six successive cycles. According to the results of the toxicity study of the end products, the diminished toxicity of the diazinon solutions is quite evident. Also the main intermediateproducts in the degradation process of diazinon indicates the high potential of sonocatalyst for refractory pollutants degradation.

Keywords: Diazinon, Sonocatalytic degradation, Ni doped ZnO nanorods,Central composite design

Electrochemical removal of hexavalent chromium using MC / Fe_3O_4 @ PPY composite

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Abstract
The main objective of this study is improving performance of electrocoagulation process for chromium (VI) removal by using metallic polymer anode. The metallic polymer electrode prepared via immobilized Fe3O4 nanoparticles on microbial cellulose by co-precipitation method. Then MC/Fe3O4 modified and conducted by polypyrrole and put stainless steel in the middle of it. The MC/Fe3O4@PPY composite was characterized by FTIR and FE-SEM. Factors effective on chromium (VI) removal by electrocoagulation using the SS_MC/Fe3O4@PPY electrode such as initial concentration of chromium, current density, energy consumption and generation of sludge were studied. The proposed electrocoagulation system reached to 99.87% chromium removal efficiency using 5.333 mA/cm2 current density within 20 min, pH of 3_-^+ 0.5, and 10 mM NaCl. The SS_MC/Fe3O4@PPY electrode exhibited a high removal efficiency of chromium, lower energy consumption (0.627451 KWh/m3) and lower production of sludge (0.018 Kg/m3) than other electrocoagulation process. The results showed that the reasons of this phenomena were chromium adsorption on MC/Fe3O4@PPY, chromium reduction on cathode and electro-coagulation caused by the production of metallic hydroxide flocks released from stainless steel and magnetic microbial cellulose.

Keywords: Electrocoagulation, Chromium, Adsorption, MC / Fe_3O_4 @ PPY, Polypyrrole

Prioritization of Effective Factors in Surface Water Pollution Using AHP Hierarchical Analysis Process Method

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Abstract

Although global attempts have been made and modern technologies have been exploited around the world to prevent surface and ground water pollution, still access to clean water supplies is a crucial issue in many countries today. According to EPA (United States Environmental Protection Agency), roughly one third of world current is specifically polluted. Since different pollutants affect surface and ground water to a greater or lesser extent, by prioritizing these pollutants it would be feasible to adopt better strategies to deal with them.

This study is based on two modeling methods. The first method is Analytic Hierarchy Process (AHP) which has been used to prioritize different parameters. In this prioritization, the taken option must be in its nearest distance to the positive ideal situation and its furthest distance from the negative ideal situation. The second method of modeling is based on decision tree which is one of the most frequent methods used for deductive reasoning.

Industrial pollutants are identified as the main branch and detergents, pesticides, and radioactive material are known as the chief leaves of pollution. Also heat and dissolved salts are dropped out from the decision tree due to their minor importance compared to these main factors.

Based on the research that is conducted, surface water is more subject to pollution than ground water. In this essay the effects and results of the six pollutants, i. e. industrial pollutants, detergents, radioactive material, pesticides, heat and dissolved salts density are studied. It shows that except for radioactive material which pollutes ground water more than surface water, all the other five pollutants exert more effects on surface water. 74 percent of surface water and 26 percent of ground water are subject to these pollutants. This study also shows that industrial pollutants are the most effective pollutants and dissolved salts density is identified as the least effective one.

Keywords: water pollution, decision tree, surface water, ground water, modeling, pollutants, Weka software, analytic hierarchy process (AHP)

Study of a COP/SBMBBR hybrid process in the diazinon removal from aqueous solutions

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Abstract

Layered double hydroxide nanoparticles (LDH) were used in the ozonation process as a catalyst for the pre-treatment of the sequencing batch moving-bed biofilm reactor (SBMBBR) to remove diazinon. The response surface methodology (RSM) was applied in the COP parameters optimization, including initial diazinon concentration, LDH dose, reaction time, and pH. The method of dispersive liquid-liquid microextraction (DLLME) was used for diazinon extraction from aqueous samples. The maximal removal efficiencies of diazinon, COD, and TOC were 92, 80, and 74%, respectively under optimal conditions of pH: 8.25, diazinon: 120 mg/L, LDH: 750 mg/L, and reaction time: 70 min. This effluent was transferred into biological reactor of SBMBBR (pH of 6.5-7, HRT of 24 h, mixed liquor suspended solids attached to bio-carriers (MLSSatt.) of 4500 mg/L, mixed liquor volatile suspended solids attached to bio-carriers (MLVSSatt.) of 3600 mg/L, MLSS of 950 mg/L, and MLVSS of 830 mg/L). The application of COP/SBMBBR hybrid process resulted in the complete degradation of diazinon, COD and TOC removal efficiency of 99.37 and 99%, respectively.

Keywords: SBMBBR, catalytic ozonation, diazinon, LDH nanoparticles, RSM

Poster

Plastic Waste Crisis: The Current Situation and its Management in Iran

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Abstract

Iran is one of the top 10 countries in the world in terms of plastic consumption. The amount of plastic produced in Iran is estimated at more than 17,000 tons per year, which is equivalent to about 50 tons per day. This study aimed to investigate the current situation and management of plastic waste in some provinces of Iran. The study is a descriptive-analytical one that has been done from 2019 to 2022.The plastic waste produced in 9 provinces (out of 31 provinces) was sampled once a week for 12 months to determine the total weight and per capita per day. Also, the method of collecting and disposing of plastic waste was determined in different cities of the provinces. After that, a training program regarding the in-source separation of plastic and other municipal wastes was implemented in Semnan city to teach people how to reduce and separated their plastic wastes. Finally, a plastic recycling factory was been designed and constructed in Semnan. The study indicate that the plastic waste per capita per day average is about 56gr in the studied provinces. Also, currently, only 5% of the total plastic waste is collected separately and more than 95% of them are disposed of as mixed with other wastes. By carrying out an in-source separation and reduction program, the amount of plastic waste produced in this province decreased by 10% in two years, and also a plastic recycling plant with a capacity of 30 tons per day was constructed in Semnan city (the capital of Semnan province) which prevents disposing of 1050 Ton of plastic annually, resulting in environmental pollution preventing. Based on the results, the implementation of a training program to reduce plastic production and the construction of plastic recycling factories can greatly decrease the plastic crisis in developing countries such as Iran.

Keywords: Plastic, Crisis, Iran, Management, Recycling,

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Poster

Removal of Cefixime from aqueous solutions by the biosorbent prepared from Pine Cones: kinetic and isotherm studies

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Abstract

The bio-char prepared from pine cones was used to remove Cefixime (CFX) from aqueous solutions. The influence of some parameters including pH (2-12), contact time (0 to120 min), initial concentration of CFX (10, 50, and 100 mg/L), adsorbent dose (0.1 to 2.5 g/L), temperature (10 to 50°C) was evaluated. The pine cones pieces was washed with the distilled water, dried, crushed and sieved to provide a particle size of 100-250 nm. For carbonization, the dried raw material was put into a stainless steel reactor and heated in an electrical furnace at 20 °C per min and maintained at 460 °C for 2 h. After carbonization, the samples were washed with distilled water and then dried at 105 ° C for 12 h, and were used as adsorbent. The specific surface area, total pore volume and mean pore diameter of the biosorbent were determined to be 789 m2/g, 0.373 cm3/g and 1.89 nm respectively. In the optimum conditions (pH = 6.3, initial concentration of CFX = 50 mg/L, contact time = 90 min and adsorbent dose = 2 g/L), the removal efficiency was 92 %. The adsorption isotherm of CFX follows the Langmuir model. The kinetic study confirmed that the adsorption process fits with the pseudo-second-order reaction. The thermodynamic study indicated that the adsorption of CFX by the bio-char is feasible, spontaneous and exothermic. This study represents that the biosorbent prepared from the pine cones can be used as an appropriate and cost-effective adsorbent for the removal of CFX from aqueous solutions and hospital wastewater.

Keywords: Cefixime; Adsorption; Pine cones; Bio-char; Kinetics; Isotherms

Evaluation of the efficiency of electrocoagulation process in removing cyanide, nitrate, turbidity and chemical oxygen demand from landfill leachate

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Abstract

Leachate contains toxic and non-biodegradable substances that are not easily treated by conventional treatment methods. In this study, the effect of pH, current density and reaction time parameters on the removal of cyanide (CN-), nitrate (NO3-), turbidity and chemical oxygen demand (COD) in leachate by electrocoagulation process was investigated. This work is an experimental study with direct current using four aluminum electrodes with 90% purity and parallel bipolar arrangement. The length, width and thickness of the electrodes are 5 cm, 10 cm and 2 mm, respectively. On each of the electrodes has existed 6 holes with a diameter of 0.7 cm. The samples were prepared from the old leachate of solid waste landfill in Ghaemshahr, Iran. In this study, at a current density of 33 mA/cm2 and a time of 60 minutes, the optimum removal efficiency of cyanide (100 %) was obtained pH of 5.5 and 10. The maximum removal of nitrate (99.65 %) and turbidity (86.41 %) were at pH 5.5 and 8.3, respectively. The high removal efficiency of COD (83.14 %) was obtained at pH 10. The results showed that the removal of cyanide, nitrate, turbidity and COD increases with increasing current density and reaction time. Due to the proper removal efficiency of nitrate and cyanide pollutants in leachate by electrocoagulation, nitrate and cyanide amounts reached less than the allowable contamination level. Based on the results, electrocoagulation is an efficient and effective method for removing nitrate and cyanide in old leachate of municipal solid wastes.

Keywords: Electrocoagulation, Cyanides, Nitrates, Turbidity, COD

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Poster

Imidazole-modified clinoptilolite as an efficient adsorbent for removal of 2, 4, 6- tr`ichlorophenol: fabrication, characterization, kinetic and isotherm studies

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Abstract

Chlorophenol compounds, especially trichlorophenols, are on the US environmental protection agency's list of priority pollutants due to the carcinogenicity and mutagenicity. In this study, for improving of the removal efficiency of 2, 4, 6-trichlorophenol (2, 4, 6-TCP) using a naturally based and eco-friendly adsorbent; raw clinoptilolite, acidic Clinoptilolite, modified clinoptilolite with silane and imidazole-modified clinoptilolite (Imid-Clino) was evaluated. Morphology of the modified adsorbent was analyzed using FE-SEM, TGA, XRD, FT-IR, BET and EDAX. Adsorption process of 2, 4, 6-TCP onto Imid-Clino adsorbent as solution pH, adsorbent dose, agitation speed, contact time, initial 2,4,6-TCP concentration and temperature was investigated. From the results, it has been observed that the highest removal efficiency is 86% at contact time of 3-hour, initial 2,4,6-TCP concentration of 30 mg/L, adsorbent dosage of 40 mg and agitation speed of 150 rpm at pH 5.0 that is related to Imid-Clino. The equilibrium data were studied using Langmuir, Freundlich, Radlich-Peterson, Temkin and Elovich isotherms. Moreover, kinetic syudies were evaluated by pseudo-first-order (PFO), pseudo- second order (PSO), intra- particle diffusion (IPD) and Elovich models. The results indicated that Langmuir-Freundlich isotherm and PSO model had the most agreement with the experimental data. Thermodynamic parameters showed the 2, 4, 6-TCP adsorption onto Imid-Clino was exothermic and spontaneous. The desorption studies have shown that the removal efficiency of this contaminant after four stages of adsorption and desorption decreased about 4%. The obtained reaults confirmed that the Imid-Clino can be used as potential adsorbent in practical applications for removal of 2, 4, 6-TCP from industrial wastewater and other water contaminated with 2, 4, 6-TCP.

Keywords: Adsorption; 2, 4, 6- TCP; Imid-Clinoptilolite; Isotherms and kinetics, Reusability

Synthesis of $CoFe_2O_4$@MC using Methylcellulose as a highly efficient and green nano-catalyst to Metronidazole photocatalytic degradation

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Abstract

By using a simple, quick, and novel microwave-assisted technique using iron and cobalt salts on methylcellulose in alkali medium, nano-CoFe2O4@Methycellulose (MC) as a highly powerful, magnetically separable photocatalyst was produced. Field emission scanning electron microscope-energy dispersive spectroscopy (FESEM-EDS), mapping, and X-ray powder diffraction (XRD) were used to investigate the nano-biomagnetic catalyst CoFe2O4@MC. The production of pure-phase spinel ferrites was verified by powder XRD and EDS investigation. The sphere-like particle shape of the samples with a reduced agglomeration was confirmed by FESEM analysis. The effective parameters of reaction time, starting antibiotic concentration, pH, photocatalyst loading, and MNZ removal effectiveness were studied after this photocatalyst was characterized. In ideal conditions, the maximum removal effectiveness of 85.3% was found. This photocatalytic method is a viable option for removing MNZ and other antibiotic contaminants from a variety of wastewaters.

Keywords: Nano-catalyst, $CoFe_2O_4$@MC, Metronidazole, Methylcellulose

Simultaneously denitrification and disinfection of contaminated water by electro-catalytic activity of Ni-Fe/Fe_3O_4

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Abstract
The aim of this study was to provide an effective electrocatalytic system for the simultaneous reduction of nitrate and disinfection of contaminated water by the electrocatalytic performance of Ni-Fe/Fe3O4 cathode. At first, the Ni-Fe electrode was synthesized by electrodeposition process. Then its physical properties were analyzed by scanning electron microscopy (FESEM), X-ray diffraction (XRD), Brunauer-Emmett-Teller (BET) analysis, and photoelectron X-ray spectroscopy (XPS). Simultaneous disinfection and reduction of nitrate were performed under the following conditions: 15 mg/l Fe3O4 nanoparticles, pH 6.5, NaCl 10 mM, 50 mg/l nitrate, 105 CFU/ml and current density 4 mA/cm2.According to the results obtained in the absence of nitrate, 100% of Escherichia coli bacteria were disinfected after 12 minutes. In the presence of nitrate, the time of complete disinfection increased to 120 minutes. In the absence of bacteria, 83% nitrate was removed in 240 minutes, which in the presence of bacteria, the nitrate reduction efficiency increased slightly to 88%. In nitrate reduction process, nitrite (0.22 mg/l) and ammonium (3.6 mg/l) were produced. In the presence of bacteria, the amounts of nitrite and ammonium produced increased to 0.42 mg/L and 7.3 mg/L. The results show the outstanding ability of Ni-Fe/Fe3O4 electrode in electrocatalytic reduction of nitrate and disinfection of contaminated water separately and simultaneously with high efficiency, high selectivity to nitrogen, and low energy consumption.

Keywords: Electrocatalytic nitrate reduction, Disinfection, E. Coli, Ni-Fe, Fe_3O_4 nanoparticles

Effective removal of tetracycline from aqueous solution using biochar prepared from pine bark: Isotherms, kinetics and thermodynamic analyses

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Abstract

In recent years, there are many concerns about the potential risks of contamination of emerging compounds in water resources and their adverse effects on human health and the environment. Today, the production and use of drug compounds for the treatment of human and animal diseases is increasing. The aim of this study was to investigate the effect of the biosorbent prepared from pine bark on the removal of tetracycline from aqueous solutions. In this study, the effect of various variables including pH (2-12), adsorbent dose (1-2 g)), tetracycline concentration (50-500 mg/l), contact time (10-120 min)) and temperature (10-50 °C) as well as the structural properties of biochar were examined. The isotherms, kinetics and thermodynamics of the adsorption process were also evaluated. The residual concentration of tetracycline after adsorption by DR5000 spectrophotometer of the Hack Company at 292 wavelengths was read. Using FTIR and SEM methods, it was found that the biochar structure has many pores for adsorption and also has functional groups including hydroxyl, carbonyl and amine, which increases the adsorption capacity. Maximum removal of tetracycline (89.5%) was achieved in 15 minutes, pH 5.1 and dose 1 g. In this study, the removal efficiency of tetracycline increased with increasing temperature and adsorbent dose and decreased with increasing contaminant concentration. The adsorption isotherm of tetracycline at maximum adsorption capacity (58.47 mg/g) is consistent with the Langmuir model and the adsorption kinetics follows the pseudo- second order model. According to the results of this study, it was found that biochar produced from pine bark is a cheap and efficient adsorbent in the removal of tetracycline antibiotic and can be used to remove this antibiotic in hospital wastewaters.

Keywords: Tetracycline, Adsorption, Biochar, Pine bark

Evaluation of the efficiency of SnO_2/H_2O_2 hybrid process for removing direct red dye 81 from aqueous solutions

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Abstract
The aim of this study was to use tin oxide (SnO2) nanoparticle along with hydrogen peroxide (H2O2) and to evaluate their effectiveness in removing direct red 81 dye from aqueous solution. This study was performed on a laboratory scale and in a batch mood. To show the structural properties of SnO2 nanoparticles, X-ray diffraction (XRD), and electron microscopy (SEM) images were used. According to BET analysis, the particle size is 10 nm. Laboratory results showed that the direct red 81 dye removal efficiency by SnO2/H2O2 hybrid process under the conductions including H2O2 concentration of 0.1 mmol/L, SnO2 concentration of 0.1 g, initial dye concentration of 25 mg/L, and pH of 3 reached 97.73% after 60 min. Direct red dye removal efficiency has a direct relationship with an increase in reaction time and adsorbent concentration while there is an inverse relationship between removal efficiency with the increase in pH, hydrogen peroxide concentration, and initial dye concentration. Considering the obtained results, the hydrogen peroxide activated by the SnO2 catalyst has a good ability to remove direct red 81 dye, and this process can be used to remove direct red 81 dye and other anionic dyes from wastewaters containing these pollutants. According to the results of the reaction rate, it can be concluded that the process follows the pseudo-second-order kinetics.

Keywords: SnO_2 nanoparticle, Hydrogen peroxide, Direct red 81 dye, H_2O_2

Poster

Metronidazole antibiotic degradation by a new magnetic nano-catalyst $CuCoFe_2O_4$@MC/AC in presence of persulfate and ultrasonic

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Abstract

Antibiotics are a class of antibacterial chemical compounds that are used to prevent and treat bacterial infections in people and animals. Because of their complicated structure, these medicines accumulate in the environment, increasing bacterial resistance and endangering public health. The antibiotic metronidazole accumulates in the human body and animals due to its presence in water sources, causing adverse effects on the central nervous system such as encephalopathy, seizures, and cerebellar and spinal cord damage. The goal of this research was to create a magnetic nanocatalyst that could remove this antibiotic from water. The degradation of Metronidazole (MNZ) in the presence of ultrasonic (US: 60kHz) was studied utilizing CuCoFe2O4@MC/AC catalyst produced by microwave-assisted technique as an effective activator for persulfate (PS). To characterize the structure of the CuCoFe2O4@MC/AC catalyst, X-ray powder diffraction (XRD), Field emission scanning electron microscope (FESEM), and Energy dispersive spectroscopy (EDS)-Mapping & Line scan were used. After 15 minutes of reaction, the maximum MNZ degradation of 93.78% was reached using the optimal operating parameters of 0.4 g/L catalyst, 6 mM PS, 5 mg/L MNZ, and pH 3. Because of its great efficiency, this magnetic nanocatalyst can be utilized in treatment facilities that have been polluted with drug substances.

Keywords: Advanced Oxidation Processes, Metronidazole, Magnetic nanocatalyst, Persulfate, Ultrasonic

Evaluation of the efficiency of the biochar prepared from the pine bark in removing diclofenac from aqueous solutions

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Abstract
In recent years, there has been a great deal of concern and attention to the potential for problems related to emerging pollutants in water resources and industrial and municipal wastewater. Among these, the production and use of pharmaceutical compounds to treat human and animal diseases is increasing today. The aim of this study was to evaluate the efficacy of the biochar obtained from the pine bark in removing of diclofenac from aqueous solutions. In this batch study, the effect of various variables such as pH (2-12), adsorbent dose (0.1- 2 gr), initial concentration of diclofenac (50- 500 mg/l), contact time (10-120 min) and temperature (10- 50°C), as well as structural characterization of the biosorbent were investigated. The isotherm, kinetics and thermodynamics of the adsorption process were also investigated. The residual concentration of the compound after adsorption process was read by spectrophotometer, DR5000 model, Hack Company at 292 nm. In the structural studies of the adsorbent surface (FTIR and SEM), it was found that the adsorbent structure has multiple pores for proper adsorption and has functional groups such as hydroxyl, carbonyl and amine groups that increase the adsorption capacity. The maximum removal of diclofenac (80.4%) was at pH of 6.2. In this study, the adsorption efficiency of diclofenac increased with increasing the amount of adsorbent and decreased with increasing the contaminant concentration. With increasing temperature, the adsorption efficiency of diclofenac increased. The adsorption isotherm of diclofenac fitted to Langmuir model with maximum adsorption capacity was 54.64 mg/g. The kinetics of the adsorption process of the drug compound followed by the pseudo-second-order kinetic model. According to the result, the adsorption efficiency of diclofenac by the biochar of the pine bark is suitable and it can be efficient and cheap for removal of drug compounds from hospital and other drug production centers wastewater.

Keywords: Diclofenac, Adsorption, Biochar, pine bark.

Technologies of Sulfur Dioxide Removal from Air, Review Study

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Abstract

Air pollution is a major environmental health problem in both developing and developed countries. Sulfur dioxide (SO2) is one of the most important air pollution indices that is produced by the combustion of fossil fuels containing sulfur. The results of studies showed that the SO2 concentration levels are high in Iran, even in warm seasons, which indicates the adverse conditions of the pollutant in cold seasons. Given the effects of this pollutant on humans and the environment, the controlling measure against this pollutant is very necessary. Many researchers have studied different methods for removing this pollutant from air in several studies, and each of these methods has several advantages and disadvantages. In fact, the Ever-increasing demand for energy efficiency and conversion has been a driving force behind the development of alternative approaches, and the In-Plasma Catalysis (IPC) technology provides such an alternative. This technique, which is achieved by integrating non-thermal plasma (NTP) and catalyst, is new and combines the benefits of the catalyst (high selectivity) with the rapid reactions at ambient temperature and the atmospheric pressure caused by NTP. Also, the interaction between plasma and catalyst in an IPC system has made it an ideal technique to remove SO2 with high removal efficiency and high energy efficiency. In this integrated system, different catalysts were being studied with the aim of increasing the removal efficiency and energy efficiency and resistance against sulfur poisoning.

Keywords: Sulfur Dioxide, Air Pollution, Non-Thermal Plasma, Catalysis, Plasma-Catalyst Hybrid System

Humic acids removal from synthetic aqueous environment by Electrocoagulation process duad with Hydrogen Peroxid

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Abstract

Presence of humic acides in water resources is important because it is a precursor to disinfection by-products (DBPs) and affects many treatment processes. In this study the performance of electrocoagulation process duad with Hydrogen Peroxid has been investigated for humic acids (HA) removal from aqueous environment. The experiments were performed in a bipolar batch reactor (covered with the aluminum foil) that was equip with iron electrodes and connected to electric source with electrical potential 10 V in bipolar mode. Several working parameters, such as initial pH (3, 5, 7, and 8), electrical conductivity produced from adding 1, 1.5, 2 and 3 g/lit KCl and reaction time were studied to achieve the highest humic acid removal capacity. Solutions of humic acid with concentration equal 20 mg/l were prepared in all samples. To follow the progress of the treatment, hydrogen proxide (50 mg/l) added to reactor and then samples of 10 ml were taken at 5, 15, 30, 45and 60 min and then filtered (0.45 µ) to eliminate sludge formed during electrolysis. Finally, humic acid and iron concentration was measured by TOC analyser and atomic absorption method, respectively. Results of this study revealed that the most effective removal capacities of humic acid (97.19%) could be achieved when the pH was kept equal 5and this pH share fenton and electrocoagulation process was %7.9 and %92.1 respectively. Also, the results were showed that the removal efficiency of humic with increase amount of pH and electrical conductivity parameters, diminish and got better respectively. It can be concluded that the fenton process combined with electrocoagulation process has the potential to be utilized for cost-effective removal of humic acid from aqueous environments.

Keywords: Humic acid, Fenton, Hydrogen Proxid, Electrocoagulation, Aqueous environments

Poster

Bioremediation of soils contaminated with petroleum compounds in Iran: A review study

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Abstract
Soil contamination with petroleum compounds (TPH) is one of the main environmental concerns, especially in Iran, where 8.58% of the world's oil resources exist. The main causes of soil pollution were attributed to petroleum compounds, leakage of storage tanks, transmission pipes, evaporation ponds, occurrence of accidents in transportation and decay of gas station tanks. One of the most economical and applicable technology for remediation the soils contaminated with petroleum compounds is bioremediation. The bioremediation method has received a lot of attention in the last decade due to the production of low-risk intermediate products and even the safe final composition with repeated use in the soil. However, increased the efficiency of the bioremediation method can be feasible by addition a microbial consortium of potential microorganisms capable of the decomposition the recalcitrant compounds, the use of complementary substrates containing nutrients and combined biological methods. The purpose of this study was to gather a comprehensive information on bioremediation methods for soils contaminated with petroleum compounds published in reputable databases. The results of the present study showed that most of the studies made in the field of removal of petroleum compounds by bioremediation method, had a special view on the use of bioremediation method. However, only one study dealt with biostimulation methods using hybrid methods. Therefore, the comprehensive information collected in this study can be used as a guide for selecting different bioremediation methods given to the concentration of pollutants and effective parameters in different regions of the country.

Keywords: Bioremediation, Soil pollution, Total petroleum hydrocarbons

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Creating Wealth, Policy making and Environmental Health Management

Agha Bozorg Mosque

Creating Wealth, Policy making and Environmental Health Management

Oral Presentations

Electronic waste: from traditional recycling and hidden waste economy to scientific extraction of precious metals and wealth creation

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Abstract
The electrical and electronics industry is one of the major consumers of many precious metals worldwide. Despite all efforts in various countries for the economic recovery of these materials, a large part of them are lost due to improper collection and recycling technology as well as their illegal exports. This has led to a phenomenon in the hidden economy known as the "waste economy". The existence of huge working capital only in Tehran, which city managers consider it as dirty gold, along with the stagnation of the formal sector of the country's economy, labor market demand, and multidimensional poverty, has led to the creation of a waste-based economy, in the meantime, e-waste has played a very important role in this economy. The informal economy, in addition to adverse environmental effects, leads to rent-seeking and corruption, as well as weakening the formal economy, which shows the need for the entry and intervention of the scientific and governmental sector of the country to preserve these valuable economic resources and reduce the environmental risks caused by them. Intervention that, if done in a timely manner and based on the scientific principles of the world today, can lead to the creation of enormous wealth. One way to reduce the problems related to electronic waste is scientific and principled recycling and reuse of their various components. Therefore, in the present study, in addition to the topics of hidden waste economics, the results of scientific recycling of the electronic waste with five different hydrometallurgical processes (hydrochloric acid, nitric acid, potassium cyanide, ammonium persulfate, and ethylenediaminetetraacetic acid) and comparison of the efficiency and economic value of metals extracted by each process are also presented. The results indicated that each ton of raw powder obtained from printed circuit boards contains 400 kg of copper, 1.137 kg of silver, and 829 g of gold. The process of potassium cyanide achieved the first rank in the extraction of copper and gold, which had the potential to generate wealth equivalent to 3463.71 and 433611.45 $ from copper and gold, respectively. The nitric acid process also took first place in silver mining, with a value of 830.029 $ per ton of metal powder.

Keywords: Electronic waste, Waste economics, Hydrometallurgical processes, Metal extraction, Printed circuit boards

Health Impact Assessment from the perspective of international experts

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Abstract

There are two streams and some models for Health Impact Assessment (HIA); one stream of environmental impact assessments and the other stream of health impact assessments stem from public health policy. The difference in models of HIA is in areas such as community involvement, attention to health equity, and the emphasis on quantification. Integrating HIA with other assessments, especially environmental impact assessment, is also a point of contention. This study intends to receive and report the opinions of a number of international experts in this regard. This is a descriptive cross-sectional study. A questionnaire was developed to receive the opinions of experts with experience in the field of HIA, regarding the parameters of HIA and after confirming the validity and reliability was used to conduct the survey. Questionnaires were sent to international expert members of the International Association for Impact Assessment and the Asia-West Pacific Health Impact Assessment Network, and descriptive responses were reported. 41 international experts answered the questionnaire questions. 73% of the participants agreed with the participation of the community affected by the project in the health impact assessment process. 92.7% considered policy evaluation possible. 85.4% agreed with the integration of the assessment in other assessments. 82.9% also emphasized the need to consider health equity in evaluations. Only 48.8% of the participants insisted on quantifying the data in HIA. The use of experience in environmental impact assessment and its development towards more comprehensive assessments with consideration of policies, as well as attention to the assessment of health equity and community participation is emphasized by international experts.

Keywords: Health Impact Assessment, Environmental Impact Assessment, Healthy Public Policy

Creating Wealth, Policy making and Environmental Health Management

Posters

The strategies of wealth creation and entrepreneurship in the water and wastewater industry

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Abstract

One of the signs of economic development of countries is the growth of sustainable entrepreneurship. To succeed in the economic development, countries need to produce the products needed by at the national and international communities. In fact, the most effective of a country's economic prosperity sectors relies on the knowledge-based companies, the entrepreneurship and the startups instead of assembling and importing the foreign industry. Therefore, the entrepreneurship as an effective element in this regard, has played an important role in the development and growth of developed countries, and the development of many countries is due to entrepreneurs and innovative activities that create wealth and increase economic turnover. Entrepreneurship, in addition to creating wealth and job in the industrialized societies, has led to the development of new technologies, encouraging and expanding the investment, and increasing the level of public welfare. Thus, in order to create the wealth, it is necessary to support and encourage the sustainable entrepreneurs, along with their savings and up-to-date knowledge, to seek the creativity and ideation in solving the problems in all aspects of the water and wastewater industry. In addition, after finding the product-oriented ideas and the creativity, entrepreneurs plan to create wealth in this direction by creating knowledge-based companies and startups, and receiving financial supports from investors by introducing attractive and practical products through digital, virtual and traditional marketing. Entrepreneurship of environmental health engineers in the field of water and wastewater (as one of the branches of Environmental Health Engineering) has a high capability for establishing the science-based startups. It requires the collaboration between the universities, the industries, the investors, the relevant organizations.

Keywords: Wealth creation, entrepreneurship, water and wastewater, startup, environmental health

Opportunities and Strategies for Circular Economics in Construction Waste Management

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Abstract

The construction industry is one of the main consumers of resources and waste producers in the world. Part of the problems of construction waste is the improper disposal of waste, urban ugliness, and over-exploitation of mines. In developed countries, in addition to the management of construction and civil wastes, by reusing these materials, they provide the basis for reducing the consumption of raw materials in the construction industry, and these materials have up to 90% recycling potential and can be reused as raw materials that to be placed. In recent years, there has been a greater focus on how to collect and reuse some wastes that can be recycled. Paying attention to the rotational economy can increase added value and reduce environmental problems in the path of sustainable development. One of the four strategic components of a rotational economy is reuse. Rotational economics is about more than just waste management. In this article, based on global experiences, a review of global experiences has been done, which includes Rehafutur Engineering House; Queen Elizabeth Olympic Park in London, England; Brummen City Hall in the Netherlands, Liander Headquarters (Netherlands); Use of concrete, brick, ceramic and tile in the structure of hollow cement blocks; Reuse of old bricks in the facades of buildings and BUS BOARDER design. Based on the experiences and studies conducted in Iran and the world, some cases have been summarized and suggestions in the field of rotational economics of construction waste management have been presented.

Keywords: Construction Waste, Reuse, Circular Economy, Solution

A review of strategies to increase biogas production in sludge digesters

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Abstract

Wastewater treatment plants are one of the centers of energy consumption in municipal facilities. Consumption of fossil fuels to supply energy to these facilities, in addition to spending money, emits greenhouse gases. Therefore, energy self-sufficiency leads to economic savings by increasing bio methane production in anaerobic digestion of sewage sludge while preserving the environment. The purpose of this article is to review the solutions to increase the production of biofuels in wastewater treatment plant, including biomethane and bio Hydrogen. Extraction of methane from anaerobic digestion of waste materials such as grease trape sludge and cellulosic solids collected in fine screen is one of the new energy supply solutions in wastewater treatment plants. Co-digestion of sewage sludge with municipal organic waste and microalgae produced in photo bioreactors increases biogas production. Reuse of agricultural wastes in sludge digestion while increasing biogas production with compost production and its use in agriculture will lead to a boom in the circular economy and nutrient recycling. The process of direct interspecies electron transfer by adding metal nanoparticles, injecting carbon dioxide in the combustion chimney into the digester and adding biochar also improves the efficiency of anaerobic digester. The production of bio Hydrogen and the extraction of soluble methane from the digestive effluent also contribute to energy self-sufficiency in the treatment plant. As a result of the present review, it is shown that co-digestion of municipal and industrial organic waste in sludge digestion with the help of new anaerobic process technologies can increase energy production (electrical and thermal) in wastewater treatment by increasing bio methane production.

Keywords: Anaerobic digester, Co- digestion, Bio methane, Sludge treatment.

Investigating the Knowledge, Attitude and Practice of housewives in Abarkouh city in relation to solid waste recycling

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Abstract

Women, with their marital and maternal roles, have been the agents of knowledge transfer and performance to them and by having a managerial role in the home, they can be effective in reducing waste production and recycling. the present study was conducted to investigate the knowledge, attitude and practice of housewives in Abarkouh in relation to solid waste recycling. In the descriptive-cross-sectional study, 260 housewives were randomly selected. The data collection tool was a questionnaire consisting of 4 sections of demographic information, knowledge, attitude and practice. The data were analyzed after entering SPSS 23 version software using appropriate statistical tests. The level of awareness of 4.2% of housewives was poor, 60.8% was moderate and 35% was good. 5.4% had a weak attitude, 36.2% had a moderate attitude and 58.5% had a good attitude towards recycling. 6.5% had poor practice, 42.3% had moderate practice and 51.2% had good practice. There was a significant relationship between the level of education of housewives and their level of knowledge and attitude. According to the results of this study, it seems that the practice of housewives in Abarkouh is at an acceptable level.

Keywords: Housewives, Solid Waste, Knowledge, Attitude, Practice

Poster

A survey of the knowledge of the people of Shiraz about fast food in 2021

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Abstract

Undoubtedly, one of the practical factors in maintaining health is nutritional status. Today, due to lifestyle changes, the use of fast food has become popular. For this reason, the present study has been conducted to measure the awareness of the people of Shiraz about the harms of fast food and their tendency and consumption. The present study is a descriptive cross-sectional study performed in a cluster on 500 people in Shiraz. The necessary information was collected between 13 and 72 years old using a researcher-made questionnaire whose validity and reliability was confirmed. After completing the questionnaire, the data were entered into SPSS16, and using the Kolmogorov Smirnov test, Kruskal Wallis, Mann Whitney, and spearman's test were analyzed statistically. According to the estimated information, the average age of the people was 34.44%. This study showed that people did not have the proper knowledge of the definition of fast foods, but most of the people studied have the necessary knowledge about the diseases caused by consuming these foods. Therefore, the results of this study show that most people, even though they are aware of fast food losses, prefer home foods for health reasons and health foods, but because of the delicious dishes of urgent foods that are abundant from additives and salt. The availability and availability of these foods use that with culture and change in people's attitudes, nutrition plays a role in health, and food should be used according to the body's needs and appropriately.

Keywords: Fast food, Shiraz, Food Safety.

Investigating the effect of lead risk education on maternal health to improve the awareness of patients referred to Kashan Health Center

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Abstract
Lead poisoning has become a health issue in many countries around the world, including Iran. Numerous studies have reported the dangers and side effects of lead on human health, but so far no action has been taken to educate the public about this dangerous metal. The aim of this study was to investigate the effect of lead hazard education on maternal health and wellness, in order to raise the awareness of those who referred to Kashan health center in 1400. The method of the present research is quasi-experimental of pre-test-post-test with control group. The statistical population in this study includes 230 mothers who referred to the center in August who were selected by census. The required information was collected using a researcher-made questionnaire. Research questions were answered using descriptive statistics and central indicators and inferential statistics. Findings show that lead hazard education has a significant effect on increasing the awareness and skills of mothers referring to Health Center ($p < 0.05$). According to the results, in order to maintain the health of the community, especially the vulnerable, it is necessary for the authorities to adopt an education-based approach to improve the awareness and skills of as many people in the community as possible to reduce or prevent exposure to lead.

Keywords: Lead, Health, Mothers, Hygiene, Awareness

Survey of Environmental Health Engineering Students' attitude on the Field of Study and Career Future

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Abstract

Students are considered as the main body of society. Their concerns about their field of study and career future affect the quality of education and health services. This issue has become more important due to the increase in student enrollment in recent years. The aim of this study was to evaluate the attitudes of environmental health engineering students towards their field of study and future career. This research is one of the applied studies that was done cross-sectionally (descriptive-analytical) in the summer of 2021. The study population consisted of all students of environmental health at Sirjan University of Medical Sciences. In order to collect information, a standard questionnaire containing 17 questions of demographics, field of study, and career prospects was used. After completing the questionnaires, research data were statistically analyzed (descriptive and analytical statistics) using SPSS and Excel statistical software. The results of evaluating students' attitudes toward the field of study showed that 71.5% of students were completely satisfied or satisfied with the choice of this field. The majority of students have become more interested in this field after graduation. The results of a survey of students' attitudes toward future careers showed that 65% of students believed that professors in this field motivate students to find a suitable job. 46.8% of students are concerned about finding a job in this field. The results of the statistical test did not show a significant relationship between students' attitudes toward the field of study and career future with demographic variables ($P > 0.05$). The results of this study showed that review and educational planning in order to train motivated and skilled workers in society, study and create job opportunities in the field of environmental health should be considered.

Keywords: Environmental health engineering, Future career, Field of study, Attitude

Practice and Attitude of Dormitory Students of Mashhad University of Medical Sciences about Waste Source Separation in 2018

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Abstract

Separation from the source affects the various pillars of waste management, including the recycling of most municipal waste and returning to the production cycle, a significant reduction in the volume and weight of municipal waste, reducing the transmission of diseases related to the collection and improper segregation. On the other hand, success in all waste control programs requires informing the public about the economic and health importance of this action. Improper segregation of dormitory waste poses the risk of spread of diseases such as cholera, hydatid cyst, plague, relapsing fever, visceral leishmaniasis, and many other diseases among dormitory students. Therefore, the present study was conducted to investigate the practice and attitude of dormitory students of Mashhad University of medical sciences about waste source separation in 2018 before the Coronavirus disease began. The multistage sampling method was selected which is one of the other random sampling methods. The data were analyzed using SPSS 16 software by central statistical indices and frequency distribution as well as Pearson correlation coefficient test with 75 percent confidence level. The results showed that 90 percent of men and 76.2 percent of women considered recycling to be the most appropriate method of waste management in the dormitory. 56 percent of men and 60.3 percent of women sometimes separate their waste in the dormitory. 90 percent of dormitory students consider separation to be the best way to waste management. Waste is an inevitable product of any society and waste management is one of the main needs of society. Hence, the establishment of a waste management system is essential especially in the case of waste source separation. In the waste management system, depending on the amount of production and composition of waste, there are different options for its management that in addition to economic costs, have a different environmental burden. In this regard, examining the practice and attitudes of different people in society, especially medical students, and ultimately their education can play an effective role.

Keywords: Waste, Recycling, Attitude, Performance, Source Separation

Determining the level of awareness and practice of farmers about the health and environmental hazards of pesticides in Kashan city in 2020

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Abstract

Farmers' awareness of pesticides includes their information about environmental problems, factors influencing the spread of these problems and information about measures that farmers can take to improve their biological performance. The purpose of this study is to investigate the performance and biological awareness of farmers in rural areas of Kashan. This descriptive cross-sectional study was performed in three stages. In stage one, a questionnaire was prepared and its validity and reliability were determined. Next stage 277 farmers were selected by cluster sampling method and a questionnaire including demographic characteristics of education level, area under cultivation, type of possible poisoning due to exposure to pesticides, health measures and their knowledge and practice of the effects and effects of pesticides on health was completed. Data were analyzed using SPSS software. The results showed that 82% of farmers have moderate knowledge. 9% of farmers have been poisoned in the use of pesticides, of which 16% had a low level of awareness and 84% had a moderate level of knowledge. In the study of the performance of poisoned farmers, it was observed that 32% with poor yield level and 68% with good yield level. There was no statistically significant relationship between performance level and toxicity ($P < 0.05$). Eye irritation with 23.5% was the most common complication and dizziness and imbalance with 5% was the least common complication observed when using toxins. The level of awareness and practice of farmers about the health and environmental hazards of pesticides in the villages of Kashan city is at a moderate level and agricultural jihad is the main source of education and awareness of farmers in the region. Eye irritation was the most common complication and dizziness and imbalance was the least common complication in the use of pesticides in farmers.

Keywords: Knowledge, performance, farmers, pesticides

Applied Environmental Health Policies in Hospitals with COVID-19 Patients

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Abstract
With increase of COVID-19, hospitals are facing new challenges regarding disinfection, waste disposal and the management of sewage and bodies. The aim of this study was to investigate the correct disinfection strategies and management of sewage, waste and bodies during covid-19 pandemic in hospitals. In this study, all researches related to the solutions used in different countries have been used and investigated. The results of this study provide solutions for hospitals with covid-19 patients, which shows that the duty of hospitals does not only end in the treatment of covid-19 patients, but also it includes the proper management of sewage, waste and bodies to prevent the contamination of the out-of-hospital environment to coronavirus.

Keywords: covid-19, Hospital, corpse, waste, wastewater

Policy making in environmental health:looking back for futre

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Abstract

The end of a historical century and the entry into a new century psychologically activate the ideas of change in the overall strategies and perspectives of an organization. On the other hand, adopting new strategies requires giving a clear picture of the process and the historical past of the organization, and adopting a new strategy is impossible without knowing the path taken and the turning points of the past. Environmental health, as an organization in Iran and the world, has gone through various ups and downs, and due to the psychological burden of changing the historical century, the ground for rethinking, reforming and changing its strategies is felt. Methods: There are several methods for retrospective study and extracting the components affecting the formation and evolution of an organization, one of which is referring to written historical documents. Examining recorded historical documents helps to gain a better understanding of an organization's historical past. This article has been done in order to study the environmental health status of the country by relying on the historical documents available in the library of the National Organization of Documents and observing some laws related to environmental health. Results: The study of historical documents shows that issues related to environmental health have been raised since the beginning of the formation of health-related institutions and along with the development of health organizations have undergone many changes and developments and in this short period of the last hundred years.

Keywords: environmental, health policy-making

Investigation of model of treated water consumption and social determinants in Kashan and Aran-Bidgol cities in 2018

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Abstract

In recent years, the use of domestic sweeteners has been widely welcomed, and there are numerous firms that operate, import, manufacture, sell and store these household sweeteners. Given that the prospect of continuing the current state of health, the environment and the economy requires basic information from the population of users and their related characteristics, this study seeks to "review the current status of the use of domestic refrigeration and Commercial in the city of Kashan and Aran and Bidgol in 2018. The study is a kind of ecological study on the people of Kashan, Aran and Bidgol. The instrument is a questionnaire that has been completed by telephone executives. The systematic random sampling method is one-step randomized random sampling and the collected data were analyzed by descriptive statistics using spss16 software. In this study, 343 questionnaires were completed for 1200 individuals, of which 247 (72%) were Kashan and 96 (28%) related to Aran and Bidgol. 83.2% of samples were used in Kashan and Aran Bidgol cities of refined water for drinking and cooking and tea making, and 44.2% of households had domestic water purifier and 39% of used water was used They bought themselves from commercial water desalination centers, all of which are reverse osmosis. This study showed that 83.2% of people in Kashan and Aran Bidgol cities currently use drinking water and cooking. Demographics of users have not had a significant role in welcoming domestic or commercial refined water in Kashan and Aran-Bidgol cities, and the most important criterion for drinking water users is the taste and taste of drinking water and Samovar sediments. Accordingly, attention to social health and environmental protection requires further studies on the development of reverse osmosis water desalination.

Keywords: Household Water, Reverse Osmosis, Commercial Desalination

Social, economic, political, cultural determinants, and laws affecting water and the environment

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Abstract
Providing safe and sufficient water with the desired pressure is the right expectation from authorities responsible for water supply in the communities. Today, with population growth and increasing per capita water consumption, as well as drought crisis and climate change, water quantity has become a major problem and there is a health risk of infectious diseases due to insufficient washing. The role of policies and social, economic, cultural factors and laws and regulations in this regard is significant, which in this article is discussed through the collection and interpretation of information that can be cited and available.

Keywords: Water management, Environmental management, Sustainable development.

A review of activities done to prevention the effects of climate change on health in Iran (2015-2020)

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Abstract

Climate change has significant and far-reaching effects on the environment and people's lives, including the effects of disease and mortality in society. In the field of climate change and health, prominent researches have been conducted by researchers in the country and have described the past effects and its possible predictions in the future in the population of different regions of the country and some of the whole country, especially vulnerable people. For example, areas affected by extreme changes in temperature and rainfall will affect all populations in all economic and social groups, some of which are directly due to climate change and some indirectly. So far, three national studies examining the health vulnerability to climate change have been conducted by specialized and academic teams of different universities in the field of the effects of climate change on health in different parts of the country. The prevalence of various diseases is directly and indirectly unanimous. The first step in reducing the adverse effects of climate change is to develop a system for recording disease and death data in various parts of the Ministry of Health. Increasing cross-sectoral partnerships and sharing health-related data are also prerequisites for running programs. The Ministry of Health and Medical Education has the main task of monitoring and evaluating the progress and implementation of these strategies.

Keywords: Climate Change, prevention, Health, Iran

Survey of Knowledge, Attitude and Practice of Drivers Towards Reduction of Car-Caused air Pollution

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Abstract

Air pollution is known as the most important environmental hazard. In urban areas, pollutants emitted from motor vehicles cause 50 to 90% of environmental air pollution. Due to the role of drivers in reducing air pollution, this study was conducted to evaluate knowledge, attitude and practice of drivers towards reduction of fuel consumption and control of car-caused air pollution in Isfahan. The present study is a cross-sectional descriptive-analytical study that was conducted in Isfahan in 1399. The study population consists of 200 male and female taxi drivers in 4 regions north, south, east and west of Isfahan. Were randomly selected and the required information was collected through a questionnaire. The results showed that the score of awareness of female drivers in reducing car-caused air pollution is higher than male drivers. Drivers with higher levels of education had higher scores of knowledge and attitude than other drivers and there was no significant difference in knowledge, attitude and performance of drivers in different age groups. Drivers consider the prevention of Single occupancy car to be the most important factor in reducing air pollution. The drivers' knowledge, attitude and practice towards ways of reducing car-caused air pollution is average, so further education is required.

Keywords: Awareness and attitude, taxi drivers, air pollution, Isfahan

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Poster

Investigating the Feasibility of Reuse of Effluent from Wastewater Treatment Plant in Borujen city for Agricultural and Irrigation Uses

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Abstract

The expansion of agricultural and industrial activities, and the growing trend of population has increased the utilization of available water resources and creating water crises, especially in in arid and semi-arid regions. Thus the purpose of this study is to investigate the possibility of using the effluent of Borujen municipal wastewater treatment plant for agricultural irrigation. For this purpose, some physical, chemical and microbial properties of Shahrekord municipal wastewater treatment plant effluent according to the book of standard methods of water and wastewater testing in the period August-December 1398, measured monthly and with standard The Environmental Protection Agency of Iran and the standard of the World Food and Agriculture Organization (FAO) were compared. The results were analyzed in Excel. Statistical indicators including mean and standard deviation were obtained. The mean of BOD5, COD, TSS, and turbidity parameters were 10±1.17 mg/L, 39.19±4.1 mg/L, and 513±8.7, 54.27 ± 16.47 NTU respectively. Mean parameters of chloride, sulfate, phosphate, nitrate, nitrite, sodium, magnesium, calcium, bicarbonate, carbonate, alkalinity, and heavy metals were in ISIRI standard range. The mean of total coliforms, fecal coliforms and intestinal nematodes was 2/8×104 (MPN / 100mL), and 8/5×103 (MPN / 100mL), respectively. The average quality index of agricultural irrigation, including SAR, was equal to 2.04. The average electrical conductivity of the treatment plant effluent was 1114 (µ S / cm). The Results showed that the effluent of Borujen wastewater treatment plant, except for turbidity, total, fecal coliforms, has no restrictions compared to the standards of the Environment Organization of Iran in the field of reuse of effluent and FAO for use in agriculture. Continuous disinfection and monitoring are essential to meet the microbial standard.

Keywords: Wastewater Treatment, Agriculture use, Reuse

Internal Evaluation of Environmental Health Engineering Department of Health School of Alborz University of Medical Sciences in 1399

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Abstract

Internal evaluation in departments is the process of reviewing the educational status of the university by faculty members. This study aimed to promote the qualitative growth of the higher education system and increase the awareness of the head of the department, faculty members, graduates and students about the current situation and efforts to achieve the desired situation. The present study was conducted with the aim of internal evaluation of the department of environmental health engineering, Alborz University of medical sciences and health services in 2019. This descriptive cross-sectional study was conducted using research and development (R&D) and survey research. Observation, interview, questionnaire and checklist were used as measurement tools to collect information which were gathered through between the group manager, faculty members, graduates and students. Data were evaluated based on weighting and according to the score obtained (based on Likert criteria) and the minimum and maximum weight obtained, and finally the overall result was determined for each of the criteria considered in the research and the results of internal evaluation, based on the SWOT model (strengths, weaknesses, opportunities and threats), were analyzed for the department of environmental health engineering, Alborz university of medical sciences. Based on the results of this study, the highest satisfaction in the field of educational and research facilities and equipment with a score of 2.47 and the lowest satisfaction in the field of frustration and employment of graduates with a score of 1.27. According to the results of this study, it was necessary for the department to maintain and improve the current situation and try to eliminate the shortcomings and threats of the situation and plan to eliminate them. University officials should provide the necessary resources and facilities to improve the current situation and achieve the desired situation, as well as students and graduates in order to improve their education and learn the existing skills in their field in order to solve these problems together with threats, and turn them into opportunities.

Keywords: Internal evaluation, Evaluation of education, Environmental health, Alborz, Iran

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Poster

The Survey of knowledge, attitude and practice of Iranian housewives about household hazardous wastes management and recycling in Isfahan

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Abstract

Hazardous waste is not only specific to industries and medical facilities, but also includes the household sector. In recent years, the production of hazardous waste has increased in many countries. Therefore, the present study was conducted to determine the knowledge, attitude and practice of housewives in Isfahan in the field of recycling and disposal of hazardous household waste in 2019. In this descriptive-analytical cross-sectional study, 350 housewives in Isfahan were randomly selected by cluster sampling and completed a questionnaire of knowledge, attitude and practice in the field of recycling and disposal of hazardous household wastes. Data were analyzed using k2, Q-Q and Kolmogorov-Smirnov tests in SPSS software. The mean age of the women was 33.68 years. knowledge about of hazardous household waste was received in 37% poor, 34.3% moderate, 27.8% good. In terms of attitude, 31% were weak, 31.9% were moderate and 37.3% were desirable. practice was 31.9% poor, 37.1% moderate and 31% good. The most hazardous wastes used in homes are included cleaners and detergents, medicines, batteries and oils and dyes. The majority of knowledge, attitude and practices of housewives in Isfahan are in moderate and good condition. By increasing the level of public awareness about hazardous household wastes, their attitude can be improved to the desirable level and therefore it is expected better performance from the citizens.

Keywords: Recycling - Hazardous wastes- Housewives- Awareness- Attitude

Investigating the methods of environmental education and sustainable development in preschool

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Abstract

In recent years, environmental issues have become one of the most important issues on the world agenda. The problems of pollution, environmental degradation, economic efficiency and national security, global warming, depletion of the ozone layer and the loss of biodiversity have made human beings understand the problems of the environment. Therefore, it is very important to educate children from an early age about environmental protection. The purpose of this documentary study is to examine the methods of environmental education and sustainable development in preschool. For this purpose, first, the meaning and concept of sustainable development and the use of natural resources without disturbing the balance and integrity of ecosystems have been studied. The concept of environmental education, which is based on the principles of sustainability, was then examined. The role of preschool and pre-service teachers in fostering children's thoughts about the environment and nature is described below. The results of research have shown that the more environmental education is done for children at a very young age, the higher the attitude towards the environment and gaining awareness of the environment. It is also essential to prepare teachers before entering the service for their role in educating and educating children about the environment as part of a group whose education is achieved through modeling teachers, and to achieve a higher level of success in achieving sustainable development goals. It is suggested that in order to increase the level of knowledge and information of preschool and pre-service teachers regarding environmental protection and methods of transmitting information to children, educational structures and environmental awareness and understanding of environmental issues, based on the principles of sustainable development.

Keywords: Sustainable development, environmental education, preschool

Challenges of encounter with the Covid-19 epidemic from the perspective of ethics, culture and media

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Abstract
The Covid-19 epidemic has created a new challenge in the health system that requires all aspects and positive and negative experiences to be examined and to strengthen the positive experiences and eliminate and compensate for the negative experiences. Therefore, in this study, we observed the encounter of experts, decision makers, officials, facilitators and educators to this phenomenon through mass media and field observations and compared the cases with indicators and teachings in the field of health education and health promotion. We gave and enumerated the challenges in this field; Challenges such as lack of multidisciplinary approach, lack of control over the consequences of the epidemic, lack of sufficient attention to scientific and ethical principles in health education, etc. are among the challenges observed that a macro and multidisciplinary perspective in the face of such crises are necessary in order to consider all its dimensions and consequences and to find a solution for a logical confrontation.

Keywords: COVID-19, Epidemic, challenges, Education, Culture

Assessment of Knowledge, Attitude and Practice (KAP) for health behaviors regarding air pollution during burning waste among the villagers of north of Iran

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Abstract

Incineration is a waste disposal technique which is employed to reduce the volume of waste and results in air pollution. This study aimed to determine the knowledge, attitude, and practice on health behaviors among Rasht villagers regarding air pollution when burning waste. The present study is a descriptive cross-sectional study conducted among 260 rural households in Rasht. Data were collected using a questionnaire and by interviewing the participants. Participants were randomly selected and entered the study. Data were analyzed by SPSS version 16 using t-test, one-way ANOVA, and Pearson correlation at a 95% confidence interval. Content Validity Index (CVI) and Content Validity Ratio (CVR) indices were used to assess the validity of the instrument. To evaluate the reliability of the questionnaire, Cronbach's alpha coefficient was calculated. The findings confirm the optimal validity and reliability of the instruments used in the study. The participants' age range in this descriptive cross-sectional study was 19 to 78, and the mean was 43.87±12.66 years. The practice had a positive and significant correlation with knowledge (r = 0.216). The correlation between practice and attitude was also positive but not statistically significant. Education and information on how to burn waste have a substantial relationship with knowledge. Participants received 80%, 29.3%, and 66.7% of the maximum achievable scores for knowledge, attitude, and practice components in the questionnaire. The villagers' attitude in performing health behaviors regarding air pollution was not favorable, and there is a need to provide educational and behavioral interventions in this regard.

Keywords: Attitude, Incineration, Knowledge, Practice, Waste

Identifying the factors affecting waste management costs and prioritizing them with factor analysis model in one of the northern cities of Iran

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Abstract

One of the major concerns of developing countries, regarding public health, economy and environment, is municipal solid waste (MSW) management, so that waste management is one of the costliest services provided by the municipality in developing countries. Because waste management imposes huge costs in developing countries, one of the most important strategies in these countries is to minimize waste production and thus to reduce the process of waste collection and transportation for disposal. Main problems of waste management in Iran cities include low technical quality, low investment and low attention to its cost in the stages of collection, transportation and disposal. In this study, the factors affecting costs and their impact percentages were identified by univariate analysis, the correlation between factors was determined by Pearson correlation coefficient, and their prediction and determination were performed by factor analysis with an exploratory method. According to the results, transportation had the greatest impact on the management costs of the regional waste organization. Also, the results of exploratory analysis showed that two factors were effective on the costs of the waste organization.

Keywords: Costs of waste organization, Solid waste management, Collection and transportation, Correlation coefficient, Factor analysis

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Oral Presentations

Oral Presentation

Investigating the Relationship between Gross Domestic Product and Environmental Performance Index (Climate Changes) in Iran and the World in 2020

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Abstract

Today, the issue of protecting the environment and preventing its destruction has been raised as one of the most important challenges of the international community. One of the important Indexes is the Environmental Performance Index (EPI), which contains important information about the approach of different countries in the field of environmental issues, including climate change. The purpose of this study was to examine the environmental performance Indexes for climate change in the country in 2020 and compare these Indexes in the Middle East and developed countries. In addition, the relationship between these Indexes and gross domestic product (GDP) in Iran and the Middle East, as well as 10 developed countries in the world were examined. In this regard, information related to the environmental performance indexes and gross domestic product was extracted from the database epi.yale.edu, which is one of the sources for calculating the index in the world, and the relationship between them was examined using linear regression. The results showed that Iran in 2020 in terms of CO2 growth rate and Black Carbon growth rate was ranked fifteenth and sixth among the countries studied, respectively. It has also been ranked first in terms of CO2 from land cover. On the other hand, although Iran ranked Eleventh among Middle Easte and developed countries in CH4 growth rate, it was the largest producer of fluorinated gases. Iran also ranked seventh in the Middle East in terms of GDP per capita and fourteenth among all countries studied. However, no significant relationship was observed between changes in gross domestic product with environmental performance index and global ranking in the studied countries. Considering the position of Iran in comparison with the studied countries in the studied indexes, it can be concluded that Iran should design production and economic methods to improve climate parameters in order to improve environmental performance in the field of climate change. In this regard, it is proposed to establish strict laws to protect the environment and continuous assessment of the environmental situation in Iran.

Keywords: Environmental performance index, Gross domestic product, Iran, Middle east, Developed countries

Survey of the effect of irrigation with urban wastewater treatment plant effluent on transfer of antibiotic resistance genes in soil and crops

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Abstract
The increasing demand for fresh water coupled with the need to recycle water and nutrients has witnessed a global increase in wastewater irrigation. However, the development of antibiotic resistance hotspots in different environmental compartments, as a result of wastewater reuse is becoming a global health concern. The effect of irrigation water sources (wastewater, surface water, fresh water) on the presence and abundance of antibiotic resistance genes (blaCTX-m-32, tet-W, sul1) were investigated in the irrigation water-soil-crop continuum using quantitative real-time PCR (qPCR). Sul1 and blaCTX-m-32 in almost all samples were the most and least abundant ARGs in three environments, respectively. The abundance of ARGs significantly decreased from wastewater to surface water and then fresh water. However, irrigation water sources had no significant effect on the abundance of ARGs in soil and crop samples. Principal component analysis (PCA) showed that UV index and air temperature attenuate the abundance of ARGs in crop samples whereas the air humidity promotes the ARGs. So that the climate condition of semi-arid regions significantly affects the abundance of ARG in crop samples. The results suggest that treated wastewater might be safely reused in agricultural practice in semi-arid regions without a significant increase of potential health risks associated with ARGs transfer to the food chain. However, further research is needed for understanding and managing ARGs transfer from the agricultural ecosystem to humans through the food chain.

Keywords: Antibiotic resistance genes, Food chain, Wastewater irrigation

Oral Presentation

Comparing the Reported Air Quality Index (AQI) Values Reported in Tehran with the Actual Values Calculated Based on the EPA's Instruction

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Abstract

Since several years ago, AQI is used to report the condition of air pollution in Tehran. However, instead of calculating and reporting the maximum AQI value in the city, the average value of AQI across all monitors is reported for the whole city. The aim of this study was to evaluate the air quality index (AQI) values reported in Tehran, and compare them to those calculated using the original U.S. EPA's method. The reported AQIs (R-AQI) were obtained from the Tehran's Air Quality Control Company online archive. To calculate AQI based on the original EPA's method (C-AQI), the concentrations of six criteria air pollutants (PM10, PM2.5, NO2, O3, SO2, and CO) were used. C-AQIs for all years were 1.8 times higher than R-AQIs ($P<0.001$). This difference changes the reported AQI categories as well. Although 4.5%, 66.2%, 27.6%, and 1.7% of days have been categorized as "Good", "Moderate", "Unhealthy for sensitive groups", and "Unhealthy" by local officials, based on the U.S. standards, these categories contribute to the 0.0%, 5.2%, 28.5%, and 50.8% of days. In addition to the different shape of distributions, the distribution of calculated AQIs was more positively skewed, and had higher kurtosis than the reported AQIs. The overall correlation coefficient between C-AQIs and R-AQIs was 0.34. These results indicate that the actual condition of air pollution is much worse than that reported by the official agencies. Therefore, it is necessary for these agencies to revise their current AQI calculation procedure to provide more accurate guidance to the public.

Keywords: Air pollution, particulate matter, ozone, nitrogen dioxide, AQI

Occurrence of human adenovirus in wastewater effluent and wastewater-irrigated soil

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Abstract
Enteric viruses are excreted at high levels from infected individuals and are frequently found in wastewater. These viruses are resistant to unfavorable environmental conditions and the conventional wastewater treatment processes are not able to remove them completely. From enteric viruses, adenoviruses with their non-enveloped structure and double-stranded DNA have high persistence characteristics in the environment. Subgroup F adenoviruses (causative agent of human gastroenteritis) are of major public health importance in wastewater, especially in the case of agricultural reuse. In this study, the occurrence of human adenovirus in 65 effluent samples, 6 water and 21 soil samples were investigated using Real-time PCR. Adenovirus was detected in 74 percent of effluent samples with a mean concentration of 38 Genomic copy per mL. Adenovirus was also detected in soil samples without significant difference between the concentrations in wastewater effluent- and water-irrigated samples. The presence of adenovirus in effluent samples and effluent- irrigated soils can be a concern in terms of transmission of these viruses to vegetables, especially vegetables eaten raw. It is needed to investigate the presence of adenoviruses in effluent-irrigated vegetables, considering the effect of the climatic conditions in the region (high temperature, intensity of UV light, and desiccation) on the inactivation of viruses.

Keywords: Adenovirus, gastroenteritis, soil, wastewater

Environmental Health Indexes

Posters

Characteristics of environmental health in Shiite teachings with emphasis on the validity of the authenticity of narrations

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Abstract
Shiite narrations contain many health recommendations and instructions. Some of these recommendations relate to environmental health. The aim is to isolate authentic Shiite traditions in environmental health to help raise its level. The findings of the article are such that first the theoretical foundations are stated; after that, we will extract the different teachings of Shiite traditions in the field of environmental health. In this regard, there is a category of narrations about air, water, nutrition, oral and housing hygiene. In each section, first all narrations with a series of documents of Shiite narration are expressed in a coherent manner and then we validate the documents of each category. Finally, we summarize the correct narrations. 1. In Shiite narrations, there are numerous and useful recommendations in the field of environmental health. 2. It is necessary to infer religious teachings from reliable and valid narrations by measuring the validity of a document. It is suggested that in future researches, each of the narrations that were identified as valid in this research should be raised as an issue for experimental research in environmental health. The method of this article is analytical, documentary and referring to books, relevant software and reputable sites.

Keywords: Environmental Health, Narration, Shia, Index, Document Validation.

Comparison of effluent quality of recycled paper and cardboard mill with environmental standards

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Abstract

The recycled paper and cardboard mill is one of the major industries producing wastewater. In order to reach the desired environmental standards, the performance of wastewater treatment plants in these industries must be continuously evaluated so that if the effluent is used for agricultural purposes or discharged into the receiving water, there is no threat to the community and the amount of effluent parameters is by environmental standards. Therefore, the purpose of this study is to compare the quality of effluent from one of the recycled paper and cardboard industries in Yazd province with environmental standards. In this study, sampling (instant sampling) of incoming and outgoing wastewater was performed once a week for a quarterly period. A total of 12 samples and 150 experiments were performed to monitor the parameters of temperature, pH, EC, TSS, TDS, COD, turbidity and color. Temperature, pH and EC parameters were measured at the sampling site and the samples were transferred to the laboratory for analysis of turbidity, TSS, TDS and COD parameters and color. The experiments were performed according to the methods presented in standard methods for the examination of water and wastewater. Then the measured variables in the effluent were compared with the standards of the Environmental Protection Organization of Iran. Mean and standard deviation of pH, TDS, TSS, EC, COD, temperature, color and turbidity in the effluent were 11.03 ± 0.910, 11383 ± 2830. 39, 508.66 ± 173.98, 11.41 ± 1.152, 5980 ± 1879. 88, 26.17 ± 1.74, 610.83 ± 54.84 and 48.65 ± 18.09 mg/l respectively. The results showed that except for turbidity, the parameters of pH, TSS, COD and color of the output are more than the standard. The results also showed that the removal rates of TDS, TSS, COD and output turbidity were 14.72, 68, 38.49 and 92.96%, respectively. According to the results, the quality of the effluent in terms of the studied pollutants (except turbidity) did not comply with environmental standards and it is necessary to take principal performances to improve and upgrade the treatment plant units.

Keywords: wastewater treatment plant, recycled paper and cardboard mill, effluent, environmental standard.

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Poster

Hazard identification and risk assessment of drinking water supply system based on WHOs water safety plan: case study Torbat Jam, Iran

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Abstract

Water supply networks (WSNs) are always exposed to various contaminants due to their vastness and high relationship with the surrounding environment. Due to the scarcity of water resources and increasing costs of providing safe drinking water, hazards identification and risk assessment for optimization of water supply systems is a very important issue in the quality management of drinking water. In this study, hazards identification and risk assessment of Torbat-e-Jam water supply system were carried out based on the World Health Organization's water safety plan, and then appropriate control measures were provided to reduce the existing risks. Based on the results of risk analysis, in order to achieve safe drinking water, it is necessary to determine the wellhead protection area, replacement of old and defective pipes, maintain the desired pressure in the distribution system, provide sufficient residual free chlorine in the distribution network and storage tanks, increase consumer awareness and regular monitoring for validation of water safety control measures. The results of this study showed that the adequate knowledge of the water supply system and potentially harmful factors, providing control measures to reduce direct or indirect losses caused by accidents, reducing the duration of failure and system downtime, improving system efficiency and finally, protection of water produced at all stages of the water supply chain is one of the most important benefits of risk management and assessment in water supply systems. Accordingly, the use of modern approaches in comprehensive risk management can be the most effective tool for risk assessment and selection of appropriate control measures to ensure the quality of drinking water in water supply systems.

Keywords: Water safety plan, hazard identification, risk assessment, water supply system, control measures.

Temporal and spatial variation of fluoride concentration in drinking water of Kohgiloye & Boyerahmad province by using Geographic Information System (GIS)

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Abstract

Similar to many elements, fluoride is beneficial to human health in small doses whereas can be toxic in excess. In this study, changes in fluoride concentration in drinking water resources of Kohgiloye & Boyerahmad province are investigated with GIS system. In this cross-sectional study, the sampling and measurement of parameters was done based on the Standard method book, Overall the number 300 samples from 50 sources and results of 6 years Archived analysis in Water and sewage Co with GIS software version 9.3 and SPSS version 16 and Pearson correlation test was analyzed. The results showed that, the highest concentration of fluoride (1.18±0.35 ppm) were related to Gachsaran city in autumn of 2010 and the lowest mean value related to Sisakht (0.06 ppm) and Yasuj city (0.07±0.05 ppm). There is not significant correlation between variations of fluoride concentration and years. There is Significant correlation between total dissolved solids ($R = 0.79$, $p = 0.001$) and hardness ($R = 0.757$, $p = 0.001$) and fluoride concentrations. Spatial variations are indicative of lower concentration than standard in most of studied areas. According to the results, fluoride concentration in most parts of province is lower than the standard. According to importance of fluoride on human health, the fluorination of water resources in all of the counties except Gachsaran is necessity.

Keywords: Fluoride, GIS, Temporal and Spatial variation

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Poster

Investigation of airborne bacteria and fungi of industrial wastewater treatment plant (Case study : Murche khort Industrial Small Town)

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Abstract

The most important elements of biological air pollution include viruses, bacteria and fungi that can come from sources such as sewage, human and animal feces, soil, plant and animal products and dust. The aim of this study was to investigate the bacterial and fungal contamination transmitted from the air of the wastewater treatment plant of Murche Khort industrial town. This descriptive cross-sectional study was conducted in the last three months of 1998 in the wastewater treatment plant of Murche Khort industrial town. Sampling from Anderson single-stage sampling pump (made in England) with a flow rate of 14 liters per minute was performed according to the method of the American Institute of Occupational Safety and Health (NIOSH). The results showed that the highest density of bioaerosols in biological aeration ponds with a density of 97 m3 / CFU and the lowest density is related to the chemical and microbial laboratory unit 13 m3 / CFU. Due to the lack of specific guidelines and standards regarding microbial air pollution in wastewater treatment plants, it seems necessary for the responsible agencies to take the necessary measures in compiling these guidelines.

Keywords: Industrial wastewater treatment plant, bio aerosol, air pollutants, air microbiology

Poster

Investigation the types of colors used in the sweets offered in the township in 2018 year

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Abstract

Color additives are defined as any synthetic dye, plant pigment, and any other dye that colors food, medicine and cosmetics. Most color additives are safe for daily use. However, improper use may be carcinogenic or toxic. Therefore, considering the importance of the subject of the present study, the purpose of this study was to design and implement different types of colors used in pastries offered in Kashan.This descriptive study was conducted on 61 bakeries in Kashan. A total of 183 samples were taken including sampling of 3 types of pastry from 61 pastry shops that the environmental health expert suspected to use color in the pastry. The specimens were transported to Food Laboratory of Food and Drug Administration for observation. First, the use of synthetic dyes in each center was investigated, then its frequency and type of dye used were determined, and finally, results were analyzed using exact chi-square tests. Also, the effect of different factors on the use of natural and artificial colors was analyzed by logistic regression model and analyzed by SPSS 21 software. In this study, 183 pastry samples from 61 pastry and confectionery units in Kashan were studied. There were 59 men and 2 women operating the pastry shop. The highest frequency was in the age group of 46-55 years with 28 persons. 55% of graduates had a diploma or higher. Also, 42 percent of them had incomes of between 16 and 20 million. 65% of the units were both production and supply of sweets. 77.6% of the pastries were traditional and the rest were industrial. 36.1% of them were dry and 41.5% more than traditional pastries. 77.6% of the pastries were traditional and the rest were industrial. The results showed that the knowledge of confectionery staff about edible and non-edible colors and standard use of edible colors is low. According to the results, this training should be based on the level of education.

Keywords: Cookies, Allowed colors, Artificial colors, Natural colors, Kashan.

Heavy Metals Concentration in Agriculture Water and Surface Soils in Area Adjacent of Neyshabour Industrial Town, Iran

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Abstracts

The increase in population has caused industrial towns that known as a major source of heavy metal pollutions. The heavy metal accumulation in soil and water caused by industrialization has become a potential threat for human and environment. This study investigates the contribution of heavy metal accumulation in agriculture water and surface soils surrounding of Neyshabour industrial town in 2020.In the present study, 48 topsoil samples and 48 agriculture water samples were collected in two seasons, beginnings of spring(investigating of rainfall effect) and ends of summer(investigating of irrigation and agriculture effect) in 2020. The total contents of As, Cd, Cr, Cu, Fe, Mn, Zn, Pb and Hg were measured using Inductively Coupled Plasma (ICP) spectroscopy. According to the obtained results, the order of metal contents was found to be Fe>As>Cr>Mn>Zn>pb>Cu>Cd>Hg>Ni and Fe>As>Mn>Cr>pb in contaminated irrigation water in summer and spring respectively. Similar patterns Fe>Mn>Zn>Ni>Cu>Cr>pb>As>Cd> Hg and Fe>Mn>Ni>Zn>Cu>Cr>pb>As>Cd> Hg was also observed in arable soils in summer and spring respectively. Other heavy metals whose concentrations are not given, were not detected in samples. The heavy metal concentrations in agriculture water samples were below the WHO/FAO permissible limits in two seasons; as well as in soils samples, except for the Ni in soils samples. There is no significant relationship between the concentration of heavy metals and the distance from the industrial town. Although no significant contamination was observed in the studied area, however, continuous monitoring on the management and disposal strategies for solids waste and wastewater produced in this industrial town is necessary.

Keywords: Soil, Water, Heavy Metals, Industrial Town, Neyshabour

Poster

Design and development of software program to calculate IRWQI index using Python programming language

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Abstract

surface and groundwater resources are exposed to pollutants due to development of industry and increasing population growth rate.Therefore, quality assessment of groundwater is the most important task to maintain public health in society .There are some defects in the manual calculation of the water quality index, such as low speed of calculation, user faults while entering parameters manually, lack of structure for managing and clearing raw input data and complexity of mathematical formulas that is mentioned in this article. The purpose of this study is designing and implementing a software program to calculate water quality index by using python programming language. in this study,the systematic structure is proposed to managing input data for calculation of water quality index.the structure of this program is divided into several general parts, including 1-Data preparing step 2-implementing intelligent function to calculate input parameters index 3-calculate water quality index 4-create output in xls format. results are shown in two way, including qualitative results and quantitative result that represent water quality index.the results of the study are in the form of a software package that can be run on a computer system. after installing the software and running it, the user must prepare the data according to the appropriate format.The software saves the output results in the least time (within a few seconds) In Excel file format. in this study the ability of interact with other program output is considered, other program output can be prepared to appropriate format, thence, that has been imported to software that implemented in this study to calculate water quality index. This software increase speed and moreover increase accuracy due to systematic structure in cleaning data, calculating and removing end user Interventions.

Keywords: water quality index, groundwater resources, python programming language

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Quantitative investigation of PM2.5 and PM10 particles concentration in the ambient air Galikesh Cement Mill and effective of atmospheric factors: Preparation of particle distribution maps with GIS

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Abstract

The cement industry has long been one of the most important environmental pollutants. For this reason, monitoring and control of environmental pollution in this industry is of particular importance. Particles in the air around cement factories are one of the most important environmental effects of this industry. In this study, after identifying the area based on topographic maps in terms of urban and rural areas and according to the data of the Meteorological Organization of Golestan Province, 20 stations were determined in different parts of the area around the cement factory. Sampling of PM2.5 and PM10 particles from stations was performed monthly from October 2020 to April 2021 by Bentek air quality meter and meteorological data were extracted from the web of the Meteorological Organization in during sampling. Then the monthly mean of particles was determined and compared with the standards of the country and zoned in Arc GIS ver10.8 software. Based on the results, the mean concentrations of PM2.5 and PM10 were about 28.98 and 70.63 µg/m3, respectively. In general, the average of most data was below the environmental standard, although in some samples the measured concentrations were above the standard due to strong winds. The study of the effect of meteorological parameters on the emission of pollution showed that temperature had the opposite effect on the concentration of particles, so that on cold and cloudy days we saw an increase in the concentration of particles.

Keywords: Cement industry, Galikesh, particles, GIS, atmospheric factors

Investigation of the fungal and bacterial contamination in indoor units and outdoor air of Kashan Beheshti hospital in 2018

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Abstract

The health of patients with weakened immune systems is endangered by presenting of bacteria and fungi in the internal units of hospital as well as development of nosocomial infections in them. The current article aimed to investigation of the bacterial and fungal contamination degree in internal units and outdoor of the hospital in which some points are mainly considered such as the nosocomial infections and the discussion of improving the quality of hospital spaces and providing appropriate conditions to maintain the health of patients.This study is a cross sectional study conducted in Kashan Beheshti hospital in 2018. Air sampling is done by direct bacterial sampler (Quick Take 30) along with identification of type and the number of fungi and bacterial colonies including 180 samples from internal units and outdoor spaces. Data analyzed statistically by SPSS 22, EXCELL and BONFERRONI test. The obtained results from 180 samples showed that bacterial and fungal contamination among 180 was 97% and 47.8%, respectively. Also, the most bacterial and fungal contamination presented in medical units and outdoors, respectively. The results revealed that the micro-organisms concentration in internal units is more than in outdoors that results can be related with the presence of the patients, air conditioning and inappropriate cleaning. For this reason, improving cleaning standards and setting the appropriate air-conditioning are suggested in internal units of the hospital.

Keywords: Bacterial contamination, Fungal contamination, Hospital units

Survey on Bacterial and Fungal Agents of Nosocomial Infections in Hospital Air

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Abstract
Bacterial and fungal bioaerosols are a global concern due to nosocomial infections, especially in developing countries. Our study aimed to detect fungal and bacterial bioaerosols in different wards of an obstetrics and gynecology hospital air samples. 240 bioaerosol samples were collected by performing impaction method from different wards of a hospital in the central part of Iran, during two seasons. Fungi genera and bacteria species are recognized by cultivation. Concentration of fungi and bacteria were ranged from 44 to 75 CFU/m3 and 8 to 22 CFU/m3, respectively. No significant difference between microbial load of wards which used natural ventilation and heating, ventilating, and air conditioning (HVAC) system was observed. The microbial load was not affected significantly by temperature, working shift, and Inpatient Bed Occupancy Rate (IBOR). Fungal load related significantly with relative humidity. Staphylococcus aureus and Penicillium were the most predominant isolated bacteria and fungi, respectively. The results revealed that the level of bacteria and fungi responsible for nosocomial infections in the air of this hospital is very low. Although levels of microbial contamination are relatively low, it is important to investigate the effect of bioaerosols on nosocomial infections, especially in neonates.

Keywords: Nosocomial infection, Indoor air pollution, Bioaerosol, Bacteria, Fungi

Investigation of water quality changes of Qanats in operation in Ardestan town during the statistical period of 1995- 2019

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Abstract

Groundwater is an important source of water supply, especially in arid and semi-arid regions. Today, due to successive droughts, uncontrolled population growth and increasing urbanization and over-exploitation of groundwater resources, special attention to groundwater resources and changes in their quantity and quality have great importance. Therefore, due to the importance of the issue, in this study, the water quality changes of Qanats in Ardestan town have been investigated. In this cross-sectional descriptive study, the trend of changes in water quality of 16 Qanats in Ardestan town during the statistical period of 1995-2019 has been investigated. Information on aqueduct water quality including parameters of potassium, sodium, magnesium, calcium, sulfate, chloride, bicarbonate, carbonate, pH, total dissolved solids and electrical conductivity, sodium percentage, sodium adsorption percentage, cations, anions and Total hardness was obtained from the town water resources department. Finally, through statistical analysis, changes in water quality parameters were investigated and then the results were compared with Iranian drinking water quality standards and WHO guidelines. According to the results of this study, during the last 25 years, the concentration of Qanats water parameters, including total dissolved solids, hardness, etc., has increased which indicates a decline in the quality of Qanats water. During the statistical period, 85% of the water quality parameters of the Qanats were increasing compared to previous periods which indicates the uncontrolled withdrawal of water resources and the influx of saline water and the decline of water quality. We should be sensitive to them.

Keywords: Qanat, Water quality, Water withdrawal.

Comparative study of microbial quality in swimming pools disinfected by ozone-chlorine and chlorine processes using next generation sequencing in Tabriz, Iran

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Abstract
The growth of pathogens in swimming pools and their effect on swimmers shows the necessity of using desirable disinfectant. The aim of this study was to compare the bacterial community and diversity in two pools disinfected by chlorine and O3-chlorine processes. In order to analysis of the bacterial and physicochemical indicators, a total of 24 samples were taken from two pools in three seasons. Culture and molecular method were used to evaluate microbial quality. Two samples were taken from the pools at the maximum swimmer load in the summer were investigated by NGS. In total, 410 and 406 bacterial species were identified in chlorine and ozone-chlorine disinfected pool, respectively. Of the 8 dominant bacterial species in each swimming pool, Pseudomonas alcaliphila, Pseudomonas stutzeri and Pseudomonas acnes were common species between the two pools. Oleomonas sagaranensis (350 read /18593), Staphylococcus caprae (302 read /18593) and Anaerococcus octavius (110 read /18593) were among the dominant bacteria in the chlorine disinfected pool. Bacterial diversity in the ozone-chlorine disinfected pool was lower than the other, and the highest bacterial sequencing was belonged to the genus Pseudomonas (85.79%). Results showed that water quality of O3-chlorine disinfected pool was more desirable than only chlorinated pool. Molecular methods along with conventional culture methods would be advantageous in swimming pool monitoring.

Keywords: water quality, disinfection, molecular methods, swimming pool, 16s rRNA

Poster

Investigating the effect of health system transformation plan on the environmental hygiene status of Tohid Hospital in Sanandaj

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Abstract

One of the basic measures that has been in line with the health reform plan policy for creating a hygienic and healthy environment in the hospital. Therefore, the aim of this study was to investigate the level of environmental hygiene standards before and after the implementation of the health system reform plan in Tohid Hospital in Sanandaj. This study was a descriptive-analytical cross-sectional study and the information needed to determine the environmental hygiene status of hospitals using the standard checklist of the Ministry of Health and Medical Education with 260 questions that were evaluated before and after the implementation of the health system reform plan. The required data were collected including building hygiene, water, sanitation, radiation, light, sound, ventilation and insect and rodent control, clinics and specialized clinics. And the collected data were entered into Excel and SPSS software.The results of this study showed that the score of assessing the health status of the hospital using the standard checklist of the Ministry of Health and Medical Education before the implementation of the health system reform plan (30.78%)80 and after the implementation of the health system reform plan (79/61%)207of the questions waste management (16.1%) 42% and the lowest question was water and wastewater with (3/8%)10 Before implementation of the health system reform plan, the highest score was related to waste management (45.23%)19, and the lowest score was related to the general health in the laboratory with (16.66%)4 and after the implementation of the transformation plan. The health system had the highest score related to general health in laboratory (91.66%) 22% and the lowest score was related to CSSD central sterilization ward (61/90%).13and There was a statistically significant relationship between the evaluation status of the hospital before and after the implementation of the health system reform plan (P <0.0001).The health system reform plan has led to a positive change in the indicators of environmental health assessment in the hospital. And it is necessary to increase supervision and control, and hospitals are required to comply with hygiene standards and improve management procedures.

Keywords: Standard, Environmental hygiene, Health System Reform Plan, Tohid, Sanandaj

Monitoring of paraben compounds in indoor and outdoor air of a populated city

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Abstract
Detection of paraben compounds in numerous human biological samples and their association with many health disorders imply that the humans can be exposed to parabens in many ways. Although many researchers have studied dermal and oral exposures to parabens, a few of them have considered indoor and outdoor air as a source for human exposure to these compounds. Therefore, this study was conducted to monitor the indoor and outdoor air concentrations of parabens in different places and age groups in Isfahan, Iran. For this purpose, ten sites were selected to determine four parabens in indoor and outdoor air simultaneously. Sampling was carried out using a polyurethane foam (PUF) tube connected to a SKC pump operating at a flow rate of 10 L/min. Parabens desorption from PUF, their extraction from solvents and their analysis were performed using methanol/water solvents, ultrasonic-assisted dispersive liquid-liquid and micro-extraction(DLLME) and gas chromatography-mass spectrometer (GC-MS), respectively. Results showed a significant difference among MePB ($p = 0.002$), EtPB ($p = 0.001$), PrPB ($p = 0.001$) and BuPB ($p = 0.013$) concentrations in indoor and outdoor air. Moreover, the lowest and highest concentrations of MePB (0.36 and 0.63 ng/m3), EtPB (0.31 and 0.65, ng/m3), PrPB (0.64 and 1.07 ng/m3) and BuPB (0.0 and 0.21 ng/m3) were detected in green spaces and barbershops. Moreover, infants and children (6–8 years) were found to be exposed to the highest risk of indoor air. The obtained results can provide a basis for future indoor and outdoor air quality studies.

Keywords: Indoor air, Outdoor air, Parabens, Ultrasonic, DLLME method

Suspended particles in ambient air of Shahr-e Kord (Iran's rooftop); Levels characterization and health risk assessment of particles-bound heavy metals

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Abstract
In this research, the ambient air quality had monitored in views of particulate matter levels and their heavy metals content in a high-altitude region, Shahr-e Kord, for the first time. The average concentrations of TSP, PM10, PM2.5, and PM1 in the four months were 61.85, 51.57, 19.28, and 3.03 in December, 54.15, 19.68, 7.37, and 4.89 in February, 24.05, 11.32, 4.42, and 2.88 in January, 68.22, 33.72, 14.21, and 3.73 in March respectively. The concentrations of HMs in TSP ranked in the following decreasing order: Hg>As> Mn> Ni> Cr> Cu> Pb. As a consequence, the level of HMs concentration in the region of the study had lower than the observed levels in other worldwide cities. The health risk assessment showed that the inhabitants in Shahr-e Kord were within the safe range of carcinogenic and non-carcinogenic risks attributed to the exposure with heavy metals present in ambient air. Generally, this research had shown that the main source of particulate matter in a mountainous city in the central plateau of Iran (Shahr-e Kord) had mainly originated from natural sources.

Keywords: Particulate matters, Heavy metals, Wind erosion, Health risk assessment

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Poster

Evaluation of parasitic and microbial contamination among operators of food preparation, distribution and sales centers in Qazvin province

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Abstract

One of the most important areas for susceptibility to intestinal parasitic infections in society is the risky nature of jobs such as operators of food preparation, distribution and sales centers. These people can easily transmit many infectious agents, especially intestinal parasites, to their customers if they do not follow the principles of basic hygiene and personal hygiene. To obtain a health card, the operators of food preparation, distribution, and sales centers must perform the necessary tests, especially parasitic and microbial tests. Therefore, in this study, information related to intestinal parasitic and microbial tests of the operators of these centers, which was performed in 2016 in Qazvin province; the results were collected and reported using descriptive statistics and SPSS software version 24. The results of the study showed that out of 57086 experiments performed, for those following Tables 1 and 2, antambahistolytica 56 cases (0.098%), Giardia 242 cases (0.004%), Exior parasite 4 cases (0.007%),Ascaris zero, Salmonella 4 cases (0.007%), Shigella zero and other parasites were 127 cases (0.222%). According to the results of the study, it was found that the prevalence of parasitic infection, in general, is decreasing, so to accelerate this process, it is recommended to observe personal hygiene tips in preparing food and washing hands before preparing and manipulating food and after defecation. Temperament, intensification of training for food preparation and distribution center operators, as well as improving the access to safe drinking water in suburban areas, especially in rural areas, along with increasing access to sanitary sewage disposal can be helpful.

Keywords: food handler, parasitic contamination, microbial, food preparation, and distribution centers

Quantitative and qualitative analysis and investigation of the knowledge, attitude and practice of Romeshkan villages people in relation to household waste

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Abstract

Due to the lack of proper and scientific management, solid waste is one of the most effective destructive materials in the environment, which directly and indirectly causes environmental pollution. Considering the importance of rural waste in relation to the spread of diseases and its impact on the environment, this study was conducted with the aim of quantitative and qualitative study of rural waste and also to assess people's attitudes and knowledge about waste management in 2009. Based on the results of the present study, 10 household of selected household waste (recyclable and non-recyclable) in the city of Romeshgan in 2009 includes 6369.5 kg of total waste, of which 5561.6 kg (equivalent to 6.8% of total waste) recyclable and 841.3 kg (equivalent to 13.4% of total waste) were non-recyclable. Accordingly, the highest amount of waste was related to Aghajan village with the amount of 707.3 kg and the lowest amount was related to Garavand village with the amount of 339 kg. Based on the results of the present study, the quality of waste in Romeshgan city is different. accordingly, the highest and wastes in the form of organic matter(67.6% of total waste) and PET(with 0.4%) had the lowest amount. regarding the relationship between the different domains of the three sections of knowledge, attitude and performance with demographic variables(education, occupation and age) between the area of separation of household waste from the performance section with the level of education(p-value=0.04) and the scope of education of the performance section with the level of education(p- value=0.01) statistically significant relationship was observed. due to the high percentage of perishable materials in this study, the use of household fertilizer to reduce the amount of waste produced from the villages of Romeshgan city and also for use in agriculture(as a healthy organic and natural fertilizer and a suitable alternative to chemical fertilizers) will be very convenient. also, due to the significant percentage of recyclable components (plastic, metal and glass), it is necessary to pay attention to the program of separation and recycling of such waste in the villages of the city.

Keywords: Per capita production, Waste precapita, Rule solid waste

Survey of pollution harvested wheat to Eurygaster integriceps & Tilletia laevis in Semnan province

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Abstract

Wheat is the most important human food grain suppliers, Wheat consists of the ingredients, the combination of the wheat gluten it. Gluten main factor affecting the functional properties such as elasticity and strength of the dough is dough Various factors affect the properties of gluten Among them are bug and pest noted smut These factors affected the remaining flour made from wheat dough and spread Digest gluten and dough sticky and loose and create your bread quality, reduce In this study, the contamination of harvested wheat in Semnan province.The scourge of Eurygaster integriceps and smut in 1390 till 1394 assessment And solutions to combat this pest should be provided.The information required and the factors that can contribute to increased pollution in the form of a questionnaire was developed and relevant information according to which the organs were collected and were analyzed.The results show that a total of 438 492/8 tons of wheat harvested. During the five years 1394 to 1389 in Semnan province, 3/68 per cent infected Eurygaster integriceps And 0/432 percent was infected with smut fungus .The damaged in the amount of 1.68 percent In Siahkal 0.032% higher than the maximum allowable in Iran and the world.

Keywords: Eurygaster integriceps, Tilletia laevis, gluten, sanitary waste, the permissible maximum

Comparison of Chemical Parameters (TPM, Peroxide index, Acidity) in Consumption Used Frying Liquid Oils in Fast Food Shops of Mashhad City by two methods: instrumental and laboratory

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Abstract

Considering rare studies on oil chemical parameters especially peroxide, Total Polar Materials (TPM), the current study was conducted to determine the amount of peroxide, TPM, and acidity in used liquid frying oils consumed in fast food units in Mashhad City.

The statistical population of this study consisted of 51 food outlets collected from Health Center No. 3 in Mashhad City. Polar compounds in the samples were measured in situ using a calibrated Testo 270 instrument. To determine the peroxide and acidity index, the samples were collected in dark-colored bottles without dust, transferred to the chemistry laboratory of Mashhad University of Medical Sciences, and stored at refrigerator temperature to prevent further degradation. Preparation and testing were performed according to the Iranian Organization for Standardization and Industrial Research methods. After performing the experiment by portable device and laboratory method and data collections, the data were analyzed using SPSS statistical software, standard deviation, and Spearman test. Plot Altman-Bland was also drawn to investigate the proximity or difference between the two methods of laboratory measurement of peroxide and total polar compounds (TPM). The results showed that 39, 12, and 49 samples out of 51 samples had peroxide, TPM, and acidity more than standard levels, respectively. The results of statistical tests also represented increasing TPM, acidity index, the peroxide index also increased, but there is no significant relationship and correlation between peroxide index and acidity ($P < 0.05$). It is in need to improve the public awareness of the harmful effects of such fast foods and how to handle reused oils, due to the importance of TPM, peroxide, and acidity indexes in food, also the rising consumption of fast foods in today's society.

Keywords: Frying Oil, Peroxide Index, Acidity Index, Fast Food

Assessment of health risk-based air quality index (HAQI) related to PM10 in the ambient air of Birjand

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Abstract
Air quality indices are key tools for determining the level of air quality and reflecting it to the general public. Considering the importance of PM10 on human health, the aim of this study was to determine the PM10 level in Birjand and to evaluate the air quality related to this pollutant based on the health risk-based air quality index (HAQI). PM10 hourly concentration data were obtained from Birjand Environmental Protection Organization and the average 24-hour concentrations were calculated according to validation criteria. Air quality indices (AQI and HAQI) were calculated based on 24-hour average values. The results of this study showed that the values of HAQI index (and AQI) that were obtained for 249 days of 1399 of the Persian calendar were good, moderate and unhealthy for sensitive groups for 214 (221), 29 (26) and 4 (1) days, respectively. Moreover, in 1 and 2 days, the AQI and HAQI indices were very unhealthy and dangerous, respectively. In this regard, HAQI showed that the health-based air quality related to PM10 reached to dangerous level in Birjand during 1399 year. Since HAQI is based on relative risk (RR) and this risk was more than 1 in high concentrations, so the value of HAQI was higher than AQI in days with high levels of PM10. Therefore, HAQI can characterize health risk due to high concentrations of pollutants more strictly than AQI and provide a more serious warning about the unhealthy air quality.

Keywords: Air pollution, Health risk-based air quality index, PM10, Birjand

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