6th International and 25th National Conference on
Environmental Health
DECEMBER 20-22, 2022
Ahvaz Jundishapur University of Medical Sciences

Abstract

Proseedings of the 6th International and 25th National Conference on Environmental Health

December 20-22, 2022 Iran-Ahvaz

وزارت بهداشت، درمان و آموزش پزشکی

انجمن علمی بهداشت محیط ایران
Iranian Association of Environmental Health (IAEH)

دانشگاه علوم پزشکی جندی شاپور اهواز

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Environmental Technologies Research Center, Ahvaz Jundishapur University of Medical Sciences

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Tehran University of Medical Sciences

World Health Organization (WHO)

Water & Wastewater Consulting Engineers (WWCE)

Water and Wastewater Journal

Pardis Petrochemical Company

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Iranian Journal of Health and Environment (IJHE)

Journal of Advances in Environmental Health Research (JAEHR)

Journal of Air Pollution and Health

Journal of Environmental Health Science and Engineering

International Journal of Environmental Health Engineering (IJEHE)

Environmental Health Engineering and Management Journal

Research Center for Environmental Pollutants

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Alireza Zarrasvandi	Chamran martyr of Ahwaz University
Mahdi Qomishi	Chamran martyr of Ahwaz University
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Ehsan Ahmadi	Kashan University of Medical Sciences

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Maryam Ravanbakhsh
Khadijeh Sajadimehr
Zeinab Moarref
Rozhan Feizi
Fatemeh Eskandari

Conference Topics

- The role of environmental health in the prevention and control of diseases related to environmental factors
- National and international environmental health challenges; fore sighting and ways to deal with, manage and control
- Sciences and technologies for prevention, management, treatment and control of environmental pollutants
- Monitoring of environmental pollutants
- Climate change and health
- Other issues related to environmental health

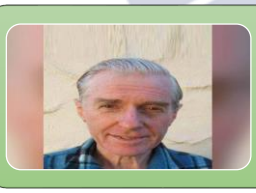
Professor. Ahmad Ali Enayati
Professor of Medical Entomology and Vector Control
Mazandaran University of Medical Sciences, Iran
Advisor to Iran Ministry of Health and WHO in malaria and Aedes surveillance and control

Professor. Masoud Yunesian
Professor of Epidemiology, Tehran University of Medical Sciences, Iran

Professor. Amirhossein Takian
Professor of Health Policy, Tehran University of Medical Sciences, Iran

Professor. Torsten C.Schmidt
Professor of Analytical Chemistry
Centre for Water and Environmental Research, University Duisburg-Essen, Germany

Professor. Michal Krzyzanowski
Professor of Environmental Epidemiology, School of Public Health, Imperial College London, London, England



Prof. Bruce Spittle
Editor-in-Chief of Fluoride Quarterly Journal of the International Society for Fluoride Research, Dunedin, New Zealand

Professor. Susana Silva Martinez
Universidad Autónoma del Estado de Morelos, Portugal

Professor. Susana Paixão
Professor of Public Health
Instituto Politécnico de Coimbra, Portugal

Professor. Philip Hopke

Professor of Civil & Environmental Engineering, Editor in chief of *Science of Total Environment*, Clarkson University, USA

Professor.Frank Kelly

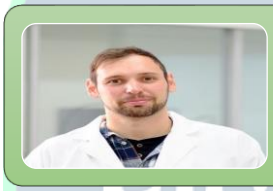
Professor of Community Health and Policy, Imperial College London

Editors-in-Chief of Journal of "Air Quality, Atmosphere & Health" (Springer)

Professor. Md Sahadat Hossain

Professor of Civil Engineering

The University of Texas, USA



Dr. Jose Luis Díaz de Tuesta

PhD of Chemical Engineering

Rey Juan Carlos University, Spain

Professor. André Niemann

Professor of Civil Engineering

University of Duisburg-Essen, Germany

Professor. Tatiana Minkina

Professor of Soil science

Southern Federal University, Russia

Professor. Ravi Naidu

Professor of Environmental Remediation

Global Centre for Environmental Remediation (GCER), The University of Newcastle, Australia

Dr. George Z. Kyzas

Associate Professor

Department of Chemistry, International Hellenic University, Greece

The 6th International and the 25th National Conference on Environmental Health
December 20 - 22, 2022
Ahvaz Jundishapur University of Medical Sciences

First day: Tuesday, 20. December (Morning)
Opening ceremony 8:30 AM- 10:10 AM (GMT+3:30)

Time	Title of the program
2 minutes	Recitation of the Holy Quran
2 minutes	National Anthem of the Islamic Republic of Iran
5 minutes	Welcoming, Dr. Mohamad Hossein Sarmast Shushtari President of Ahvaz Jundishapur University of Medical Sciences
5 minutes	Welcoming, Dr. Mehrnoosh Zakerkish Vice-chancellor of Research and Technology, Ahvaz Jundishapur University of Medical Sciences
10 minutes	The report of Prof. Alireza Mesdaghinia President of the Iranian Environmental Health Association
5 minutes	The report of Dr. Seyyed Ali Mard Head of International Affairs, Ahvaz Jundishapur University of Medical Sciences
5 minutes	The report of Dr. Afshin Takdestan Executive Manager of the conference
15 minutes	Speech of Dr. Ali Salajegheh Head of the Department of Environment, Islamic Republic of Iran
15 minutes	Speech of Dr. Mikiko Senga Deputy Representative Health Emergencies & Universal Health Coverage Lead, WHO office in Iran
10 minutes	Speech of Dr. Hossein Farshidi Deputy of Health, Ministery of Health and Medical Education, Islamic Republic of Iran
15 minutes	Speech of Dr. Mohammad Esmaiel Motlagh (Secretariat of the Health and Food Safety Council) on: The role of the Secretariat of the Health and Food Safety Council in compiling the national document on climate change and its effect on human health
10 minutes	The speech of Dr. Jafar Jandaghi Explaining the plans of the Environmental and Occupational Health Centre, Ministry of Health and Medical Education, Islamic Republic of Iran
5 minutes	Rest

First day: Tuesday, 20. December (Morning)
Session 1: The role of environmental health in the prevention and control of diseases related to environmental factors, 10:15 AM – 12:15 PM (GMT+3:30)
Member of the session: Prof. Alireza Mesdaghinia (Chairman), Prof. Kazem Nadafi, Dr. Mehdi Mokhtari, Prof. Amir Hossein Mahvi , Prof . Mehdi Ahmadi-Moghadam, Prof. Jafar Jandaghi, Prof. Ahmad Jonidi Jafari, Prof. Mohammad Hassan Ehrampoush

Speaker	Title	Time
Prof. Bruce Spittle	The role of environmental health in the prevention and control of fluoride-induced diseases (In English)	(10:15-10:35) 20 minutes
Prof. Michal Krzyzanowski	Health effects of air pollution and the role of environmental epidemiology in the assessment of these effects (In English)	(10:35-10:55) 20minutes
Dr. Mohammad Ghanbari	A comparative study of TNF-α biomarker in healthy and asthmatic subjects and their relationship with ambient PM concentrations in dusty and normal conditions (In Persian)	(10:55-11:05) 10 minutes
Shirin Noshadi	Investigating the amount of water consumption and domestic and commercial wastewater production and the factors affecting it in the Covid-19 pandemic (In Persian)	(11:05-11:15) 10 minutes
Dr. Reza Fouladi-Fard	Premature Mortality and Associated Economic Costs attributed to PM2.5 and O3 in Qom (In Persian)	(11:15 -11:25) 10 minutes
Dr. Morteza Khafaie	Ambient air pollution exposure and Tuberculosis- a time series study (In Persian)	(11:25-11:35) 10 minutes
Habibeh Nasab	Investigating the relationship between exposure to urinary levels of endocrine-disrupting chemicals (Triclosan, Methyl triclosan, Triclocarban and 2,4-Dichlorophenol) with blood pressure and lipid profile in children and adolescents in Kerman city (In Persian)	(11:35-11:45) 10 minutes
Mahssa Mohebbi Cham Khorami	Ambient air particulate matter (PM10) satellite monitoring and respiratory health effects assessment (In Persian)	(11:45-11:55) 10 minutes
	Q & A	(11:55-12:05) 20 minutes
	Rest	1 Hour

First day: Tuesday, 20. December (Evening)
Session 2: National and international environmental health challenges; fore sighting and ways to deal with, manage and control, 13:15 PM – 15:15 PM (GMT+3:30)
Members of the session: Prof. Mohammad Sadegh Hassanvand (chairman), Prof. Anoushiravan Mohseni-Bandpei, Dr. Hamed Mohammadi, Prof. Mohammad Ali Zazouli, Dr. Sahand Jorfi, Prof. Mohammad Taghi Samadi, Dr. Hassan Izanloo

Speaker	Title	Time
Prof. Philip Hopke	Declining PM2.5 concentrations result in changing compositions and toxicity (In English)	(13:15-13:35) 20 minutes
Prof. Masoud Yunesian	Personalized environmental health (In Persian)	(13:35-13:55) 20minutes
Prof. Mohammad Mosaferi	Educational needs and knowledge required in the field of environmental health in Iran: Point of view of university professors (In Persian)	(13:55-14:05) 10 minutes
Prof. Behnam Barikbin	Investigating the employment Situation of Environmental Health Engineering Graduates in Mashhad University of Medical Sciences between 2010-2021(In Persian)	(14:05-14:15) 10 minutes
Dr. Samaneh Dehghan	Survey of knowledge, attitude and performance of people in Mazandaran province regarding source separation of household waste in 2021 (In Persian)	(14:15 -14:25) 10 minutes
Prof. Ali Almasi	Surveying of environmental health challenges related to the route of Arbaeen pilgrims in Mehran border (In Persian)	(14:25-14:35) 10 minutes
Parichehr Pakzad	breast cancer risk in women with active and passive cigarette/waterpipe smoking (In Persian)	(14:35-14:45) 10 minutes
Sepideh Sadeghi	Challenges related to spreading compost in urban green space: Assessment of microbial risk from accidental ingestion of compost in children (In Persian)	(14:45-14:55) 10 minutes
	Q & A	(14:55-15:15) 20 minutes
	Rest	15 minutes

First day: Tuesday, 20. December (Evening)
Session 3: Climate change and health 15:30 PM- 17:35 PM (GMT+3:30)
Members of the session: Prof. Mohammad Mosaferi (chairman) - Prof. Reza Saeedi _ - Dr. Mohammad Javad Mohammadi - Prof. Sina Dobaradaran - Prof. Ahmadreza Yazdanbakhsh - Prof. Ali Asghar Najafpoor - Prof. Masoud Yunesian. Dr. Abbas Shahsavani

Speaker	Title	Time
Prof. Susana Paixão	Climate Change and Health (In English)	(15:30-15:55) 20 minutes
Prof. Amirhossein Takian	Climate Change and modeling its impacts on food security in Iran (In Persian)	(15:55-16:15) 20minutes
Prof. Frank Kelly	Air Pollution and Climate Change: two sides of the same coin (In English)	(16:15-16:35) 20 minutes
Dr. Yaser Tahmasebi Birgani	Assessment of climate change impact on stormwater quality parameters (case study: Shushtar, Iran)(In Persian)	(16:35-16:55) 20 minutes
Fatemeh Mortezazadeh	Investigating the Importance of Environmental Factors and Climate Changes on the Prevalence of Danger Fever: A Narrative Review Study(In Persian)	(16:55 -17:05) 10 minutes
Samaneh Dehghani	Sources and emissions of greenhouse gases (carbon footprint) with emphasis on the gas refining industry (In Persian)	(17:05-17:15) 10 minutes
	Q & A	(17:15-17:35) 20 minutes

First day: Tuesday, 20. December (Evening)
Workshop on creativity, entrepreneurship, and job opportunities in environmental health, Time: 18:00-20:00 AM (GMT+3:30)

The access link will be sent to registered participants only.

Workshop leader	Title	Position	Time
Prof. Mohammad Taghi Ghaneian	Skill development , a step towards wealth creation (code design + other items)	Professor, Yazd University of Medical Sciences	30 minutes (18-18:30)
Dr. Gholamreza Mahmoudi Kandari	Creativity, entrepreneurship, and job opportunities in environmental health	The CEO of Pakan Ghatreh Innovation Accelerator Company and Secretary of the entrepreneurship team in environmental health	30 minutes (18:30-19)
Dr. Hamid Asadi	Health service offices, Employment opportunities	Head of the Economic Coordination Center, Ministry of Health and Medical Education	30 minutes (19-19:30)
Mr. Ali Ghurani	Job opportunities and income generation in radiation health (Health of nuclear energy and electromagnetic waves)	Director of health programs for exposure to nuclear energy and electromagnetism (radiation health) Ministry of Health and Medical Education	30 minutes (19:30 - 20:00)

Second day: Wednesday, 21. December (Morning)
Session 4: Monitoring of the environmental pollutants 8:15 AM- 10:15 AM (GMT+3:30)
Members of the session: Prof. Mohammad Malakoutian (Chairman) - Prof. Ali Akbar Babaei- Dr. Gholamreza Gudarzi - Prof. Ramin Nabizadeh Nodehi - Prof. Bijan Bina – Prof. Mahnaz Nikaeen - Dr. Mohammad Hosseini

Speaker	Title	Time
Prof. Andre Niemann	Environmental Monitoring of health-related biomarkers in wastewater flows – Experiences from Europe (In English)	(8:15 -8:35) 20 minutes
Prof. Torsten C. Schmidt	Comprehensive analysis of organic micropollutants in water combining passive sampling, non-target screening, and advanced chemometrics (In English)	(8:35-8:55) 20minutes
Mr. Victor Chaplygin	The morphology of roots and leaves of Verbascum thapsus L. under soil pollution (In English)	(8:55-9:05) 10 minutes
Dr. Mohammad Javad Mohammadi	Investigating the effect of particulate matter caused by dust on the health of exposed people using the Air-Q model (In Persian)	(9:05-9:15) 20 minutes
Dr. Farshid Soleimani	Toxic effect of cigarette butts leachates on blood markers and different body tissues of Periophthalmus waltoni species from the Persian Gulf Region (In Persian)	(9:15 -9:25) 10 minutes
Habib Nejati	Investigation on the presence and abundance of microplastic in highly consuming marine and farmed fish species in Mazandaran province (In Persian)	(9:25 -9:35) 10 minutes
Dr. Maryam Ravanbakhsh	Polycyclic aromatic hydrocarbons (PAHs) and butyltins in seawater, sediment, and fish samples from Ghazaleh estuary, Persian Gulf (In Persian)	(9:35 -9:45) 10 minutes
Neda Kayedi	Air Pollution history and projection in the most polluted city in the world (In Persian)	(9:45 -9:55) 10 minutes
	Q & A	(9:55-10:15) 20 minutes
	Rest	15 minutes

Second day: Wednesday, 21. December (Morning)
Session 5: Sciences and technologies for prevention, management, treatment and control of environmental pollutants, 10: 30 AM - 12: 30 PM (GMT+3:30)
Members of the session: Dr. Zabihollah Yousefi (Chairman) - Dr. Afshin Takdestan - Dr. Gholamreza Mousavi - Dr. Mohammad Mehdi Amin - Dr. Roshanak Rezaei Kalantari- Dr. Seyed Nadali Alavi- Dr. Alireza Rahmani

Speaker	Title	Time
Prof. Tatiana Minkina	Identification, measurement and remediation of soil pollution by heavy metals (In English)	(10:30 -10:50) 20 minutes
Prof. Susana Silva Martínez	Environmental technology and wastewater treatment (In English)	(10:50-11:10) 20minutes
Dr. Luis Diaz de Tuesta	Catalysts prepared from carbon-rich wastes and their application in the wastewater treatment by CWPO under a circular economy scene (In English)	(11:10-11:30) 20 minutes
Dr. Vishnu D. Rajput	Role of Green Synthesized Nanomaterials to Improve the Soil Health (In English)	(11:30-11:40) 10 minutes
Fahimeh Shamseali	Electrochemical denitrification of aqueous solutions using Ti/RO2 anode and graphite cathode: RSM modeling and Monte Carlo sensitivity analysis (In Persian)	(11:40-11:50) 10 minutes
Dr. Yadollah Ghafuri	Investigating the performance of activated carbon catalyzed ozonation for removal of antibiotics in hospital wastewater (In Persian)	(11:50-12:00) 10 minutes
Majid Amiri Gharaghani	Evaluating photo-catalytic ozonation process using ZnO catalytic fixed bed in the degradation of para-nitroaniline from aqueous solutions (In Persian)	(12:00-12:10) 10 minutes
	Q & A	(15:10-15:30) 20 minutes
	Rest	1 Hour

Second day: Wednesday, 21. December (Evening)
Session 6: Other issues related with environmental health, 13:30 PM – 15: 30 PM (GMT+3:30)
Members of the session: Prof. Kamyar Yaghmaeian(Chairman) - Prof. Mehdi Farzad Kia - Prof. Mehrdad Farrokhi- Dr. Mahmoud Ali Mohammadi - Dr. Abdulkazem Nisi - Prof. Ali Almasi - Prof. Afshin Maleki – Dr. Yaser Tahmasebi Birgani

Speaker	Title	Time
Prof. Ahmad Ali Enayati	Environmental factors related to the environment and the prevalence of emerging and re-emerging diseases transmitted by arthropods (In Persian)	(13:30 -13:50) 20 minutes
Prof. Ravi Naidu	Waste to wealth: tapping a hidden resource (In English)	(13:50-14:10) 20minutes
Dr. Chetan Keswani	Microbial Biopesticides: An Enigma for Human and Environmental Health (In English)	(14:10-14:20) 10 minutes
Dr. Dariush Naghipour	Remove safranin dye from the Aqueous solution using zinc oxide stabilized on zeolite in the presence of ultraviolet light (In Persian)	(14:20-14:30) 10 minutes
Dr. Nahid Navidjouy	Bioenergy production and removal of organic matters from wastewater using microbial fuel cell system (In Persian)	(14:30 -14:40) 10 minutes
Farzaneh Gharibzadeh	Health and economic impact assessment of walking and cycling as transportation modes in Tehran megacity (In Persian)	(14:40-14:50) 10 minutes
Dr. Gholamhossein Safari	Exposure to pesticide residues in the Northwestern of Iran: A Probabilistic health risk study based on consumption of apple using Monte Carlo Simulation (In Persian)	(14:50-15:00) 10 minutes
Dr. Fatemeh Kardel	Assessing the health risk of stone mine workers to the Al, Cu, Pb and Ni elements using lichen (In Persian)	(15:00-15:10) 10 minutes
Dr. Sudhir S. Shende	Bio-fabrication of nanoparticles (NPs): An emerging approach for the sustainable developments	(15:10-15:20) 10 minutes
	Q & A	(15:20-15:40) 20 minutes
	Rest	5 minutes

Second day: Wednesday, 21. December (Evening)
Meeting of wealth creation and value creation in environmental health, 15:45 PM- 17:45 PM (GMT+3:30)

Topic	Side	the speaker
Promotion and development of technology in environmental health	Director of the Health Technology Development, Ministry of Health and Medical Education	Dr. Hamid Reza Banafshe
Introducing businesses related to environmental health	Professor, Shahid Sadoughi University of Medical Sciences	Dr. Mohammad Taghi Ghaneian
Creativity, entrepreneurship and job opportunities in environmental health	The CEO of Pakan Ghatreh Innovation Accelerator Company and Secretary of the entrepreneurship team in environmental health	Dr. Gholamreza Mahmoudi Kandari
Need,the mother of opportunities and riches	Director of health programs for exposure to nuclear energy and electromagnetism (radiation ,(healthMinistry of Health and Medical Education	Mr. Ali Ghorani
Open innovation in the development of technological products	Vice Chancellor of Research and Technology, Qom University of Medical Sciences	Dr. Rahim Aali
Facilitator	Associate Professor, Environmental Health Engineering, Shahid Sadoughi University of Medical Sciences, Yazd	Dr. Mehdi Mokhtari
Q & A		

Second day: Wednesday, 21. December (Evening)
Workshop: Research challenges in Microplastic Studies 18:00 PM-19: 30 PM (GMT+3:30)

Title	Position	Speaker
Research challenges in the study of microplastics	Assistant Professor, Department of Earth Sciences, College of Sciences, Shiraz University, Shiraz, Iran, Department of Radiochemistry and Environmental Chemistry, Faculty of Chemistry, Maria Curie-Skłodowska University, Poland	Dr. Sajjad Abbasi

Third day: Thursday, 22. December (Morning)
Meeting: Medical Geology, current trends , challenges and future horizons 8:15 AM- 10:15 AM (GMT+3:30)

Title	Speaker
Professor of Environmental Health Engineering, Kerman University of Medical Sciences	Prof. Mohammad Malakootian
Professor of Geology, Shahid Chamran University of Ahvaz	Prof. Alireza Zarasvandi
Professor of Environmental Health Engineering, Tabriz University of Medical Sciences	Prof. Mohammad Mosaferi
Associate Professor of Geology, Shahid Bahonar University, Kerman	Dr. Ahmad Abbas Nejad
Medical Geology Center, Geological Survey and Mineral Exploration of Iran	Dr. Parisa Pirozfar
Assistant Professor of Geology, Ahvaz Jundishapur University ,of Medical Sciences	Dr. Reza Dehbandi

Third day: Thursday, 22. December (Morning)
Closing ceremony 10:30 AM- 11:30 AM (GMT+3:30)

Speaker	Title	Time
Dr. Pejhman Bakhtiarinia	Heath Vice- chancellor, Ahvaz Jundishapur University of Medical Sciences	(10:30 -10:40) 10 minutes
Professor. André Niemann	Environmental Monitoring of health-related biomarkers in wastewater flows – Experiences from Europe (In English)	(10:40 -11:00) 20 minutes
	Announcing the names of the best speeches and posters	(11:00-11:15) 15 minutes
	The final resolution of the conference	(11:15-11:30) 15 minutes

Third day: Thursday, 22. December (Evening)

Special educational lecture 1:

Time	Title	Speaker
15:30-14:00	Health Economic Assessment Tools	Prof. Masoud Yunesian Dr. Farzaneh Gharibzadeh

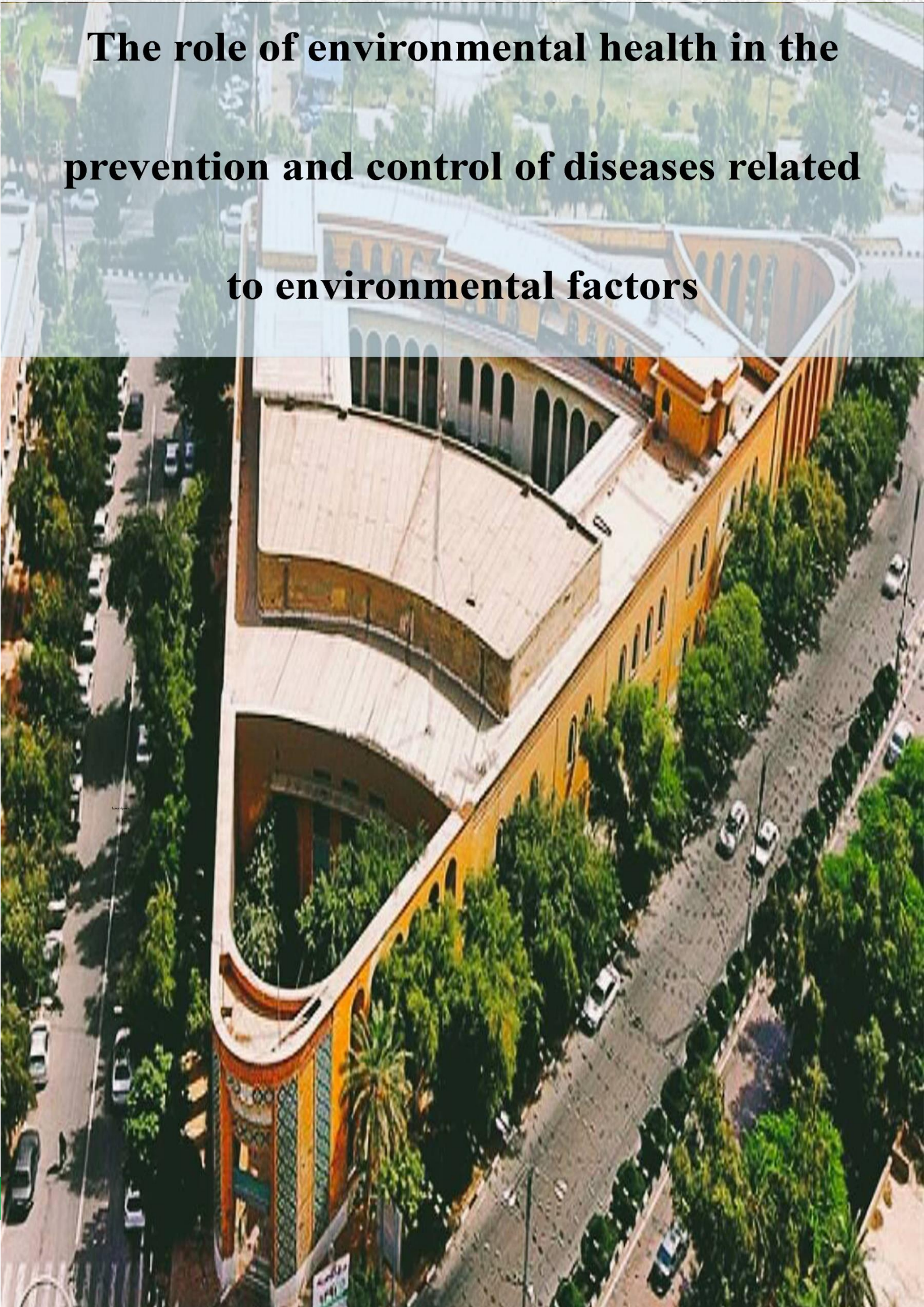
Introduction of practical and up-to-date tools to measure the benefits and limitations of active transportation (walking and cycling) in different levels of air pollution.

Special educational lecture 2:

Time	Title	Speaker
17:45-15:45	Introduction to International Chemical Safety Cards (ICSC)	Dr. Homa Kashani

International chemical safety cards (ICSC) have information about essential health, hygiene, and safety information at different levels of work, from shops to health and safety administrators in factories, agriculture, construction, and other places. Also, it can be applied by responsible agencies regarding chemical incidents and thus play an essential role in promoting the safe use of chemicals.

The role of environmental health in the prevention and control of diseases related to environmental factors



breast cancer risk in women with active and passive cigarette/waterpipe smoking

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Abstract

Although evidence suggests harmful effects of waterpipe smoking, there is limited information about its direct association with chronic diseases, notably breast cancer. Carcinogens in Tobacco smoke may increase the risk of breast cancer (BC). Conversely, cigarette smoking also has antiestrogenic effects, which may reduce the risk of BC. The association between smoking and BC remains controversial. we performed a case-control study using data from hospital and clinical cancer registry in Isfahan, Iran, among 88 participants (aged 20-69-years) that include waterpipe, smokers. The trained interviewers completed lifestyle questionnaires (53 cases and 35 healthy controls). Using logistic regression models, we evaluated the relationship between smoking exposure and the risk of primary BC. significant risk factors included changing the cigarette pattern (adjusted OR $_{moderate/low}$ =2.38, 95% CI:1.46-7.95, P value=0.02), (adjusted OR $_{high/low}$ =3.30, 95%CI: 1.37-5.25, P value=0.02) and waterpipe (adjusted OR $_{Yes/No}$=0.16, 95%CI: 0.03-0.20, P value=0.04) with BC risk evaluated by demographic variables: age, education, income, welfare, job, workplace and time in workplace. waterpipe consumption, outdoor exposure, and changing pattern were identified as significant predictors of the development of breast cancer.

Keywords: Active and passive smoking, Breast cancer, Women

Investigating the Importance of Environmental Factors and Climate Changes on the Prevalence of Danger Fever: A Narrative Review Study

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Abstract

Considering the role and importance of dengue fever disease on the health of people in the society and the impact of climatic and environmental factors on the spread of this disease, as well as the lack of sufficient information in this field, the monitoring and prevention of dengue fever disease should be focused on the Local and regional scale, and Therefore, this review study has provided information about the effective climatic and environmental factors on the prevalence of dengue fever. In this review study, published articles until August 1st 2022 in English and Persian were examined. These articles by searching in databases and using Persian and English keywords such as "dengue fever", "dengue vector", "mosquito vector", "Environmental factors" and "Climatic factors" were obtained. Endnote X7 software was also used to organize, study titles and abstracts. The results of the study showed that changes in parameters such as air temperature, rainfall and humidity are known as climatic factors affecting the dynamics of dengue fever. Also, other factors affecting the frequency of Aedes mosquitoes are environmental factors. Water areas such as swamps, springs and rivers are suitable habitats for the breeding of Aedes mosquitoes. Also, vegetation and forests play an important role in controlling temperature fluctuations, and they can be a place for resting, feeding and reproduction of dengue fever vectors. Destruction of forest cover with the extinction of natural mosquito predators creates favorable environments for mosquito carriers. Domestic waste and its accumulation around residential houses as environmental pollutants can also hold a significant amount of water and be considered as a habitat for mosquito larvae such as Aedes species. The analysis of climatic and environmental factors has shown that these factors can be effective in the occurrence of dengue fever. Since there is currently no vaccine to prevent dengue fever, still preventing mosquito bites and controlling their population are the main methods to prevent the spread of dengue fever. Therefore, people should protect themselves from mosquitoes and limit the number of bites.

Keywords: Dengue fever - Aedes mosquito - Environmental factors - Climatic factors

Surveying of environmental health challenges related to the route of Arbaeen pilgrims in Mehran border

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Abstract

The Mookeb located at the border of Mehran are special and important places in health and economic, and providing health conditions in terms of environmental health indicators is essential. Ignoring health regulations in the provision of food, services and health & welfare facilities provided in religious borders can pose risks to pilgrims' health. Therefore, continuous monitoring and control of health indicators in the borders of mourning is necessary. This cross-sectional descriptive study was conducted on Mehran Mookeb (No.200). In total, 120 and 80 samples were evaluated in terms of the microbial quality of water and food, respectively. The parameters studied in drinking water included residual free chlorine, pH, total coliform and fecal coliform, and the parameters studied in food included the number of total coliform and fecal coliform (Escherichia coli). According to the findings, the health indicators of the accommodation were 98.7% favorable and 98% of the toilets and bathrooms were in health condition. The amount of total coliform and fecal coliform in food was reported to be zero. The results of the present study showed that the health status of food production centers was good in 99.3 percent of cases and the crew in charge of personal hygiene followed the steps of food production and distribution were completely healthy and pH in 92.4 percent of the samples were in the appropriate range. Total coliform and fecal coliform were found to be contaminated in 46 samples (24.7%) out of 186 water samples. In most of the water tanks, residual chlorine was acceptable and chlorine inspection was done continuously. The correct implementation and continuous control of health guidelines for the crossing borders of Arbaeen pilgrims seems vital, and it is suggested that special regulations and indicators be considered for the responsible crew to attend training courses and obtain a medical examination card.

Keywords: Arbaeen, Environmental Health, Water Health, Food Health, Mehran Border

Investigating the amount of water consumption and domestic and commercial wastewater production and the factors affecting it in the Covid-19 pandemic: a systematic review

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Abstract

Introduction: With the widespread of coronavirus in the world, measures such as quarantine, increased adherence to health guidelines, and closure of schools and commercial and recreational complexes were carried out in order to prevent the spread of the Covid-19 disease. This study was conducted with the aim of investigating the changes in water consumption and wastewater production and the factors affecting it during the Covid-19 pandemic.

Search method: All articles from the outbreak of the disease until now in international databases such as Google Scholar, Science Direct, Scopus, WOS, PubMed, and internal search engines including SID, Elmnet, Magiran, Civilica with keywords water consumption, sewage production, Corona, Covid 19, domestic-commercial sewage were received. 11 articles related to the purpose of the study from 53 articles were received, which were separated and analyzed. Most of the studies were conducted in Asian and European countries.

Results: The amount of water consumption and wastewater production has increased in most cities of Iran and other countries, and the largest increase has been attributed to the domestic sector. Also, in some studies, water consumption in commercial sectors was reduced, which is due to the laws of the countries seeking to change the work pattern, reducing tourist attractions, and closing commercial centers.

In hot seasons, the demand for water consumption in the domestic sector has been higher. The highest rate of increase in water consumption and wastewater production is related to the domestic sector and in the countries of Spain (60-70%) and America (20-50%), which has caused an increase in the hydraulic load on wastewater treatment plants. The highest rate of decrease was in the field of commercial expenses related to England (30-50%) and Brazil (42%). The above information has been collected through a questionnaire, using a meter, and checking the data of water and sewage treatment plants.

Conclusion: The covid-19 pandemic has caused a change in the pattern of water consumption and production of domestic-commercial wastewater with factors including changing the travel pattern and reducing the desire of people to attend gatherings and quarantine in cities and more importantly increasing compliance with health guidelines.

Keywords: Water consumption, Wastewater production, Domestic-Commercial wastewater, Covid-19

Ambient air particulate matter (PM_{10}) satellite monitoring and respiratory health effects assessment

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Abstract

Air particulate matter with an aerodynamic diameter 10 µm or less (PM_{10}) is one of the main causes of acute exacerbation of chronic obstructive pulmonary disease (AECOPD). This study explored the relationshipbetween PM_{10} by remote sensing and AECOPD in Chaharmahal-o-Bakhtiari province during 2014-2018. PM_{10} concentrations were predicted and validated based on aerosol optical depth (AOD) from 161 images processed by MODIS sensor and ground air quality monitoring station data. Demographic information and spirometric indices of 2038 patients with AECOPD were collected and analyzed from the hospital during the studied periods. SPSS software was used to analyze the relationships between these two categories of information. There was a significant negative relationship between PM_{10} and FVC, FVC%, FEV_1, FEV_1%, FEF25-75, FEV_1/FVC, PEF and FEF25FVC indices ($p < 0.05$). The results showed that over 2014-2018, the annual mean of PM_{10} concentrations varied from 35 to 52µg/m^3. The result of the regression model demonstrated that the patient's age, body mass index (BMI) and PM_{10} concentrations were the most affecting variables on the two important spirometric indices i.e., FVC% and FEV_1%. The PM_{10} concentrations and number of the AECOPD patients had a similar pattern during the studied period. The women group, age group above 74 years, normal BMI and non-smoking patients showed the most sensitivity to the PM_{10} concentrations.Our findings provide supplementary scientific information on PM_{10} concentration related to the incidence of AECOPD and as a variable affecting the most important spirometry indicators by providing local decision-makers information needed to set priority of air pollution control measures as well as health services.

Keywords: PM_{10}, Satellite Monitoring, acute exacerbation of chronic obstructive pulmonary diseases, spirometric indices, Chaharmahal-o-Bakhtiari Province

Ambient air pollution exposure and Tuberculosis- a time series study

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Abstract

Objectives To evaluate the effects of exposure to ambient air pollution on the incidence of TB.

Methods A time-series study conducted in Ahvaz, capital city of Khuzestan province, Iran. Patients' data were obtained from Ahvaz Jundishapur University of Medical Science. The air quality data of Ahvaz from March 2013 to March 2021 came from, Ahvaz monitoring stations. We examined the association of air pollutants concentration with the daily diagnosed pulmonary TB cases in Ahvaz using linear regression time series.

Results Ahvaz had 1473 pulmonary TB from 2013-2021. Ahvaz statistical analysis shows a significant association between SO2 and TB incidence. 1SD increase in SO2 would lead to 0.06% increase in TB incidence.

Conclusion Industrial air pollutants apparently have a significant effect on TB incidence in Ahvaz. It is somehow different from the common view that put the whole blames on regular dust storms in the territory.

Keywords: Air pollution, Tuberculosis, Time series

Premature Mortality and Associated Economic Costs attributed to $PM_{2.5}$ and O_3 in Qom

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Abstract

Air pollution has serious impact on both health and economic burden and is known as one of the causes of million deaths globally each year. The objective of this study was to conduct health assessment and evaluation of associated economic cost of mortality attributable to $PM_{2.5}$ and O_3 pollution in Qom in 2019 (only in warm season for O_3) using BenMAP-CE. The air quality data were acquired from Qom Province Environmental Protection Agency. The population data were collected from Qom Province Management and Planning Organization website. The Baseline Incidences related to Stroke, Chronic Obstructive Pulmonary Disease, Lung Cancer, and Ischemic Heart Disease attributable to $PM_{2.5}$ and Baseline Incidences related to Cardiovascular and Respiratory mortality attributable to O_3 were obtained from Global Burden of Disease (GBD) website and epidemiological studies, respectively. To perform the assessment, the maximum 8-hour of O_3 and its cut-off value (EPA guideline value: 0.07 ppm) were converted from ppb into $\mu g/m^3$ for every day under ideal condition (25^0C, 1atm). The IER function was used to quantify health effects of $PM_{2.5}$ and O_3 pollution. The associated economic cost was assessed by value of a statistical life (VSL) approach. The annual average of $PM_{2.5}$ concentration was found to be 16.32 $\mu g/m^3$ (SD: 9.93) and the maximum 8-hour of O_3 in 3 months of warm season was equal to 0.16 ppm (SD: 0.07). A total of 2475.73 and 239.24 premature mortalities were found to be attributable to $PM_{2.5}$ and O_3, respectively. The total associated cost was calculated to be 451.39 and 43.60 million USD associated with $PM_{2.5}$ and O_3, respectively. The results indicate the importance of solving air pollution in Qom, as well as other big cities in Iran. Limited studies have been conducted to survey health effects air pollution in Iran using BenMAP-CE software. Such studies are crucial to implement policies to subtract air quality problem. The elimination of limitations, such as insufficient local data, should be regarded in future studies.

Keywords: O_3, $PM_{2.5}$, BenMAP-CE, Premature mortality, Economic cost

Study of ventilation system in the operation rooms in Abadan, Iran during 2018

Running title: Ventilation system in the Operation Rooms

Hafez Ajam Ekrami[1], Mohammad Effatpanah[2], Hosein Effatpanah[3], Behzad Fouladi Dehaghi[4], Mahsa Kianizadeh[5], Sahar Sarkohaki[1], Arghavan Afra[6], Fatemeh Mombeni Kazemi[1], Saeid Jalali[5], Puria Mehrabi[6], Fatemeh Kiani[1], Masoume Taherian[1], Mohammad Javad Mohammadi[7*]

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Abstract

The ventilation system plays an important role in reducing the concentration of anesthetic gases used in operating rooms and thus reducing the side effects of these gases, including carcinogenic risks and chronic respiratory problems for health care workers (HCWs) and patients .

The purpose of this study was to investigation the ventilation system in Ayatollah Taleghani, Valiasr and Shahid Beheshti educational hospital operating room during 2018. We in this study used the observation and questionnaire included ventilation system in operating room .

In this study SPSS software used to for the analyzed data. According result this study, the Ayatollah Taleghani, Valiasr and Shahid Beheshti had the average quality of ventilation system. According to the results from the current study, there are a signification relationship between ventilation system in the level of anesthetic gases (P=0.0054). Based on the findings of this study, improving and equipping air conditioning systems in medical centers can play an important role in increasing the health of employees working in operating rooms and minimizing the complications of inhaling anesthetic gases.

Keywords: Ventilation system, Medical Centers, Operating Room, Patients, Abadan, Iran.

The detection of SARS-CoV-2 in the environmental surfaces in hospital

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Abstract

The current COVID-19 pandemic that is caused by SARS-CoV-2 has led all the people around the globe to implement preventive measures such as environmental cleaning using alcohol-based materials, and social distancing in order to prevent and minimize viral transmission via fomites. The role of environmental surface contamination in viral transmission in within hospital wards is still debatable, especially considering the spread of new variants of the virus in the world. Therefore, the present study aims to investigate environmental surface contamination in different wards of a hospital as an environmental side effect of the pandemic. With regard to environmental surface contamination, 76 samples were taken from different wards of the hospital, from which 40 samples were positive. These samples were taken from contaminated environmental surfaces such as patient bed handles, the nursing station, toilet door handles, cell phones, patient toilet sinks, toilet bowls, and patient's pillows, which are regularly-touched surfaces and can pose a high risk for transmission of the virus. The results correspond to the time that the VOC 202012/01 (lineage B.1.1.7) had emerged in the hospital and this should be considered that this variant could possibly have different traits, characteristics, and level of persistence in the environment.

Key words: SARS-CoV-2; VOC lineage B.1.1.7; Environmental surface; Hospital

Association of coronavirus (Covid-19) pandemic with some risk factors in some world cities

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Abstract

Introduction: The current outbreak of the novel coronavirus SARS-CoV-2 (coronavirus disease 2019; previously 2019-nCoV), epicenter in Hubei Province (Wuhan), People's Republic of China, has spread too many other countries. The study of Acute Respiratory Syndrome (SARS) indicates that there is a significant relationship between temperature and virus transmission and three important factors, namely temperature, humidity and wind speed, cause SARS transmission.

Material & Methods: Daily data on the incidence and mortality of Covid-19 disease were collected from World Health Organization website and World Meter website for several major cities in Iran and the world. Data were collected from February 2020 to September 2021. Meteorological data including temperature, air pressure, relative humidity and UV index are extracted from the website of the World Meteorological Organization, NASA and the MODIS sensor. Statistical analysis carried out for significance relationships.

Results: In our study, there was a significant association between coronavirus prevalence and temperature in **some communities:** USA (-44%), Brazil (-51%), Wuhan (-35%), Ahvaz (28%), Arak (26%), Qom (32%) and Tabriz (40%). In the United States, Madrid, Paris, Rome, and Wuhan, China, there was no association between air quality index and the prevalence and death of covid19. There is a significant relationship between covid19 mortality and air pressure, such as: USA (-51%), Brazil (60%), Madrid (-32%) and Ahvaz (-37%).

Conclusion: There was significant relationship between Dew point and prevalence. In our study, there was a significant association between coronavirus prevalence and temperature in some communities.. AQI was strongly associated with the prevalence of covid19.

Keywords: SARS-CoV-2, Covid-19, AQI, Dew point, Temperature

Health risk assessment of BTEX on fuel station (Gas, gasoline and petrol) attendants

Mohammad Javad Mohammadi[1] Arefeh sepahvad [2], Masoume Taherian[3], Majid Farhadi [4], Ali Farhadi[5], Faramarz Azimi[6] , Kosar Mohammadi[7*]

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Abstract:

BTEX compounds are the most abundant organic compounds in the atmosphere and surface waters. Gas stations are one of the most important sources of emissions of volatile organic compounds, benzene, toluene, ethyl benzene and xylenes (BTEX). Workers who work at gas stations without proper health protection are exposed to high concentrations of these compounds through inhalation and skin. Long-term exposure to these compounds can cause serious effects on human health. Toxicology studies on humans showed that this compounds are well absorbed by the body, because of their lipophilic nature, they accumulate in fat-rich tissues such as the brain, bone marrow, and body fat. The purpose of this review study was the epidemiological literature on the Health risk assessment of BTEX on fuel station (Gas, gasoline and petrol) attendants. 451 articles according to different databases: PubMed, Web of Science, Springer, Cochran and Science Direct were retrieved. 55 full-text articles entered into the analysis process. Finally, 32 articles were selected in this study. The search was restricted to English-language papers published between 1 February 1995 and 13 August 2022. The health of gas station workers is affected by exposure to BTEX and gasoline vapor emissions. BTEX compounds cause genotoxic changes, chromosomal and genetic abnormalities. Genotoxicity at high levels in gas station workers can cause cancerous and non-cancerous risks.

Keyword: BTEX , Risk assessment, Gas station, Monitoring

Measurement of urinary biomarkers of parabens in an Iranian population and their associations with anthropometric and socio-demographic factors

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Abstract

Parabens are widely used to prevent organism growth and increase the shelf life of foods, medicines and personal care products (PCPs). Recent studies have reported endocrine disruption due to exposure to parabens and the potential harmful effects on human health. There is no information on the extent of exposure to parabens among Iranians. We measured the concentration of urinary methylparaben (MP), ethylparaben (EP), propylparaben (PP) and butylparaben (BP) among Iranian adults and calculated estimated daily intake (EDI). Associations between urinary paraben with socio-demographic and lifestyles variables were also investigated. Detection frequencies of MP, EP, PP, and BP were 98.9, 91, 94.3, and 88.2 %, and median urinary concentrations were 69.06, 9.10, 12.4, and 9.87µg/l respectively. Urinary parabens were higher in females and the difference in urinary concentration of MP and PP was significant. A significantly positive correlation between MP and PP (r = 0.638) and a moderate to weak correlation between other parabens were observed. There was a significant association between different age groups and MP, BP and PP as well as different BMI values and MP. The highest EDI value belonged to MP in the female group; despite being lower than acceptable daily intake (ADI), it was higher than other countries (except the US). Findings indicate that Iranians are widely exposed to parabens and range of exposure is associated with socio-demographic factors. These results could serve as a basis for assessing the risk of exposure to parabens amongst Iranians.

Keywords: Paraben, Urine, Biomonitoring, Adults, Estimated daily intake

Study of Prevalence Nosocomial Infections before and after the outbreak of Covid-19 in different wards of Hospital, Middle Eastern City

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Abstract

Nosocomial infections appear 48 to 72 hours and up to one year if any external object is used in the body after hospitalization. Controlling the nosocomial infections is now global priority. The aim of this research was evaluation of prevalence nosocomial infections before and after the outbreak of Covid-19 in different wards of hospital, Middle Eastern city during 2017-2021.

This is a cross-sectional study which was conducted in educational hospital of Ahwaz, Iran, during 2017-2021 prospectively. In this study different information include ward of hospitalization, type of NIs and patients's age and gender were collected. The results were analyzed by Excel and SPSS 16.0.

The prevalence of nosocomial infections in the years following the outbreak of covid-19 has decreased compared to previous years, which may be due to increased use of protective equipment such as masks, gowns, gloves and disinfectant for hands, proper and adequate use of antibiotics and education on health. The number of cases with signs of nosocomial infections were 5098 which spread of Klebsiella and E. coli were more than other pathogens, respectively. Pneumonia was the most common infections (47.9%), followed by UTI (23. 6%), SSI (16.4%) and BSI (12.1%). In this study hazard of death were increased with age and no difference between male and female was detected.

Over the last years, nosocomial infections have been assumed an important warning to health of patients and HCWs. With the correct use of protective equipment, the rate of mortality, duration of hospitalization and hospital costs are considerably reduced. Based on the results of this study, the use of protective equipment is crucial to limit transmission of covid-19.

Keywords: Nosocomial Infections, Covid-19, Prevalence, Educational Hospital, Middle Eastern

Epidemiology of cholera El Tor in Ahvaz southwest Iran, during the years 2011-2021

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Abstract

Background: Cholera El Tor is one of the infection diseases which can lead to outbreak and death. The aim of this study was evaluation of Epidemiology of cholera El Tor in Ahvaz, Middle Eastern city during 2015-2021.
Methods: This is a cross-sectional study which was conducted in Ahwaz, Iran during 2011-2021. All Cholera cases and epidemics of the disease in the Ahwaz (Iran) were assessed using the registry system of Vice Chancellor for Health (VCH) of the Ahvaz Jundishapur University of Medical Sciences from 2011 to 2021. The results were analyzed by Excel and SPSS 16.0.
Results: According to our findings, the study used data from 74 Cholera patients with mean age of 28.1±20.50 in Khuzestan province in southwestern Iran. The incidence of cholera declined significantly each year from 2015 to 2021. The highest incidence of cholera was reported in 2015 year with the 46 cases. During 2011-2021 patients who infected by Inaba serotypes have lower chance for remission (HR: 0.55, CI: 0.24-0.87). The main prescribed medication was Ciprofloxacin (48.6%), Cefixime (28.4%) and Azithromycin (23%). The finding this study showed that using water contaminated with microorganism an increased risk of infection associated with using water.
Conclusion: In recent years, the overall incidence of cholera has decreased. The occurrence of cholera is an outcome of rainfall in the previous year. Whenever cholera in the prevalent countries, Khuzestan province was one of the provinces that contracted the disease and the average incidence in the province was higher than the national average.

Keywords: Cholera, El Tor, Epidemiology, Health, Ahvaz.

Investigating the relationship between nanoplastics and human health

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Abstract

Introduction: Over the years, the environment of living organisms has been polluted with millions of tons of plastic. The size of microplastics and nanoplastics varies from 100 nanometers to 5 mm and 1-100 nanometers, respectively. The most common plastics are polyethylene, polypropylene, polystyrene, polyvinyl chloride, polyamide and polyethylene. It is estimated that 4.85 trillion microplastics are released into the oceans. Nanoplastics can remain in marine and terrestrial environments for hundreds of years. Humans are comprehensively exposed to microplastics and nanoplastics through inhalation, skin and ingestion. Nanoplastics are more harmful than microplastics because they can penetrate through biological membranes, causing adverse effects on human health and other organisms.

Search Method:In this review study, the keywords nanoplastics, human health and cancers were searched and studied in articles from 2020 to 2022published by Pubmed, Google scholar and Scopus, finally 10 articles were analyzed.

Results: Studies have shown that The presence of nanoplastics in many foods and drinks shows their log in the food chain and people exposed to the inhalation of cellulose fibers and nanoplastics, are more susceptible to colon and lung cancer. Inhalation is the strongest way nanoplastics to enter the body of, which are deposited deep in the alveolar region. Nanoplastics can be deposited in the brain through inhalation through the nose, causing neurotoxicity and altering behavior. Polystyrene, polyethylene terephthalate and polyvinyl chloride have adverse effects on cell viability and inflammatory gene expression in the laboratory. The effects of inhaled nanoplastics outside the lungs on cardiovascular and brain diseases are evident.

Conclusion:According to research, nanoplastics have an adverse effect on human health and are involved in causing inflammatory reactions, metabolic disorders, and cancers. Also, plastics that are not buried in a standard and principled manner cause nanoplastics to disperse in the air and enter the lungs through inhalation and cause irreparable problems. Considering the study of nanoplastics in the marine environment and paying less attention to the study of the effect of these materials on humans, it is suggested that more research be done to investigate the effect of nanoplastics in causing various cancers.

Keywords: Nanoplastics, Human Health , Cancers

Ecological study of ambient air pollution exposure and incidence of thyroid cancer

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Abstract

Thyroid Cancer (TC) is the fifth most common malignancy in adult women globally. Fine particulate matter ($PM_{2.5}$), a ubiquitous environmental pollutant, has been indicated to affect thyroid hormone (TH) homeostasis. We sought to estimate the association between long-term exposure to the fine (diameter ≤ 2.5 µm) particulate matter component of air pollution and the risk of thyroid cancer incidence in Iran. We extracted thyroid cancer incidence data from Iran from 1990 to 2019 for males and females for all age groups from http://www.healthdata.org/. We entered the data into Joinpoint Software statistical software to present APC and AAPC and their confidence intervals. We used the site https://data.worldbank.org/ to extract data on $PM_{2.5}$ ($PM_{2.5}$ air pollution, mean annual exposure (micrograms per cubic meter)) and examine the correlation between thyroid cancer and $PM_{2.5}$; we entered the information into R software. Thyroid cancer in males had four joint points, and its general trend was upward. AAPC = 5.6 (4.5-6.8) had two joinpoints in females, and the general trend was upward. [AAPC = 4.9 (4.1-5.6)]. There was a positive correlation between $PM_{2.5}$ and the incidence of thyroid cancer ($r = 0.493$, $p = 0.214$). This study indicated increasing trends in thyroid cancer incidence with exposure to $PM_{2.5}$. So, attention to high-risk groups and public programs is necessary to reduce the incidence of this cancer in the future. Our novel findings provide additional insight into the potential associations between risk factors and thyroid cancer and warrant further investigation, specifically in areas with high levels of air pollution nationally and internationally.

Keywords: Particulate Matter, Thyroid cancer, Air pollution, Cancer

Investigating the technology of using biomarkers in the diagnosis of cancer caused by exposure to toxic air pollutants

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Abstract:
Today, air pollution caused by environmental factors is the most important factor in the occurrence of various types of cancer in human societies. Scientific advances made around the world make molecular biomarkers used for cancer diagnosis part of a routine diagnostic panel. Molecular changes include changes in DNA, RNA, microRNAs (miRNAs), and proteins. Today, single-stranded RNAs have been discovered that can regulate metastasis, invasion, and development of cancers. Their changes can lead to their use as biomarkers for cancer diagnosis. This narrative review study aimed to investigate the technology of using biomarkers in the diagnosis of cancer caused by air pollutants The finding of this study showed that antibodies are used for immunohistochemical detection of proteins, and risk classification is used technologies such as protein and DNA arrays, mass spectrometry and the human genome have made it possible to simultaneously examine thousands of proteins and single genes, which has led to the discovery of new biomarkers for cancer. the result of this study expresses that modern technologies can perform parallel analyses, providing opportunities to identify distinct patterns to diagnose and classify cancer and predict response to treatments. These technologies provide a means to discover new and unique tumor markers through the use of reasonable hypotheses and novel analytical strategies. So far, several important limitations to the discovery of new single tumor markers have been identified, including study designs, and artifacts related to sample collection and storage. which causes new technologies and strategies to often fail in identifying known cancer biomarkers. These technological advances have revolutionized the discovery of biomarkers. Overall, new cancer detection tools have expanded their utility as predictors of risk factors and can be used as targets for personalized medicine.

Keywords: Progress; Cancer diagnosis; Clinical;

Effect of toxic air pollutants (Arsenic) on prevalence Diabetes

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Abstract

Introduction: Arsenic has metallic and non-metallic properties. It is also widely found in sulfide ores and belongs to the nitrogen family. Arsenic is used as an insecticide due to its high toxicity. Arsenic has caused many environmental concerns, including the widespread availability of arsenic in the environment, biological toxicity, and exploitation. Potential routes of arsenic exposure in humans include drinking water, industrial manufacturing, diet, cosmetic, smoking, and air. A recent debate has focused on the link between arsenic exposure and diabetes. Diabetes is a common disease in the world that affects many people. This disease is caused by a long-term increase in blood sugar levels in the body. The purpose of this review study was the epidemiological literature on the side effect of arsenic on diabetes.

Material and methods: 703 articles according to different databases: PubMed, Web of Science, Springer, Cochran and Science Direct were retrieved. 81 full-text articles entered into the analysis process. Finally, 36 articles were selected in this study .

Results: The literature was shown Arsenic is available in a variety of sources, including natural resources, groundwater, industrial activities, food and tobacco. Arsenic can affect the function of pancreatic β cells and cause diabetes.

Conclusion: According to research related to the subject, the level of toxic air pollutants especially Arsenic are a attributed to human activities, industrial process, fuel uses, transportation, power plants and energy consumption and emission this pollutants can increase risk of prevalence of diabetes .

Keywords: Toxic Air Pollutants, Arsenic, Diabetes, Epidemiology

Effect of Polycyclic aromatic hydrocarbons (PAHs) on bladder cancer and the risk factors related to cancer.

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Abstract

Polycyclic aromatic hydrocarbons can increase the risk of cancer in human. Bladder, liver, stomach, lung, skin, gastrointestinal and nervous cancers, are the most common cancers that PAHs can dramatically increase the risk of getting them. Bladder cancer depends on many factors, such as inherited genetic predisposition and external exposure. They have different effects. Bladder tumors are directly related to exposure to carcinogens. The higher the exposure to risk factors, the higher is the risk of cancer. Risk factors that affect bladder cancer include: Smoking, Occupational and Dietary factors. Although there are natural sources of PAHs, human-induced sources are still dominated and can be subdivided into outdoor and indoor sources. PAHs are by-products arising from incomplete combustion of organic matter. They are found in all environments such as hospitals, industries, homes, etc.

The purpose of this review study was the epidemiological literature on the side effect of polycyclic aromatic hydrocarbons (PAHs) on bladder cancer and the risk factors related to cancer.

1271 articles according to different databases: PubMed, Web of Science, Springer, Cochran and Science Direct were retrieved. 404 full-text articles entered into the analysis process. Finally, 29 articles were selected in this study.

The literature showed that PAH exposure occurs in everyday life through tobacco smoke exposure, consumption of charcoal smoked meats, and air pollutant inhalation. The concentration of PAHs correlates with the lifetime bladder cancer risk of PAHs

Keywords: Polycyclic Aromatic Hydrocarbons (PAHs), Risk Factors, Bladder cancer, Urinary tract

Strengthening Environmental Health Systems for the implementation of the Sustainable Development Goals

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Abstract
The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity now and in the future. The 17 SDGs are integrated - they recognize that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability, all while tackling climate change and working to preserve our oceans and forests. The mission statement of the United Nations on SDGs is as follows: "A blueprint to achieve a better and more sustainable future for all people and the world by 2030." Environmental Health plays a pivotal role in the implementation of these SDGs. It is interesting to note that Environmental Health fits into 7 SDGs, 19 targets and 30 indicators of the SDGs.

Keywords: Environmental Health, Sustainable Development, World Environmental Health Day

Effects of heavy metals on children's health

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Abstract

Children are more susceptible and vulnerable to environmental pollutants relative to adults. Due to their unique physiological and behavioral characteristics, children are easier to be exposed to environmental pollutants than the general population. Children are more sensitive to chemical exposure as their organs are still developing and not yet mature and their immune systems and detoxification mechanisms are weaker than adults. The purpose of this study is to investigate the types of heavy metals (such as lead, mercury, cadmium and arsenic), their sources, possible routes of exposure and entry of heavy metals into children's bodies, the vulnerability of children to heavy metals and the adverse effects of heavy metals on children's health.

The present study is a descriptive-review study, the data of which was obtained through library studies, and the most relevant and up-to-date sources containing valuable points regarding the effects of heavy metals on children's health were used.

Findings of this paper revealed that entry of heavy metals to the body occurs through inhalation of contaminated air, dermal absorption, consumption of contaminated food, and drinking of contaminated water. Exposure of children to heavy metals has adverse impacts on their health. Most of these metals have been found to cause mental retardation and neurocognitive disorders in children such as impaired memory and lower IQ in children. In turn, the neurological damages impede a child's academic performance besides causing behavioral disorders. Moreover, mercury, lead, and cadmium impair children's growth. Further, they cause cancer, including sinus, lung, and nasal cancers and cause diabetes. Heavy metal poisoning also causes respiratory problems, such as irritation of air passages, obstruction of airways, and respiratory diseases such as rhinitis, bronchitis, and asthma.

Because of the detrimental health effects of heavy metals on children, efforts should be made to curb their pollution or release to the environment through stringent laws and regulations. Measurement and monitoring of exposure are essential for the protection of high-risk populations and subgroups probable intervention for reducing additional exposure to heavy metals in the environment and in humans can become a momentous step towards prevention.

Keywords: children, Heavy metals, Health, Environmental pollution

Health Risk Assessment of heavy metals (chromium, lead) in Drinking Water Supplies of Jiroft, Faryab and Qalaganj cities and using Arc-GIS software

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Abstract
Heavy metals are the most important pollutants that cause contamination of underground water sources in rural and urban areas. Consumption of drinking water contaminated with heavy metals leads to chronic health risks and cancer in the human population. The health risk assessment of heavy metals in drinking water sources is of interest due to their properties such as toxicity, high resistance in the environment and biological accumulation in living tissue. In this descriptive-cross-sectional study, water samples of 500 cc were collected in polyethylene containers from 20 urban water distribution network stations in 3 cities of Jiroft, Qalaganj and Faryab in the southeast of Kerman province. The concentration of heavy metals in the samples was measured by a flame atomic absorption device. The detection limit of the device for chromium and lead metal is equal to 0.02 and 0.01 mg/liter, respectively.The average concentration of lead in the drinking water distribution network of the studied areas was equal to 0.09 and 0.08 and the average concentration of chromium was 0.1 mg/liter. The results showed that the average concentration of lead and chromium is 0.01 and 0.05 mg/liter higher than the guidelines of the World Health Organization (WHO). The route of oral exposure of chrome metal accounted for the highest daily dose in both adult and children age groups compared to lead. The calculation of the total daily intake showed that the highest percentage of lead and chromium metal exposure is 83.7% through oral and 16.2% through skin. By comparing the carcinogenic risk of two metals in both age groups, chromium metal has the highest carcinogenic risk compared to lead metal through oral and skin exposure.Management and control of cancerous and non-cancerous risks of people in the studied areas with mines rich in chromite, titanium and minerals in the vicinity of agricultural lands and underground water wells is needed. Supervision of organizations such as Agricultural Jihad, Ministry of Health, Industries and Mines by building a water and sewage treatment plant to prevent the digging of unauthorized underground water wells by gardeners and farmers in removing common and emerging pollutants will be effective.

Keywords: Lead, Chromium, Carcinogenic, Non-carcinogenic, Drinking Water Supplies

Evaluating the effectiveness of vegetable disinfection in reducing total coliform and faecal coliform

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Abstract

Considering the importance of sanitizing vegetables before consumption, the aim of this study is to evaluate the effectiveness of different stages of the most common vegetable disinfection methods in Iran in reducing total coliform and fecal coliform for the most consumed edible vegetables. 64 fresh vegetable samples (each vegetable sample included 200 grams) were randomly purchased from the local markets in four different areas of Kermanshah city. 50 grams of vegetable samples were used to evaluate each step. Three steps of disinfection were as follows: first scrape & pre-wash of vegetables; the second stage, separation of parasites by 5-3 droplets of detergent per liter for 5 minutes; third stage disinfection of vegetables by calcium hypochlorite solution (with 200 mg/l free chlorine) for 5 min. Finally, disinfected vegetables were washed out the with water. The efficiency of each stage was determined based on the difference in total coliforms and fecal coliforms before the disinfection stage and after each stage of the procedure mentioned above. The results showed in vegetables with more foliage and hidden holes (such as basil and onion), the fecal coliform amount did not reach zero even after all of the disinfection stages. Besides, according to this study's results, radish, onion and coriander leaves had the highest contamination and lettuce had the lowest primary in terms of total and fecal coliform . To achieve the highest efficiency in reducing microbial agents of vegetables, it is necessary to complete the different disinfection stages following its instructions.

Keywords: Edible vegetables, Disinfection of Vegetable, Total coliform, Fecal coliform

Investigating fungal contamination, especially mucoral factors in the air of inpatient wards of patients with corona virus , Imam Reza hospital, Mashhad , 1400

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Abstract

Invasive fungal infections are one of the important issues in high-risk hospital departments.
Opportunistic fungi cause these infections in most cases in immunocompromised patients and other health defects. Fungal spores are among bioaerosols that are found everywhere and their wide distribution can cause various forms of disease. Especially in people with a low immune system
The purpose of this study is to investigate the diversity of opportunistic fungal contaminations, especially mucoral agents (black fungus) in the air of inpatient wards of patients with corona in Imam Reza Hospital in Mashhad.
In this study, SPAR MAX VACUME PUMP sampler made in Taiwan was used to evaluate and determine the concentration of fungal pollutants.
The flow rate of the sampling pump was 28.3 l/min and the sampling duration was 10 minutes for sampling the hospital air. The culture medium used is Saburo dextrose agar containing chloramphenicol.
In this research, the field method was used to collect the required data. The current descriptive study was carried out cross-sectionally in Shahrivar-Mehr of 1400 solar year during the fifth wave of corona disease.
The target population includes the inpatient wards of corona patients as follows, and at the time of sampling, the patient was hospitalized in these wards. Kovid 1, Kovid 2, Kovid 3, Kovid 4, ICU1 and ICU2
It should be noted that the sampling was done on two different days during the hospitalization of patients with corona virus.
The first sampling was done on 7/2/1400 from the air of Kovid 1, Kovid 2, Kovid 3, Kovid 4, ICU1 and ICU2 departments.
The types of identified colonies include: Aspergillus, Penicillium and Mucor, 4 colonies were reported in the Covid 1 department
The species detected in the air of Kovid 4 section are as follows:
Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus and Penicillium, 7 colonies were seen and no evidence of mucor was reported.The second stage sampling was done on 10/7/1400 from the air of Kovid 1, Kovid 2, Kovid 3, Kovid 4, ICU1 and ICU2 departments.
The types of identified colonies include: Mucor and Aspergillus niger in the amount of 61 CFU/M3 in the air of the Covid 2 department. The highest fungal density was observed in the Kovid 2 section (room 208) at the rate of 61 CFU/M3 and the number of 17 colonies. The lowest fungal density in ICU C department was 4 CFU/M3 and the number of 1 colony was identified with the diagnosis of Aspergillus flavus and Penicillium. Bacteria density in all sampling points was reported lower than ISO14644 standard.

Keywords: Fungal contamination, Mucoral factors, Hospital infection, Covid department

Investigation of furan-2-carbaldehyde removal from aqueous solutions using magnesium oxide nanoparticles in a laboratory pilot UV-light reactor

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Abstract

Furan-2-carbaldehyde is a toxic compound with the molecular formula ($C_5H_4O_2$) that is produced in many industries such as oil refineries and petrochemicals. This compound exists in different concentrations of these industries and enters the environment. Therefore, removing this pollutant from the effluent of production units is one of the environmental priorities. In this study, decomposition of furan-2-carbaldehyde using magnesium oxide nanoparticles and photocatalytic process from aqueous media was investigated. The concentration of furan-2-carbaldehyde was measured using a spectrophotometer at a wavelength of 277 nm. The optimal removal conditions were achieved in the initial concentration of Furan-2-carbaldehyde 250 mg/L, contact time 160 min, pH about 6, UV radiation intensity 30 μW/cm^2 and 1 gr/L nanoparticle dose. Under these conditions, the removal efficiency of 97.99 for furan-2-carbaldehyde and COD was obtained. Also, the results of the analysis of the magnesium oxide nanoparticles showed that the direct deposition method is a suitable and low-cost method for the synthesis of magnesium oxide nanoparticles. The results showed that the photocatalytic process in the presence of magnesium oxide nanoparticles is highly efficient in removing furan-2-carbaldehyde from aqueous solutions.

Keywords: Magnesium oxide nanoparticles, Photocatalytic process, Furan-2-carbaldehyde

Survey on the presence of *Acanthamoeba* spp. in Bandar Abbas coastal waters and associated health risks

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Abstract

Introduction: Swimming in marine waters may pose health risks to individuals by exposing them to pathogenic microorganisms through several routs. Nevertheless, the quantitative microbial risk assessment (QMRA) approach has mainly been applied to investigate the possible risk of gastrointestinal illness associated with recreational activities. The purpose of this study is to evaluate the microbial characteristics of coastal waters on Persian Gulf recreational beaches as well as to estimate the health risks associated with ocular exposure to *Acanthamoeba* spp. during swimming events.

Methods: A total number of 55 water samples was taken from Bandar Abbas city beaches. The presences of fecal pollution indicator bacteria and *Acanthamoeba* were investigated using multiple tube fermentation method and real-time PCR, respectively. Using Monte Carlo simulation the level of *Acanthamoeba* infection risk associated with ocular exposure was assessed.

Result: Fecal indicator bacteria (FIB) and *Acanthamoeba* spp. were highly detected in coastal water samples. The median risk of ocular illness was estimated to be 1.5×10^{-2}.

Conclusion: The results of this study could be helpful for local authorities to manage potential sources of microbial contamination on beaches to reduce health risks associated with recreational activities. Further research on the infective proportion of pathogens derived from sewage into coastal waters and a reliable dose of pathogens which may cause infections from ocular exposure to water is needed.

Keywords: QMRA, Exposure assessment, Marine, Recreational water, Swim

A survey on the Environmental Health indices of women's hairdressing and beauty centers of Qaemshahr city in 2018

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Abstract

Introduction: Hairdressing centers are one of the public places that are covered by article 13 of the Food, Drinking, Cosmetic and Sanitation Law. In these places, due to the visit of different people and possible common usage of dressing devices, the chance of transmittance of various deadly diseases such as AIDS increases. Therefore, it is necessary to educate and inform hairdressers about such work-related health issues.

methodology: in this descriptive cross-sectional study, the hairdressing centers of Ghaem Shahr city have been investigated regarding their environmental sanitation and health issues. Out of 84 women's hairdresser centers, 42 dressing centers were randomly selected and investigated. The checklist, which covers the research objectives including the environmental sanitation conditions of the centers, the type of disinfectant and disinfection method, and other related information, were prepared according to article 13 of the Food, Drinking, Cosmetic and Sanitation Law. In addition, a questionnaire was also devised to assess the awareness of the hairdressers about their work-related health issues as well as the impact and efficiency of public health education classes. The Microsoft Excel 2010 was used to perform the statistical analyses and prepare the graphs.

Results: the obtained results show that 61% of the hairdressers had health care and safety certificate. Unfortunately, none of the hairdresser was wearing a suitable gown during dressing and only 4.7 % of them used a mask during working hours. 50% of the hairdressing centers had no adequate and proper ventilation; 67% of them had no window with mesh. Only 17% of them kept shaving strings in a proper plastic wrap or cover. Lack of proper or adequate disinfection of the equipment and lack of sufficient knowledge about the transmission of diseases through common use of dressing equipment are alarming.

Conclusions: The results indicate the lack of awareness as well as the lack of adequate supervision on hairdresser centers. The use of color and bleaching agents and the lack of ventilation, given that the use of a mask is not satisfactory, can increase the possibility of respiratory problems and diseases among hairdressers. The Lack of the supervision of the hairdressing union and control of the authorities can be the factors behind these problems among hairdressing centers. By providing more training classes and, if possible, face to face training of the individuals can be effective.

Keywords: Environmental sanitation, Public places, Women hairdressing

Investigating factors affecting the physical health status of administrative and service workers of Tabriz Region 7 municipality

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Abstract

Monitoring and improving the physical health of employees in workplaces is one of the most important measures to increase productivity. The aim of this study was to evaluate the physical health status of Tabriz municipal staff and to determine the prevalence and early detection of diseases. The present study was a cross-sectional study. Employees of one of the districts of Tabriz municipality were census divided into two groups of staff and service. Data was collected through demographic questionnaire, blood test results and personnel examinations. Collected data were analyzed using SPSS software through independent t-test and analysis of variance.

According to the results 75% of personnel are service workers and 24% are administrative staff that 95.5% of them are male and 4.5% are female. The mean age of employees and BMI were 40.12 and 26.61, respectively. 23.5% of people had a history of smoking. The most common diseases were obesity with an average of 17.6%, fatty liver 15.4%, blood concentration 12.25% and hypertension 11.35%, respectively, with higher prevalence among administrative. There was a significant relationship between smoking, overweight and exercise with job type. Despite doing more sports activities among staff than in services, 75.8% and 57.5% of them, respectively, still have overweight. Municipal managers should implement programs to improve the general health of staff and monitor them through periodic examinations.

Keywords: Physical health, Occupational Examinations, Screening, Municipal staff

Investigating the quantity of urban, sanitary and civil waste before and after the epidemic of Covid-19

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Abstract

Background and purpose: The epidemic of COVID-19 and the state of quarantine have had positive and negative effects on the environment and all aspects of society globally. An increase in these cases will increase the amount of contaminated waste, and this epidemic will cause an increase in waste materials. It also leads to disturbance in the dynamics of food waste production. This study was conducted with the aim of investigating the quantity of urban, sanitary and civil waste before and after the epidemic of Covid-19 in Babol city.

Research method: This research is a cross-sectional descriptive study. In this study, the necessary information regarding the amount of production of sanitary waste was obtained from the vice-chancellor of health, and the necessary information regarding civil and urban waste was obtained from the municipality of Babol. And data analysis and graphs and tables were done using excel software. .

Findings: The findings show that the amount of urban, sanitary, construction waste produced in 2098 respectively88,867,672, 2293 and 7445940 and in 1400 it is 86,308,747, 2802 and 5914680 kg per year respectively. And the trend of production of sanitary waste was increasing in Corona conditions. The reason for its increase is the use of masks, disposable gloves, etc. during the corona epidemic.

Conclusion: Due to the increase in the production of infectious waste in the Corona era and due to the danger of such waste materials, careful and continuous monitoring of the management of such waste materials is necessary to ensure, maintain and increase the level of health of employees, patients and all visitors. will be.

Key words: Amount of urban, Sanitary, Babol, Corona, Covid

Investigating the level of awareness, attitude and performance of female hairdressers in Babol city regarding the spread of covid-19 disease

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Abstract

Background and purpose: One of the infectious diseases that has caused a pandemic in the world since 2019 is the covid-19 disease that started in Wuhan, China, and the transmission speed of this disease has turned it into one of the pandemics in human history. The covid-19 disease exists in hairdressing salons due to face-to-face contact with clients and frequent exposure to secretions and exhaled air, which leads to the spread of this disease. For this purpose, this research aims to investigate the level of awareness, attitude and performance of Female hairdressers of Babol city regarding the disease of covid-19.

Methodology: This research was a cross-sectional descriptive study that was conducted on 30 female hairdressers in Babol city who were selected by stratified sampling method. The data collection tool was a researcher-made questionnaire whose validity and reliability were confirmed. After completion, data was examined by using SPSS and Excel software.

Results: The demographic characteristics showed that most of the hairdressers were aged 25-35, married, without underlying diseases, living in the city, having a diploma and from a family of 4. The average scores of their awareness, attitude and performance are 7.26, 7.83, 7.26 respectively. It was found that there is a significant relationship between attitude and performance ($P<0.05$). But there is no significant relationship between awareness, attitude and performance awareness. There is a significant relationship between performance and underlying disease. So that people with underlying diseases showed better performance against the Covid-19 virus. There is no significant relationship between family members and the level of attitude and performance. But there is a significant relationship between age and awareness. The fact that the hairdressers are urban or rural does not affect their awareness, attitude and performance.

Conclusion: In general, the results of this research showed that hairdressers in Babol city have average awareness, attitude and performance regarding the Covid-19 virus.

Key words: Covid-19 disease, Awareness, Attitude, Performance, Barbers, Babol

Investigating the role of environmental factors on cholera Prevalence

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Abstract

Background: Cholera is one of the re-emerging infectious diseases caused by the ingestion of Vibrio cholerae bacteria through contaminated food and water. Vibrio cholera bacterium is a natural inhabitant of water environments and its infection causes vomiting and watery diarrhea which, in severe cases can lead to death.

Methods: This study aims to review the effective risk factors in the occurrence of cholera. This study was conducted by searching in scientific sources, including SID, Science Direct, Google Scholar, PubMed, Web of Science, and Scopus using the keywords cholera; Vibrio cholera, and environment.

Results and discussion: The review of studies showed that environmental, ecological, and climate factors can be related to cholera disease. Water and food contamination, Consumption of vegetables contaminated with human sewage, and seafood that are correlated to zooplankton have an effective role in the dynamics of cholera epidemics. Also, environmental and weather variables such as rainfall, flood, and temperature can be the triggers of a cholera epidemic. Population movement is also one of the factors that increase the spread of the infectious agent to others and different places.

Conclusion: The most effective way to control or prevent the disease is to minimize exposure to pathogenic strains of bacteria and identify the factors influencing the transmission of cholera. Educating the general public to observe the points of personal hygiene and intensifying supervision over the health of water and food and considering climatic factors can help this.

Keywords: Vibrio cholera, Cholera, Environment

Investigate and evaluate the effects of the Covid-19 pandemic on municipal solid waste management in Semnan city

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Abstract

Introduction: Recently, the World Health Organization has considered the epidemic of Covid-19 as a global crisis, which has caused an increase in economic and social problems and indirectly harmful environmental effects in different countries of the world, these problems also spread to the issue of waste management and has affected the management of municipal solid waste, especially its processing and disposal. The purpose of this study is to investigate and evaluate the effects of the Covid-19 pandemic on urban waste management in Semnan city.

Methodology: The present study is descriptive-cross-sectional type, which was conducted by stratified sampling method in the conditions of covid-19 pandemic. Quantitative data was defined after entering SPSS software 22 version, calculation of mean and standard deviation and paired T-test and the values were analyzed by drawing the relevant tables with Excel.

Results: According to the obtained results, due to the spread of the corona virus and with the increase in the number of hospitalized cases, the amount of infectious waste in hospitals has significantly increased. The amount of infectious waste has increased by 96% compared to the same period before the outbreak of the corona virus and has reached 30 tons per month and in the urban waste department of the municipality, due to the increase of selected corona centers, special corona laboratories, clinics and other health care centers in the municipality, this figure has increased by nearly 80 percent and reached 39 tons per month.

Conclusion: Considering the prolongation of the pandemic diseases and the increase of hospital solid waste generation, there is a need for serious management, collection, disposal and sanitary landfilling of infectious waste.

Keywords: Municipal waste management, Corona Virus, Infectious waste

Investigating the environmental health and safety situation in Arak hairdressers

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Abstract

Introduction and importance of the topic: health is complete physical, mental and social well-being and not just the absence of disease and disability. Also, safety can be defined as the degree of being away from danger. Hairdressing is one of the important and influential professions in the health of the society. Therefore, this study was conducted with the aim of evaluating the health and safety of male barbers in Arak city in 1401.

Materials and methods: This is a descriptive-analytical study that was conducted on 20 male hairdressers in Arak city. The tool of data collection was a questionnaire that was in the fields of (awareness related to personal and occupational health, health performance of hairdressers, health regulations of article 13, and environmental health and safety tips). After collecting, the data was analyzed using SPSS 16 software.

Results and discussion: The research findings about the average age of the research population (33.6 years) indicate that our research population is young. The level of knowledge of hairdressers about diseases related to the profession of hairdressers such as AIDS, hepatitis, trachoma, tetanus and tetanus was at an average level. 85% of them knew that AIDS and hepatitis are contagious, and 95% believed that hairdressing tools can cause the transmission of AIDS and hepatitis diseases. The findings of the research about the educational status of the society under our study show the low educational level of hairdressers, such that 75% of hairdressers have a diploma or lower education. The results of the research indicate that only 65% of people believe in the constant use of appropriate work clothes in the workplace. 75% of hairdressers had a health card. 65% of hairdressers used bright colored aprons for customers. Only 20% of hairdressers had more than 20 years of experience. According to the results and findings, the situation of hairdressers is in a good state in terms of safety and health.

Conclusion: The lack of health awareness in relation to the job and the poor performance of hairdressers in this regard requires increasing the level of awareness, attitudes and health performance of hairdressers through training and retraining programs. Also, according to the results of this study, in terms of personal health, In some parameters, such as medical examination card and public health certificate and compliance with personal hygiene, more monitoring should be done by environmental health inspectors.

Keywords: Male hairdresser, Awareness, Attitude, Health, Safety

Measurement of heavy metals in suspended particles (PM10) in the air of Mashhad city

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Abstract

Introduction: In recent years, air pollution has become a serious environmental problem, especially in industrial and densely populated cities. One of the most important groups of atmospheric pollutants are heavy metals. Heavy metals are toxic to living organisms. and threatens human health and the environment. They are emitted from various sources such as industrial processes, combustion of fossil fuels, mines, waste burning, motor vehicles and other human activities. The purpose of this research was to measure heavy metals in suspended particles (PM_{10}) in the air of Mashhad in the winter of 1400.

method: To evaluate the ambient air quality of Mashhad city, suspended particles were collected in a station and analyzed for the content of heavy metals. The concentration of ten heavy metals (zinc, iron, copper, lead, aluminum, manganese, arsenic, nickel, chromium and cadmium) was estimated. In this study, the working method was implemented according to the standard of the US Environmental Protection Agency. Sampling using a high volume pump was chosen to collect samples from a residential and commercial area.

Results: According to the results, iron, chromium and zinc had the highest concentrations among the investigated metals. The amount of arsenic, nickel and manganese among the samples was insignificant. The element of iron with an average of 21.826 ng/m3 ranked first as the highest average concentration, and the element of arsenic with an average of 0.3011 ng/m had the lowest concentration. The average concentration of heavy metals in the air of Mashhad in the order of decreasing trend was Fe> Cr> Zn> Al> Cu> Mn> Pb> Ni> Cd>As.

Conclusion: The analysis of the results showed that among the effective factors in increasing the concentration of heavy metals in the studied area, we can refer to the traffic volume of gasoline and diesel vehicles, domestic natural gas and dust particles in the atmosphere.

Keywords: Air heavy metals, Suspended particles (PM10), High volume sampler, Mashhad city

Identification of Infectious Bacteria in Dental Units

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Abstract
Aim: The aim of this study was to determine the bacterial contamination of surfaces and water of dental units of dental units of dental office of Divanndareh City.
Materials & Methods: This cross-sectional descriptive study was conducted on the dental units dental units of dental office. Totally 80 samples were collected from different parts of the dental units. Total Staphylococcus aureus, Pseudomonas aeruginosa, Legionella pneumophila and Escherichia coli were counted before and after disinfection by Deconex.
Results: The results of this study showed that before and after disinfection, Staphylococcus aureus, Pseudomonas aeruginosa, and Coliforms were the most frequent bacteria in dental units (100%, 100%, 100%, respectively) There was no significant relationship between pre and post-disinfection in terms of Staphylococcus aureus and Pseudomonas aeruginosa for (p 24 >0.05). Furthermore, the statistical results indicated that all parts of the dental units were statically significant pre- and post-disinfection in term of Coliforms ($p < 0.05$).
Conclusion: It can be concluded that the rate of microbial pollution in water lines and surfaces of the dental units are high. Also, since a significant number of bacteria were identified after disinfection, it indicates the improper use of disinfectants.

Keywords: Dentistry, Legionella pneumophila, Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Bacteria, Contamination

Management of monkeypox virus in health systems with emphasis on the role of environmental health professionals

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Abstract

Due to the ongoing COVID-19 pandemic, the unexpected outbreak and global spread of monkeypox virus (MPXV) has attracted global attention. This virus was first identified in 1970 and in the past it was more common in Central and West Africa. As of April 2022, a large number of cases of MPXV have appeared worldwide in areas that are completely free of the common zoonotic reservoir. Monkey pox is usually a self-limiting infection with symptoms lasting 2 to 4 weeks and a mortality rate ranging from 0 to 11 percent. As of September 25, 2022, 75,885 confirmed cases of MPXV have been reported worldwide, the largest and most widespread MPXV epidemic outside of Africa. Therefore, it is necessary to take proactive measures including adopting new anti-MPXV strategies to control the spread of MPXV and prevent MPX epidemics. Moving forward, the focus on preparedness must include programs for infection prevention and control, diagnosis and management. Environmental health professionals have a unique role in the prevention and control of disasters, including emerging diseases. In this study, the role of environmental health professionals in the management of monkeypox virus in health systems was investigated. This study provides basic knowledge to prevent and control future outbreaks of this infection.

Keywords: Monkey pox, Preventive measures, Environmental health.

"Presence and absence of COVID-19 in the air around the rooms of acute corona patients in razi Hospital, Ahvaz"

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Abstract:
For the first time in December 2019 in Wuhan, China, a new coronavirus was reported to cause the respiratory disease outbreak, which spread rapidly throughout the world. Therefore, it is important that specialists in all fields are fully aware of the characteristics of this virus and the necessary measures to protect the health of medical staff and the general public. Hospital is one of the environments for the treatment of acute and emergency patients with the most traffic by patients and their companions and families. For this reason, it can be considered as one of the places where the indoor air may be infected with this virus and the virus can be found in the air of the rooms, corridors and halls of the hospital. Therefore, this study was conducted to identify and investigate the presence or absence of COVID-19 virus indoor air of Razi specialized and sub-specialized educational and medical hospital in Ahvaz, which is one of the most important hospitalization centers for COVID-19 in the southwestern region of Iran. In this study, 48 samples in two series of 24 samples were treated, once in the autumn and once in the spring from the ICU4 ward and its corridor COVID-19 patients. In the first period, which was conducted in the autumn, all samples were negative. In the sampling repetition section, which was conducted in spring, 2 samples were taken, one at a distance of 0.5 m from the patient and one sample in the corridor and in the part leading to the positive section. It is concluded that the virus can be airborne, especially when the central cooling devices (chillers) are on and the need for further investigation into the weight of the virus and the role of central chillers in the air movement of the virus is felt.
Keyword: COVID-19, airborne transmission, indoor air quality.

Evaluation of knowledge and attitudes of service personnel in Kangan Imam Khomeini Hospital, regarding of to food hygiene and safety in 2020

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Abstract

Background and Objective: Food hygiene and safety is one of the important principles in the prevention of human diseases that ensures the profitability of appropriate food and is an essential element in proper nutrition. This study aimed to determine the knowledge and attitude of service personnel in Kangan Imam Khomeini Hospital, concerning food hygiene and safety in 2020.

Materials and Methods: This descriptive cross-sectional study was conducted on 46 service personnel. Data were collected using a questionnaire containing questions about personal information, knowledge, and attitudes toward food hygiene and safety. Data were analyzed using SPSS software (V. 21) and the analysis of variance (ANOVA) test.

Results: The knowledge score of service personnel ranged from zero to 16, with a mean score of 8.39, indicating the average knowledge level of service personnel in this study. Moreover, weak, moderate, and good attitudes toward food hygiene and safety were observed among 41.3%, 7.3%, and 50% of the personnel.

Conclusion: The results of this study demonstrate that the service personnel's knowledge and attitude toward food hygiene and safety are at moderate and weak levels, respectively, at Kangan Imam Khomeini Hospital. It is, therefore, necessary to hold periodical classes and workshops to increase their knowledge and attitude in this regard.

Keywords: Evaluation, knowledge, attitude, food, Kangan

National and international environmental health challenges; fore sighting and ways to deal with, manage and control

Educational needs and knowledge required in the field of environmental health in Iran: Point of view of University professors

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Abstract

Trend of developments in the health system and medical education and other related sciences, including environmental health, is a universal challenge. Therefore, future study and providing preparedness to encounter difficult conditions is a necessity for the health system and also medical and health education. In this research, educational needs and knowledge required in the field of environmental health of Iran was studied form point of view of university professors. During the research, 78 respected professors of environmental health of the country participated and completed the questionnaire prepared to obtain their opinions. This questionnaire was prepared regarding the educational content of environmental health field using educational curricula. Based on the results, 69.3% of participants believe that the educational content of environmental health in Iran has fundamental differences with developed countries. 89.8% of respected professors believe that the aspects and conditions of environmental health in the country have significant differences compared to the past 40 years. Meantime, 96.2% of the respected professors of environmental health believe that the expected capabilities included in the educational curricula of different degree of environmental health should be revised. Also, 85.9% of participants agree that the monitoring of environmental pollutants affecting health is one of the most important environmental health topics. It should be determined that in the mentioned field, students receive what kind of training in different stages of education and whether these trainings are sufficient or not.

It is expected graduates of environmental health should be trained in such a way that they have the necessary ability to skilled in monitoring and exposure assessment. The challenge related to how to revise the educational content of environmental health in Iran should be examined in the form of expert meetings of the respected board of environmental health and a decision should be made in this regard. It is necessary to review the definition of environmental health and provide a new definition of it based on common indicators in developed countries, taking into account the environmental health conditions of the country.

Keywords: Environmental health, Education, Environmental pollution, University, Revision

Evaluation of the performance benefits of a water safety plan (WSP) implemented in Bostan Abad

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Abstract

One of the main ways of transmitting diseases is drinking water, so the safety of drinking water is an important issue for consumers, water suppliers, operators and health officials. Therefore, risk assessment and risk management approach for drinking water supply systems is a necessity. This study was conducted with the aim of identifying and semi-quantitative evaluation and prioritization of risks in the drinking water supply system of Bostan Abad city. In this article, the Water Safety Plan (WSP) method is used for risk assessment. In order to evaluate and document the key elements of WSP and identify the steps that need improvement, the quality assurance tool of the water safety plan (WSP-QA TOOL software) was used, and then based on the guide of the water safety plan from the World Health Organization and the International Association Water safety, WSP team formed. Then the water supply system of Bostan Abad city from the farthest point of the basin to the last consumption point was inspected and described with the cooperation of the team. The results of the risk assessment showed that the highest number of risks are in the water supply sources, distribution network and point of consumption, respectively. Also, the most vulnerable part of the system was identified as the disinfection unit and storage tanks due to biological and chemical contamination caused by equipment failure and improper preparation of chlorine solution. In a summary, it can be said that carrying out the necessary reforms can play an effective role in reducing the risk potential in times of crisis, which should be given serious attention by the water industry officials.

Keywords: Risk assessment, Water safety plan, Water supply system, Bostan Abad city

Evaluation of Water Quality of the Karun River in Ahvaz, Iran Based on Biological Indicators (Daphnia and Crustaceans)

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Abstract

Introduction: Given the fact that the Karun River, as the most important source of water supply in Khuzestan province, has recently been affected by various pollutants such as sewage, monitoring its water quality is a necessity. This study aimed to determine the water quality of the Karun River based on biological indicators (Daphnia-crustaceans).

Methods: In each season of year, water samples were obtained from three stations at three different points along the river. After measuring the physical and chemical parameters, the samples were left to settle for 24 hours in the laboratory. Then 1 cc of the sediment was placed on the slide in order to study the diversity and frequency of crustaceans. Data were analyzed using SPSS version 21.

Results: In the present study, the frequency and variety of crustacean species isolated from the samples decreased from the initial station of the river to the final station. In addition, 27 species of Protozoa were isolated from three stations, of which Daphnia and Rotifer species with an average of 2.166 and 4.833 and standard deviation of 1.984 and 5.166, respectively had the highest frequency compared to other species. The results of Pearson correlation showed that there is a direct and statistically significant relationship between dissolved oxygen (DO), Turbidity, Daphnia, and Rotifers.

Conclusion: Based on the results of this study, it can be stated that the entry of effluents into river water causes a significant reduction in water quality, which in turn reduces the diversity and frequency of crustaceans living in the water. This is possibly due to increase in sewage discharge from Ahvaz city to Karun River.

Keywords: Biological Indicators, Water Quality, Crustaceans, Daphnia, the Karun River

Investigating pollutants in perfumes and colognes and their health effects on the consumer: A systematic review study

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Abstract

Cosmetic products, especially perfumes and colognes, are widely used in various communities. However, the use of these products can have side effects on consumers. The purpose of this review was to study the pollutants in aromatic products and their effects on exposed individuals. For this purpose, keywords were determined and the search protocol was defined. The search was conducted in three databases: Scopus (230), PubMed (102), and Web of Science (230), and finally 37 related articles were selected after the screening process. The results showed that phthalates, aldehydes, parabens and aluminum-based salts are the most important contaminants in aromatic products that have side effects such as allergies, breast cancer, reproductive disorders, especially in males, skin allergies, nervous system damage and migraine headaches for consumers. The incidence of complications in people using these products depends on parameters such as age, sex, race, amount of substance consumed, duration of use and economic status, and according to the relationship between diseases such as cancer, respiratory disorders and endocrine with common contaminants in aromatic products are likely to cause these diseases in consumers, which requires further research to prove.

Keywords: Prfume, Aromatic products, Health effects, Allergies

Investigating the impact of implementing physical space standards on environmental health indicators in central sterile supply department, reducing costs and hospital productivity

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Abstract

Hospitals as one of the medical centers providing quality and safe diagnostic-therapeutic services to patients and clients. The process of cleaning, disinfecting and sterilizing of reusable medical instruments, which is carried out in the central sterile supply unit(CSSD), is one of the most important services related to patient safety. To meet quality assurance of services in this unit, implementation of environmental health standards is necessary. One of the most important standards that facilitate other current processes in this unit is the physical space standards. The importance of which has diminished due to various reasons, including economic issues, the lack of a participatory management approach in the hospital design. The aim of this study is to investigate the impact of the implementation of physical space standards on environmental health and economic indicators in CSSD.

In this study, the level of compliance with health standards in CSSD was evaluated by the environmental health assessment checklist. Analysis of the existing situation, determining the solution/corrective action was done with the tool of analysis of systems and methods, then an improvement plan was developed. After planning and implementing changes in the structure of the physical space of CSSD, the impact of these measures on the environmental health index of CSSD was re-examined.

In this research, it was found that the main reason for the low health index of the central sterilization unit is the failure to comply with the standards of the physical structure and the one-way path from the dirty area to the clean and finally sterile area. By upgrading the physical structure of this unit, in addition to improving the environmental health index of the central sterilization unit by 27.5%, it has improved the implementation of current processes and reduced department costs and increased productivity.

The implementation of physical space standards, contrary to the need for financial resources in the short term, has a significant impact on improving the environmental health status of hospitals. Due to the creation of the required infrastructure in order to facilitate and accelerate current processes, it reduces costs, manages financial resources and increases productivity in the organization.

Keywords: Physical space standards, Environmental health, Central sterile supply department, Hospital productivity

Review of Article 11 of the Law on Food, Beverage, Cosmetics, Hygiene (protein product) in Babol supermarkets and super-proteins

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Abstract:

Background and purpose: Nowadays, the desire to use packaged protein products such as sausages and salami has increased and due to the ease of cooking is consumed by households and especially young people, considering that the products produced in factories and companies should be in accordance with the items contained in of the Food, Beverage, Cosmetic and Hygienic Law and the possibility of defect of this substance by factories and companies. There are manufacturers. The aim of this study was to determine the implementation status of Article 11 of the Food, Beverage, Cosmetic and Hygienic Law (Protein Products) in the products supplied in supermarkets and supermarkets in Babol.

Materials and Methods: In this cross-sectional descriptive study, samples were taken randomly from products in 20suparmarkets and 3 super proteins in Babol. By referring to supermarkets and proteins, the products were photographed and the hygienic license number of the product (if available) was entered on the www.fdacrn.ir site, and the matching of the specifications on the product with the specifications on the site was investigated. Also, statistical reviews have been conducted in this regard.

Results: The study showed that of all protein products, 100 percentage of the products had the name of the product on them. 97.14 percentage of the products have a health license number, 83.8 percentage of them are in accordance with the site and 66.67 percentage of the license numbers have a valid date. 91.42 percentage of all protein products of ingredients are listed on them. Production date is listed on 69.52 percentage of protein products, which is the lowest percentage of sausages with 39.58 percentage, and the date of production on salami is 90.62 percentage, and on all kebabs and Hamburgers have been produced.

Discussion and Conclusion: Considering that no research has been conducted on this subject in Iran so far, it is not comparable to the study of others. However, since the health status of foodstuffs is directly related to the health of the consumer, the custodians of the affairs, which are the deputy of food and drug in the medical universities of the country, should observe all the points related to it, taking into account Article 11 of the Food, Beverage, Cosmetic and Hygienic Law. Studies conducted in Babol city showed that the status of protein products in terms of the name of the product is the most consistent with Article 11 of the Food, Beverage, Cosmetic and Hygienic Law and has the lowest conformity with Article 11 of the Food, Beverage, Cosmetic and Hygienic Law. Among protein products, the lowest conformity is related to sausage.

Keywords: Sausage, Salami, Hamburger, Protein products

The effect of air pollutants on increasing the risk of gastrointestinal diseases

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Abstract

The WHO has named air pollution as the single greatest environmental health hazard that causes 7 million premature deaths annually. This pollution is a mixture of suspended particles and gases whose concentration has reached such a level that they threaten human health. Factors of interest in this field are particles with micrometer diameters, tropospheric ozone, sulfur dioxide, nitrogen dioxide and carbon monoxide. The purpose this study was the evaluation the significant relationship between exposure to air pollutants and digestive problems. Databases used to for searched were the PubMed, Magiran, Web of Science, and Google Scholar. Identify all relevant studies published 1990-2021.

Globally, ecological studies have shown a positive association between short-term exposure to air pollution and several gastrointestinal diseases from inflammatory bowel disease, nonspecific abdominal pain in young adults, gastrointestinal cancers, and gastrointestinal disorders. In addition, a positive association between long-term exposure to $PM_{2.5}$ air pollution and hospitalization for peptic ulcer disease has been reported. Stomach cancers, colon cancer and digestive system problems play an important role in increasing public diseases worldwide, however, most studies have focused mainly on respiratory tract diseases. Considering the importance of the impact of air pollutants on human health, the digestive system and causing diseases such as stomach and intestinal cancer and exacerbation of digestive diseases. The results of this research help politicians make comprehensive decisions to solve the problem, people who are exposed to pollutants and increase public awareness of the use of protective equipment.

Keywords: Digestive System, Stomach, Gastric Cancer, Air Pollution, Particulate Matter

Investigating the Challenges and Facilitators of Corona Virus Prevention by Environmental Health Experts and Experts in Food Preparation and Distribution Centers: Qualitative Study

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Abstract

Background and purpose: The prevalence of Covid-19 disease has spread worldwide and has a high mortality rate.The present study examines the challenges and facilitators of coronavirus prevention from the perspective of environmental health experts and experts in food preparation and distribution centers in 1400.

Materials and Methods: The present study was a descriptive-analytical qualitative study. Target-based data collection was saturated with 22 samples. The data collection method was a semi-structured interview with environmental health experts and technicians with open-ended questions to data saturation. The data were provided to professors and specialists by recording and recording data, coding and re-interviewing text, and were reviewed, and content analysis was finalized and analyzed.

Findings: of the present study in the challenges section included 5 main components (economic problems, educational poverty, manpower, non-implementation of Article 13 of the Judiciary and lack of resources) and in the facilitators section included 4 main components and 45 sub-components that studies showed. (Removing economic barriers, repeated training, providing the necessary resources to enforce the law and dealing with offenders) have been appropriate facilitators in preventing the corona virus.

Conclusion: Considering the existing challenges and the scope of Covid 19, strengthening facilitators including continuing education and creating participatory awareness, intensifying monitoring, empowering health ambassadors, strong legal support in dealing with violators, vaccination of the target group over 12 years .... And the promotion of virtual shopping and commerce can help dramatically and be used by policymakers and planners in the field of health and managers.

.**Keywords**: Health Protocols ، Corona Virus 19 ، Environmental Health ، Food Preparation and Distribution Centers

A review of microplastics pollution in freshwater systems in Iran

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Abstract

Introduction: Contamination of freshwater systems with microplastics is a concern. Accumulating microplastics in freshwater systems can pose severe challenges to the quality of the country's water resources and aquatic life, and as a result, human health. Therefore, the present study was conducted to obtain an overview of the status of studies conducted in this field in Iran.

method: In this study, review of sources by searching in SCOPUS, SCIENCE DIRECT, ISC, and SID databases with keywords "plastic", "plastic debris", "microplastic", "Freshwater", "River", " Surface water", "Reservoir", "IRAN". their Farsi equivalents were "plastic", "plastic waste", "microplastic", "freshwater", "river", "surface water", "reservoir", "Iran."

Results: Most of the research has been done on seawater pollution with microplastics. However, limited information indicates the contamination of freshwater with microplastics, which has a very heterogeneous distribution. The degree of microplastic pollution in freshwater is not lower than in the oceans. Microplastics exist not only in natural freshwater systems of all continents of the world (such as rivers and lakes) but also in artificial freshwater systems (such as reservoirs, drinking water treatment plants, and sewage). The different spatial and temporal distribution of microplastics makes it challenging to obtain the exact amount of microplastics in the environment. Therefore, in recent years, studies in this field have been conducted in different countries and are expanding. In Iran, four articles have been published about microplastics in the internal waters of Iran.

Conclusion: Examining the current situation regarding the contamination of microplastics in freshwater systems of Iran shows the lack of sufficient studies in this field. Therefore, conducting studies in this field and identifying the degree of contamination of Iran's freshwater systems with microplastics can provide management measures to control the current situation.

Keywords: Microplastic, Freshwater, Iran

Arsenic levels in human breast milk: A systematic review and meta-analysis

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Abstract

Exposure to toxic metals due to their stability, bioaccumulation, and high toxicity is one of the major global health concerns. These metals are transmitted to the fetus by maternal blood through the placenta, and exposure lasts throughout life. For the general population, exposure occurs primarily through the consumption of water and food, including breast milk. This systematic review presents the potential toxicity of arsenic (As) in breast milk, focusing on the potential risks to newborns and infants. Multiple keywords, such as “human milk” and “breast milk”, associated with “toxic metal”, “heavy metal” or “arsenic” were used to search in related databases. Of the articles found in the database, studies were eligible for qualitative review, and were included in the meta-analysis. The data showed that the lowest and highest levels of As were . ± . µg/L and . ± . µg/L, respectively. The overall pooled average concentration (% CI) of As in breast milk was . (% CI: ., .). The target hazard quotient (THQ) value of As greater than indicates a possible cause of adverse effects during infancy. The results showed that the infants were in a safe limit for cancer risk through consuming breast milk. Exposure to significant metals is completely related to disease development. Moreover, knowledge creation by mental acts and continuous observation are necessary and suggested to gauge heavy metal effects in future studies.

Keywords: Toxic metals, Arsenic, Breast milk, Exposure, Systematic review, Meta-analysis.

Investigating the legal aspects of irrigation of agricultural crops with effluents and wastewater from the perspective of threats to public health

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Abstract:

In recent years, countries have found irrigation of agricultural products using wastewater as an opportunity to increase agricultural production.Despite the benefits of water reuse, the scientific community raises several concerns for human health. Wastewater treatment plant effluents contain a wide range of organic chemicals. The remaining of such materials in the wastewater creates risks for human health and pollutes the surrounding soil and water sources. Therefore, crop irrigation must meet strict quality requirements to minimize health threats including cysts and heavy metals. While many guidelines for the use of wastewater have been successfully implemented at the international level, the question remains that, considering the current facilities of the treatment plants, what analysis does Iranian legal doctrine provide in the field of using wastewater in agriculture?

Article 688 of the Islamic Penal Code prohibits the unauthorized use of raw water and wastewater and considers it a threat to public health, and Article 114 of the Criminal Procedure Law also orders to prevent activities that are harmful to health. Considering that the courts believe in the theory of guilt regarding the crime of using wastewater in agriculture, and it is necessary to prove guilt during the laboratory confirmation process; Due to the impossibility of confiscation, the contaminated product is released to the market. Therefore, the purpose of this research is to explain the "absolute theory of the crime of using wastewater in agriculture" while expressing the necessity of extending the theories of risk and pure responsibility to actions that threaten public health. However, before this, Article 2 of the Environmental Health Regulations, from the Law of the Ministry of Health as a special law, gave the Ministry of Health the authority to take legal action "directly" after detecting threats. The research method in this research is in the field of descriptive-analytical research and using the library method in the form of scientific books and authoritative websites, in relation to the investigation of effective legal processes in the prevention of water and food-borne diseases as a challenging issue that in the past And now the health of the environment is threatened and endangered.

Keywords: Public health, sewage, agricultural products

Investigating the rate of infectious waste production per bed in Shahid Hashminejad Hospital of Mashhad before and after the covid-19 pandemic

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Abstract:

Among the serious challenges and consequences of the Covid-19 epidemic, there was a 300% increase in the production of medical waste, especially the increasing and increasing use of plastics in healthcare centers and the common systems that were designed for stable and normal conditions of waste management caused problems. As a simple comparison, in Spain, medical waste, which includes surgical gloves, face masks, etc., has been recorded by the Catalan Waste Agency, with a significant increase of 350% in mid-March 2020, compared to the same period in 2019. In Malaysia, this number has increased to 27%, in China to 213%, and in our country, Iran, waste production has increased to 17% (compared to the period between October 2018 and October 2019). The traces of this virus remain for four days on banknotes and glass and seven days on plastic, stainless steel and the outer layer of surgical masks COV2 is more persistent in hospital waste such as syringes, needles, and personal protective equipment (PPE) such as gloves and masks Therefore, any contact with these residues can play an increasing role in the transmission of the virus Considering the carrier of medical and hospital wastes, the management of these wastes is now of double importance, which should be paid more attention than before. Therefore, in order to fulfill the 50th principle of the Constitution of the Islamic Republic of Iran and in order to protect the country's environment from the harmful effects of waste and their optimal management, it is necessary for the executive management of normal and medical waste to take special measures and considerations from the production cycle to the final disposal of waste with seriousness and Care should be taken and actions should be prioritized. The current research is descriptive and analytical. This research is applied in terms of research purpose. To collect information in this research, library, documentary and survey methods have been used.

Keywords: Waste increase, Waste management, Covid-19 crisis

Sciences and technologies for prevention, management, treatment and control of environmental pollutants

Bio-fabrication of nanoparticles (NPs): An emerging approach for the sustainable developments

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Abstract

In the global context, the use of hazardous chemicals in various formulations for the development of products causes environmental pollution. In various fields, nanoscience and nanotechnology occupy their place by replacing bulk materials with nanoparticles (NPs), e.g., nanofertilizers, nanofungicides, nanopesticides, and other nanoagrochemicals for agricultural application. There are several chemical and physical methods reported for the fabrication of NPs that use toxic chemicals and are laborious, expensive, time-consuming, and hazardous. As the applications of NPs have been enormously increasing in various sectors, such as agriculture, health care/pharmaceuticals (medical), electronics, and electrical, biotechnology, chemical, computers/data storage, recreation/sports, telecommunication, transportation, construction, energy, aerospace/defense, as well as environmental, water, and soil remediation, The versatile characteristics of NPs, linked with their surface-to-volume ratio and physicochemical properties, make them special.

The biological synthesis of NPs by using these bioresources is a green approach. The application of extracts of these biological agents with the sources of biomolecules like proteins, amino acids, carboxylic acids, and others in the reduction, capping, and stabilization of NPs makes them biocompatible, biodegradable, and environmentally friendly. Furthermore, the biological synthesis process is relatively quick, uses fewer toxic chemicals, and is economically viable. As biogenically synthesized NPs are green and ecofriendly, they could be employed in the formulation of different nano-based products.

Bio-fabrication of nanoparticles could be an emerging approach for sustainable developments. In this context, we proposed some examples of nanotechnology occurring in nature that could be helpful in eco-friendly, sustainable developments.

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Role of Green Synthesized Nanomaterials to Improve the Soil Health

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Abstract

Global concerns such as soil deterioration, pollution, and loss of soil productivity caused by industrialization and intensive agriculture represent a severe threat to agricultural production sustainability. Numerous technological innovations have been used to clean up soil or increase the productivity of degraded soils, but they have not been successful in restoring or improving soil health to desired levels, due to cost, impossibility in a realistic environment, or, to a lesser extent, labor consumption. Recent breakthroughs in nanotechnology promise to increase soil quality indices and crop yields while ensuring environmental sustainability. The addition of nanoparticles to soils could manipulate rhizospheric microbes or agriculturally important microbes and enhance their functionality to increase the effectiveness with which nutrients are used by plants, facilitate the availability of nutrients to plants, and improve root systems and crop growth in general. The perspective on the concerns and environmental fate of nanoparticle application in soils are also presented. The evaluation of nanotechnological approaches could be helpful in exploring insights realistic application of nanoparticles in soil health improvement.

Keywords: Nanotechnology; Food-security; Microbes; Salinity; Sustainable agriculture.

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Synthesis of titanium dioxide microspheres modified with silver for the degradation of Eriochrome Black T

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Abstract

This work reports the study of the influence of silver dopant on the photoactivity of TiO_2 microparticles. Eriochrome Black T (EBT), an azo dye, was used as model contaminant to evaluate the photocatalytic activity of the silver-doped TiO_2 under artificial solar light. The synthesis of silver-doped TiO_2 (Ag-TiO_2), with silver contents of 0.25, 0.5 and 1.0 at%Ag, was achieved by the sol-gel/solvothermal method. The catalysts were characterized by scanning electron microscopy, X-ray diffraction, diffuse reflectance and BET surface area. EBT photocatalytic degradation was followed by measuring the color removal, total organic carbon (TOC) and chemical oxygen demand (COD). All the synthesized catalysts showed a spherical morphology with an average particle size of 6.1 to 7.2 µm composed of anatase crystalline phase, in which the silver dopant did not modify the crystalline phase. The bandgap energy of Ag-TiO_2 catalysts decreased with increasing silver content in TiO_2. Furthermore, Ag-TiO_2 catalysts showed a higher surface area than the TiO_2 catalyst, where 0.25at%Ag-TiO_2 exhibited the highest value (166 m^2/g). The 0.5at%Ag-TiO_2 catalyst improved the photoactivity of TiO_2, achieving 82% color removal, 36% mineralization by TOC reduction, and 65% COD decrease during the photocatalytic oxidation of EBT at 180 min.

Keywords: TiO_2, Microspheres, Silver, Photocatalysts, Eriochrome Black T

Metal-Organic Frameworks as effective Zn^{2+} sorbents for soil remediation

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Abstract
The processes of nature self-healing and self-purification can no longer cope with pollutants entering it, which from the atmosphere and the aquatic environment pass into the soil and accumulate in it. One of the most dangerous pollutants are heavy metals ions. They are able to accumulate in plant tissues. Food products derived from such contaminated plants are toxic to humans. As a result, significant portions of the crop may become unsuitable for further processing. Together with a growing human population, and therefore food consumption, this can become a serious problem. Therefore, the search for new technologies for soil remediation is becoming an increasingly immediate task. One of the most promising ways to remove heavy metals from soils is the use of nanoparticles of metal-organic frameworks (MOF) as sorbents. The porous structure, high specific surface areas, excellent sorption properties, and high thermal and chemical stability of frameworks make them ideal candidates. In our work, we synthesized different types of MOF such as MOF-801, ZIF-8, MIL-88a, MIL-100, UiO-66, UiO-66-BA, UiO-66-NH2 and UiO-66-NH2-BA (where BA – benzoic acid) and studied sorption of zinc ions at various Zn^{2+} concentrations. Based on the experiments performed for the sorption of low zinc concentrations (0.005 mol/L), UiO-66-NH2-BA and MIL-88a turned out to be the most optimal structures. However, an increase in the zinc concentration to 0.02 mol/L led to an increase in the sorption activity of UiO-66, UiO-66-BA, UiO-66-NH2 and MOF-801. In the most concentrated zinc salt solution (0.06 mol/L), MIL-88a showed the maximum sorption capacity. It is well known that the sorption capacity of MOFs is determined by their porosity and specific surface area, the presence of crystal structure defects (benzoic acid in UiO-66 structure), and the presence of certain functional groups capable of coordinating metal ions, for example, -NH2 groups. This study also reveals a great influence of the concentration of zinc ions on the MOFs sorption capacity. The obtained data will make it possible to accurately select the type of MOF to achieve the maximum sorption efficiency at specific zinc concentrations.
The study was supported by the Russian Science Foundation (project No. 22-76-10054) at the Southern Federal University.

Keywords: Metal-Organic Frameworks, soil remediation, zinc ions sorption.

A combination of membrane processes for advanced treatment and wastewater reuse: A case study in industrial state wastewater treatment plant

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Abstract

Lack of water around the world requires efficient technologies to reuse water. Membrane processes are one of the competent methods for purification, but fouling is its biggest disadvantage. This study was conducted with the aim of determining the location of the ozonation system in order to improve the performance of membranes and advanced wastewater treatment in the industry and its reuse.

The performance of the pilot system consisting of chemical purification including coagulation, flocculation and sedimentation (Coag. /Floc. /Sed.), sand filtration (SF), ultrafiltration (UF), activated carbon (AC) and reverse osmosis (RO) was investigated with and without ozonation at three different points. Ozone injection was done at three points before chemical treatment, UF and RO respectively, with a concentration of 24 mg/L and a reaction time of 30 minutes. UV_{254}, COD, TOC, TSS, TDS, pH, TC, SDI, TMP and turbidity parameters were measured from points in the pilot, and ozone efficiency was evaluated.

The average efficiency of organic load removal based on UV_{254} index, in three stages with ozonation was 60, 70 and 74% respectively, and for the stage without ozonation it was equal to 24.7%. The removal of COD in the above steps was 63, 76 and 53%, respectively, and for the step without ozonation, it was 61%. The remaining organic substances based on the UV_{254} index entering the UF and RO membrane systems were 0.125, 0.080 and 0.198 cm^{-1}, respectively, which compared to the free ozone condition that was equal to 0.251 cm^{-1}, is desirable.

The results of this study showed the high efficiency of using the combined system of ozone-membrane process compared to the case without ozone, and taking into account the index of TOC, SDI, TDS and turbidity of the RO output, respectively, equal to 0.746 mg/l. 1.02, 21 mg/l and NTU 0.23 and microbial load removal in the ozonation stage before UF, approximately 58%, showed the superiority of ozone injection in this condition

compared to the other two ozone system installation. Therefore, the use of ozonation system protects the membrane system and improves its performance.

A combination of membrane processes for advanced treatment and wastewater reuse: A case study in industrial state wastewater treatment plant

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Abstract

Lack of water around the world requires efficient technologies to reuse water. Membrane processes are one of the competent methods for purification, but fouling is its biggest disadvantage. This study was conducted with the aim of determining the location of the ozonation system in order to improve the performance of membranes and advanced wastewater treatment in the industry and its reuse.

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compared to the other two ozone system installation. Therefore, the use of ozonation system protects the membrane system and improves its performance.

Keywords: Ozone, Membrane processes, Adv

Low-Cost On-Site Grey Water Treatment Using Sand Filtration for Household Appliance

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Abstract

The increasing population and the lack of available freshwater resources, along with the decrease in the quality of the available resources and the increase in demand, give a reason for concern and the need for appropriate water management practices. Treated gray water would provide a more sustainable water supply for uses such as flush tanks and green space irrigation that can reduce the input load to sewage treatment plants and transportation costs. Based on this, the present study aims to achieve a simple, cost-effective method for gray water treatment, which, in addition to being an on-site treatment, can be easily implemented even in rural and small municipalities not connected to central wastewater treatment. The study started for two consecutive months, from September to November 2021, in Bukan, West Azarbaijan, Iran. The grey water enters a primary sedimentation tank with a hydraulic retention time of 2h and then enters the sand filter with a hydraulic loading rate of 85.5 $l/m^2.d$ and the organic loading rate of 6.53g$BOD_5/m^2.d$. Based on the results, the primary sedimentation tank cannot reach the standards required for effluent reuse in agriculture and irrigation. Therefore, it needs another supplementary treatment. The sand filter effluent values show that the amount of TSS, pH, COD, BOD_5, TKN, and phosphate reached less than the permissible limit. The grey water quality parameters, including TSS, COD, BOD_5, TKN, phosphate, and anionic surfactants, showed contaminant load reduction by 62.70, 23.18, 40.02,16.80, 24.50 and 40.30%, respectively, at primary sedimentation. These values for the sand filter were 73.40, 78.19, 47.62,26.50, 38.60, and 30.36%, respectively. The total efficiency rate of TSS, COD, BOD_5, TKN, phosphate, and anionic surfactants were 90.10, 83.40, 69.28, 38.80, 53.70, and 58.16%, respectively, which shows the high efficiency of sand filtration for grey water treatment. In

general, from the results of the present study, gray water has a promising potential as an alternative source of irrigation water or for feeding underground aquifers.

Tetracycline adsorption by a novel eco-friendly Nanomagnetic adsorbent Fe_3O_4@Methylcellulose/APTMS

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Abstract

In the current study, we synthesized and investigated the adsorption behaviors of Fe_3O_4@Methylcellulose/3-Aminopropyltrimethoxysilane (Fe_3O_4@MC/APTMS) as a new magnetic nano-biocomposite by a simple, fast, and new microwave-assisted method for tetracycline (TC) adsorption from aqueous solutions. Fe_3O_4@MC/APTMS was characterized by Fourier transform-infrared (FTIR), Field emission scanning electron microscopy (FESEM), Energy dispersive spectroscopy (EDS), Mapping, X-ray diffraction (XRD), Thermal gravimetric analysis (TGA), Brunauer–Emmett–Teller (BET) and vibrating sample magnetometer (VSM). The point of zero charge (pH_{zpc}) value of the nano-biocomposite was estimated to be 6.8 by the solid addition method. Optimum conditions were obtained in TC concentration: 10 mg L^{-1}, adsorbent dosage: 80 mg L^{-1}, contact time: 90 min, and solution pH: 6, with the maximum TC removal of 90% and 65.41% in synthetic and real samples, respectively. The *pseudo*-second order kinetic and Langmuir isotherm models were optimum fitting models. Based on the values of entropy changes (ΔS) (50.04 J/mol k), the enthalpy changes (ΔH) (9.26 kJ/mol), and the negative Gibbs free energy changes (ΔG), the adsorption process was endothermic, random, and spontaneous. The synthesized adsorbent exhibited excellent properties, including high removal efficiency of TC, proper reusability, and simple separation from aqueous media by a magnet. Therefore, it is highly desirable that Fe_3O_4@MC/APTMS magnetic nano-biocomposite could be used as a promising adsorbent for TC adsorption from aqueous solutions.

Keywords:Adsorption, 3-Aminopropyltrimethoxysilane, Methylcellulose, Tetracycline, Magnetic nano-biocomposite

Adsorption of Diazinon from Water Using Organo-bentonite

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Abstract

Introduction and purpose: Increasing the use of pesticides causes contamination of water resources and has severe effects on living organisms. Diazinon is among the pesticides that are widely used to kill insects in agricultural fields.The aim of this study was to determine the adsorption of diazinon from water by bentonite modified with cationic surfactant benzyl-trimethyl-ammonium chloride (BTMA).

Methods : Bentonite was modified by impregnation with a certain amount of cationic surfactant benzyl-trimethyl-ammonium chloride (BTMA). The amount of BTMA used to modify kaolinite was equal to the cation exchange capacity (CEC) of kaolinite (9.39 meq/100g). Characteristics of the Modified Bentonite (MB) were determined using fourier transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD), scanning electron microscope (SEM). The effect of different parameters such as the amount of adsorbent, contact time, pH, initial concentration of diazinon were studied in batch experiments in order to obtain optimal conditions for the adsorption process. Isotherm, kinetic and equations of adsorption were investigated. Concentration of diazinon was measured by High Performance Liquid Chromatography(HPLC).

Results: The highest adsorption efficiency was obtained at pH=3, contact time of 20 minutes for modified bentonite. The results showed that adsorption process followed pseudo-second order kinetics and equations data followed Freundlich isotherms model. The maximum absorption of 98.7% was obtained on 1 g/100 ml of modified bentonite, pH = 3, and diazinon concentration of 5 mg/l. The maximum amount of desorption at pH = 3 in 30 minutes was obtained by 57.5%.

Conclusion: The results showed that modified bentonite can be used as adsorbent for removing diazinon from water.

Keywords*:* diazinon, organo-bentonite, water, adsorption

Removal of the antibiotic metronidazole by adsorption on $CoFe_2O_4$@CMC/HZSM-5 as a magnetic nanohybrid adsorbent from simulated wastewater

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Abstract

The aim of this research was the synthesis of $CoFe_2O_4$@CMC/HZSM-5 in green conditions as a new nanomagnetic adsorbent for metronidazole (MNZ) removal from the aqueous media. The physicochemical structure of the adsorbent was characterized by various techniques. After that, in the adsorption process under the optimal conditions including pH 6, temperature 20 ºC, MNZ concentration of 50 mg/L, contact time 60 min, and adsorbent dose 2 g/L, the synthetic and real samples removal efficiency was obtained 94% and 85%, respectively. The adsorption experiments were fitted with the Freundlich isotherm and *pseudo*-second-order kinetic. The values of entropy changes (ΔS=46 J/mol.k), enthalpy changes (ΔH=9.33 kJ/mol), and negative Gibbs free energy changes (ΔG) showed that the adsorption process was endothermic, random, and spontaneous and had a physical mechanism. In addition, the findings showed that after the nanosorbent recovery, the adsorbent chemical structure did not change and the efficiency decreased to 86% after six runs. $CoFe_2O_4$@CMC/HZSM-5 magnetic nanocomposite had effective adsorption capacity for MNZ removal.

Keywords: Nanomagnetic adsorbent, Biopolymer, Carboxymethylcellulose, Metronidazole

Adsorption of Diazinon from Water Using Organo-Kaolinite

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Abstract

Importance and Aim: Diazinon is widely used in agricultural fields. Diazinon is relatively soluble in water and is easily washed by water and it reaches the aquatic environment and the residues of this pesticide are found in ground water and rivers. The aim of this study was to determine the adsorption of diazinon from water by kaolinite modified by cationic surfactant benzyl-trimethyl-ammonium chloride (BTMA).

Methods: Kaolinite was modified by impregnation with a certain amount of cationic surfactant benzyl-trimethyl-ammonium chloride (BTMA). The amount of BTMA used to modify kaolinite was equal to the cation exchange capacity (CEC) of kaolinite (9.39 meq/100g). Characteristics of the Modified Kaolinite (MK) were determined using fourier transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD), scanning electron microscope (SEM). The effect of different parameters such as the amount of adsorbent, contact time, pH, initial concentration of diazinon were studied through batch method in order to obtain optimal conditions for the adsorption process. Isotherm, kinetic and equations of adsorption were investigated. Concentration of diazinon was measured by High Performance Liquid Chromatography(HPLC).

Results: The highest adsorption efficiency was obtained at pH=3, contact time of 30 minutes for organo-modified kaolinite. Adsorption process followed pseudo-second order kinetics and equations data followed Langmuir isotherms model. The maximum adsorption of 99% was obtained on 10 g/L of modified Kaolinite, pH = 3, and diazinon concentration of 5 mg/L.

Conclusion: Kaolinite modified by cationic surfactant benzyl-trimethyl-ammonium chloride can be a suitable adsorbent for removing diazinon from water.

Keywords*:* diazinon, adsorption, water, organo-kaolinite

Removal of organic substances and heavy metals from urban sewage sludge using phytoremediation process

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Abstract

One of the efficient methods in purifying sanitary sewage, is using the phytoremediation process. In this study, in order to study of the urban sewage sludge ability to be treated by plants, the pots of Echinochloa crusgall, Hibiscus cannabinus were used in the space of the treatment plant of Kermanshah city. After loading the pots with 45 cm thick sludge, combined sampling operation was done at regular intervals once a week at 5, 15 and 30 cm depths of the bed. The parameters of pH, electrical conductivity, total organic carbon and heavy metals (lead and cadmium) were measured. Based on the experiments, the investigated plants had the ability to remove heavy metals and reduce organic matter from sludge. With the passage of time of plant maturation, increase in electrical conductivity and decrease pH, the removal efficiency of sludge pollutants also increased. Therefore, this method can be used as a suitable option to remove organic and heavy metals from urban sewage sludge.

Keywords: Phytoremediation, Sewage sludge, Heavy Metal

Removal of petroleum hydrocarbon from water by co-culture of azolla and bacteria

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Abstract

Background and aim: Removing low concentrations of petroleum hydrocarbons from water by physico-chemical methods has low cost-effectiveness. Research on the removal of low concentrations of TPH from water by biological methods has been considered. The aim of this study was to determine removal of TPH in concentrations up to1000 mgL^{-1} from water by co-culture of azolla and bacteria

Methods: Diesel fuel was used as a source of oil pollution in water. The bacteria were isolated from soil contaminated with diesel fuel. Experiments were carried out by contacting water contaminated with diesel fuel for 14 days in three separate conditions, including the use of Azolla plants, pure bacterial culture and combined Azolla and bacterial culture. Three concentrations of 100, 500 and 1000 mg/L of oil pollution in water were examined. The total amount of petroleum hydrocarbons (TPH) in the samples was analyzed according to ASTM method D 7066-04.

Results: By using azolla plant during 14 days of contact time, the removal of TPH from water was 76 and 62%, for 100 and 1000 ppm TPH respectively. For 1000 ppm of TPH and using pure bacterial culture during 14 days of contact, Pseudomonas showed the lowest removal with 37% and Alkaligenes faecalis had the highest removal with 52%. Regarding co-culture of Azolla and bacteria for concentration of 1000 ppm TPH, Pseudomonas and azolla showed the lowest removal of 80% and Alkaligenes faecalis and azolla showed the highest removal of 90%.

Conclusion: In this research, the use of bacteria along with Azolla plant in aquatic environment improved the removal of oil pollution. So it is possible to remove TPH from water By using the co-culture of azolla plant and bacteria.

Keywords: co-culture, azolla, bactria, oil pollution, water

The presence of microplastics in the atmosphere and their health and ecological effects

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Abstract

Studies on microplastics (MPs) indicate their presence in various environments. Recently, microplastics have been found in samples collected from the atmospheric fallout of some cities. This study provides an overview of the studies done on microplastics in the air and their effects on human health and their ecological risks. Although studies on microplastics in the atmosphere are limited, the research results show that synthetic textiles are the main source of microplastics in the air and fibers are the dominant form of microplastics in the atmosphere. Microplastics in the air, due to their small size can easily be inhaled, which causes health risks to humans, especially to industrial workers. Meteorological conditions and human activities affect the distribution and deposition of microplastics from the air. Knowledge and data about microplastics in the air are currently limited, so more studies are needed to identify the concentration of microplastics in the air, sources of MPs in the air, and factors involved in the distribution and deposition of MPs in the air. Pollutants adsorbed on microplastics in the air, and the exchange of MPs among different ecosystems are needed to gain a better understanding of microplastics.

Keywords: Microplastics, Atmosphere, Health effects, Ecological risks

Synthesis of porous date palm fiber-based activated carbon for Reactive Red 195 dye removal

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Abstract

Industrial dye-contaminated wastewater has been considered one of the most complex and dangerous wastewaters in terms of the nature and composition of toxicants. Reactive dyes are frequently applied in dyeing industries. Treatment of such colored wastewater is usually difficult due to the non-biodegradability of these dyes. In the last few decades, the adsorption process using conventional adsorbents has been considered one of the most convenient and efficient mechanisms to remove dye from wastewater. In this study, a porous adsorbent was synthesized from date palm fiber and was utilized for the removal of reactive red 195 (RR195) dye. The activated carbon obtained was characterized by Scanning Electron Microscopy (SEM) and Fourier Transform Infrared (FTIR). The different adsorption experiments were followed by varying the mass of adsorbent, the pH of the medium, the contact time, and the initial dye concentration. The adsorption results showed that the activated carbon prepared from date palm fiber has the highest RR195 dye removal efficiency of 78.72% at pH 3, adsorbent dose of 4 g/L in contact time of 90 min and initial dye concentration of 10 mg/L. The results showed that the pseudo–second–order kinetic model best represented the adsorption kinetics. The best fitting for RR195 experimental equilibrium data was achieved with the Freundlich isotherm. The maximal monolayer adsorption capability of 3.89 mg/g for the RR195 dye adsorption onto date palm fiber-based powder activated carbon was achieved. In general, this research showed that activated carbon prepared from date palm fiber has a high potential to be used as an effective adsorbent to remove RR195 dye.

Keywords: Adsorption process, Reactive red 195 dye, Activated carbon, Palm fibers

Synthesis and evaluation of the performance of multi-walled carbon nanotubes - CoFe2O4 nanoparticles as a magnetic composite for surface adsorption of Remazol Brilliant Blue R from synthetic wastewater: study of isotherms, kinetics and thermodynamics of the process

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Abstract:

Introduction: In the leading research, MWCNTs-CoFe2O4 magnetic nanocomposite was synthesized by co-precipitation method and used as an effective and efficient adsorbent for the successful removal of Remazol Brilliant Blue R (RBBR) dye, which is one of the widely used organic dyes in textile dyeing industries. Known, used.

Methodology: In order to identify and confirm the formation of nanocomposite absorber and study its magnetic properties, instrumental analysis methods were used. After identifying the magnetic nanocomposite adsorbent, the removal process of RBBR organic dye in the presence of this compound was optimized according to parameters of time, adsorbent dose, dye concentration, pH and temperature during experiments designed by One Factor at A Time (OFAT) method.

Results: The optimal values of each of these parameters were determined as 40min, 0.4g, 20mg.L-1, 3 and 298K respectively. The removal efficiency of RBBR dye in the presence of MWCNTs-CoFe2O4 nanocomposite under optimal conditions was almost 95%. Next, the obtained experimental data were matched with different Langmuir, Freundlich and Temkin isotherms, and the obtained results showed a very good compatibility of the data with the Langmuir isotherm (R2=0.9998). Conclusion: In this study, it was observed that the process follows pseudo-second order kinetics well. The regression coefficient (R2) as well as the pseudo second-order rate constant (K2) were calculated as 0.9995 and 0.0038 g.mg-1.min-1, respectively. The obtained results showed that the surface absorption of dyes is a heat-generating, spontaneous process and is associated with a reduction in the disorder of the system.

Keywords: adsorption, color removal, multi-walled nano carbon tube, magnetic adsorbent, Rimazol Brilliant Blue

Advanced oxidation processes for phthalate esters removal in aqueous solution: a systematic review

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Abstract

This study addresses a systematic review of the scientific literature to evaluate the most common advanced oxidation processes (AOP) for the removal of phthalate esters (PE) in aqueous matrices. Six AOP were reviewed for PE degradation such as processes based on photolysis, Fenton, ozonation and sulfate radicals ($SO_4^{\bullet-}$), combined AOP and other processes. The PE degradation efficiencies by AOP processes ranged from 40.3% to 100%. In the reviewed literature, an initial PE concentration within 0.04−250 mg/L was applied. The H_2O_2 concentrations used in the UV/H_2O_2 process and O_3 concentrations in ozonation-based processes ranged between 0.85−1360.6 mg/L and 2−4971 mg/L, respectively. Based on the reported results, the PE oxidation data fit well to the pseudo-first order kinetic model. A review of the studies revealed that many oxidant species are produced in the AOP, including hydroxyl radicals ($^{\bullet}OH$), $SO_4^{\bullet-}$, superoxide radical anions ($O_2^{-\bullet}$), hydroperoxyl radicals ($HO_2^{\bullet}$), hydrogen peroxide (H_2O_2), and singlet oxygen (O_2). Among these oxidants, $^{\bullet}OH$ play a key role in the degradation of PE. However, $SO_4^{\bullet-}$ are more effective and efficient than $^{\bullet}OH$ since $SO_4^{\bullet-}$ has a higher oxidation power (E = 2.5–3.1 V) compared to $^{\bullet}OH$ radicals (E = 1.8–2.7 V). In different AOP processes, the aromatic rings of PE are destroyed by $^{\bullet}OH$ and produce intermediates such as phthalic acid ($C_6H_4(CO_2H)_2$), benzoic acid ethyl ester ($C_9H_{10}O_2$), 2, 5-dihydroxybenzoic acid ($C_7H_6O_4$), formic acid (CH_2O_2), acetic acid (CH_3COOH), and oxalic acid ($C_2H_2O_4$), among some others. Until now, limited data have been reported on PE toxicity assessment. The reviewed literature has shown that AOP can be used effectively to degrade PE from aqueous matrices. However, this systematic study suggests focusing more on the evaluation of the toxicity of the effluent resulting from AOP for the decomposition of PE in future studies.

Keywords: Advanced oxidation process, Aqueous solution, Phthalate esters, Removal, Systematic review

Modeling of a Real Combined Industrial Wastewater Biological Treatment Process by Activated Sludge Models and Biokinetic coefficients Calculation

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Abstract

Treatment of combined industrial wastewater from Industrial parks is one of the most complex and difficult wastewater treatment processes. Also, the accuracy of biological models for the prediction of performance of these processes has not been sufficiently evaluated. Therefore, in this study, IAWQ Activated Sludge. Model No. 1 (ASM1) have been created for the Jey Industrial park wastewater treatment plant (IPWWTP), which implemented in STOAT software. The Jey IPWWTP process is a combination of anaerobic, aerobic biological processes involving upflow anaerobic baffled reactor (UABR), Integrated fixed-film activated sludge (IFAS) and Extended aeration (EA) processes. To evaluate the overall performance of IPWWTP processes, Biochemical Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD), Solution Chemical Oxygen Demand (sCOD), Total suspended solids (TSS), Volatile Suspended Solids (VSS), PO_4^{-3}-P, NO_3^{-1}-N, NH_4^{+}-N, Mixed liquor suspended solids (MLSS), Mixed-liquor volatile suspended solid (MLVSS), Sludge volume index (SVI), Return Sludge (RAS), attached biomass and much other parameters were measured during 6 months. Then the biokinetic coefficients of IPWWTP aerobics were determined using Monod equations. Finally, the aerobic processes (IFAS + EA) of IPWWTP were modeled using ASM1 implemented in STOAT software. Also, a comparison was made between the model prediction in the mode of default coefficients and conditions with the optimized conditions and coefficients, and the accuracy of the model in these two modes was compared. The values of the biokinetic coefficients were found to be as follows: K= 2.7d^-, Y = 0.34 mgVSS/mg COD, Ks = 133.36 mg /L COD, Kd = 0.03 d^- and µmax = 0.93 d^-. Investigations showed that the default coefficients and operation conditions of ASM1 model do not have good predictability for such complex wastewaters and the outputs show a low accuracy compared to experiments. While after calibrating the kinetic coefficients and operating conditions, the model forecast is upgraded to an acceptable level and the predictions showed a good agreement with the results of the experiments.

Keywords: Industrial wastewater, Biokinetic coefficient, Biological Modeling, Stoat software, Activated Sludge Model No. 1

Waste management in Iran during the coronavirus pandemic: challenges and solutions

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Abstract

The consumed masks are usually disposed with the other urban wastes. In some of the Iranian cities, above-ground bins are installed in the streets and the citizens put their wastes in these bins. As a result, above-ground bins have become a place for the growth of virus and other microorganisms. The present study aims to determine the technical requirements and the implementation costs of underground systems for collection of the household wastes in Karaj. The present research is a descriptive-analytical study investigating the waste collection systems of Karaj for six months. The research goal is to analyze and compare the current aboveground waste collection system of Chahrbandi Boulevard in Mehrshahr (Karaj) with the underground collection system in terms of the technical and economic aspects. The research stages include the following: referring to the Urban Service Department of Karaj Municipality to get the information of the bins located in Chahrbandi Boulevard, designing the underground waste collection system for Chahrbandi Boulevard, estimating the operational costs of the underground waste collection system, and comparing the current (aboveground) system with the underground system in terms of technical aspects. According to the results, in the aboveground waste collection system, the total costs of the initial investment are equal to 88615 US$, and the total costs of the ten-year operation period are equal to 257820 US$. In the underground waste collection system, the total costs of the initial investment are equal to 63362 US$, and the total costs of the ten-year operation period are equal to 204765 US$. The cost analysis suggests that both the initial investment cost and the ten-year operation cost of the underground waste collection system are lower than those of the aboveground system.

Keywords: underground collection, feasibility, technical, economic, Karaj

A review on the treatment of poultry slaughterhouse wastewater using anaerobic reactors

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Abstract:
Background: Poultry slaughterhouses consume a large volume of high-quality water for washing equipment and poultry processing, which results in the production of a high-strength wastewater. However, this wastewater can be treated using low-cost biological treatment methods. Therefore, the study aims to review the anaerobic wastewater treatment methods of poultry slaughterhouses.
Methods: Using the terms "poultry slaughterhouse", "wastewater" and "anaerobic methods" this study was carried out as a narrative review by searching databases associated with recognized medical and health journals such as Web of Science, PubMed, SID, and Google Scholar. Finally, 66 articles covering research on anaerobic methods for treating poultry wastewater in Iran and other countries were selected.
Results: Several studies have been conducted on the treatment of poultry slaughterhouses wastewater by an anaerobic method during the years 1999 and 2022, which revealed that the Down-flow expanded granular bed reactor achieved the highest levels of COD, BOD, and oil and grease removal, at 99.6, 99.9, and 99.4%, respectively. In contrast, the Up-flow anaerobic sludge blanket and Static granular bed reactor achieved the lowest levels of COD, BOD, and oil and grease removal.
Conclusion: This study showed that various reactors have been used in poultry slaughterhouse wastewater treatment. Among the methods used, the static granular bed reactor has been used more frequently, which can be the reason for this system's reliance on biogas mixing, which leads to the minimum need for a mixing system or recirculation system and reduces short circuits and dead zones in the reactor.

Keywords: poultry Slaughterhouse, Wastewater, Anaerobic method

Heterogeneous magnetic nanophotocatalysts in advanced photocatalytic oxidation process for the removal of pharmaceutical pollutants from aqueous media: A review

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Abstract

Introduction and aim: Medicines and antibiotics are one of the most important groups of emerging pollutants. These organic compounds enter water environments through many methods, and removing these compounds from water environments is very important. Advanced oxidation processes based on the production of active radicals such as superoxide or hydroxyl radicals in order to treat pollutants resistant to biological degradation such as antibiotics are effective processes. The aim of this research is to review the removal of pharmaceutical pollutants from aqueous environments during the advanced photocatalytic oxidation process using heterogeneous magnetic nano photocatalysts.

Methods: The current research is a review study on the removal of pharmaceutical compounds from aqueous environments during advanced photocatalytic oxidation process using heterogeneous magnetic nanophotocatalysts. This research was conducted by selecting articles in the period of 2017-2022 and searching in the information sources and databases of the Web of science, Scopus, PubMed, and Google scholar, using the keywords water, wastewater, treatment, photocatalyst, advanced oxidation process, and magnetic nanocomposite.

Discussion: Based on the research conducted, the advanced photocatalytic oxidation process with the help of heterogeneous magnetic nanocatalysts has been effective for the decomposition and destruction of pharmaceutical pollutants. The presence of oxidizing agents during the process and the use of elements with oxidation potential in the photocatalyst structure can increase efficiency in photocatalytic removal processes.

Conclusion: The use of these heterogeneous magnetic nano photocatalysts can be used in the future in water purification processes and wastewater contaminated with pharmaceutical compounds due to their high efficiency and easy operation in a short period of time.

Keywords: advanced oxidation process, water and wastewater, photocatalyst, magnetic nanocomposite

A review on the performance of various processes for microplastics removal from wastewater treatment plants

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Abstract

The presence of microplastics in the environment can have environmental and health effects and ultimately cause uncertain consequences for the health of aquatic organisms. Microplastics are widely used by humans in today's world. This issue results in the entrance of large volumes of this emerging pollutant to municipal wastewater treatment plants. Microplastics causes adverse consequences on the human's public health, therefore, reducing their use and application has become one of the most serious challenges of countries. This subject has also caused many warnings to be given about the unpleasant side effects of microplastics on human health and the ecosystem. On the other hand, the efficiency of different methods and technologies used in domestic wastewater treatment plants can play a significant role in reducing the amount of microplastics released into the environment. Various studies conducted around the world have presented different efficiencies in removing microplastics from municipal wastewater treatment plants. Different units including the membrane bioreactor (MBR) system showed an efficiency of 96.2% and the activated sludge system with the membrane bioreactor showed an efficiency of about 99%. The use of electrocoagulation unit also proved the removal efficiency equal to 97.5% and the advanced oxidation demonstrated 95% success in eliminating this emerging pollutant. Studies conducted in different parts of the world showed the acceptable efficiency of wastewater treatment plants in microplastics removal. Therefore, in this study, efficient methods of removing microplastics in wastewater treatment plants were investigated.

Keywords: Microplastics, Removal, Wastewater, Wastewater treatment plants.

Decontamination of infectious waste by ozonation method: feasibility and effectiveness study

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Abstract

Decontamination of infectious waste using methods with minimum health risks and environmental pollution is of great importance. The purpose of this study is to evaluate the feasibility of using ozone in decontamination of infectious waste in hospitals. In this study, Bacillus atrophaeus spore was used as a biological indicator and was placed inside the most central part of the bags containing infectious waste assuming the worst possible conditions for ozone penetration. The ozone generator was equipped with a constant dose of 5 grams per liter, with a discharge of 1 and 3 liters per minute, and a contact time of 10 to 120 minutes and in 3 modes 1) dry conditions, 2) separate infusion with water vapor into the contact tank and 3) injection into a glass column containing water and then transfer of ozone-containing bubbles into the contact tank. Then the ozone exposure indicators were incubated for 24-24 h at 36 ± 1°C and, finally, the absence of colony growth in the culture medium was considered as the success of ozone in disinfection of infectious wastes. In this study, the decontamination process was done with dry and wet ozone with 4 repetitions. The results were analyzed using descriptive and analytical statistical tests. The results showed that the highest efficiency of inactivation of Bacillus atrophaeus was achieved by dry gaseous ozonation at 80 min with a rate of one liter per minute. By increasing the ozone dose to 3 liters per minute, the deactivation time decreased, so that complete elimination efficiency was achieved in 15 minutes of contact time. The deactivation efficiency and complete elimination of the desired biological index in the process of wet ozone injection by glass column and wet ozone injection through separate injection of water vapor into the contact tank were obtained in 30 and 50 minutes, respectively. Based on the results of this study, the best conditions for risk-free infectious wastes were obtained in conditions of dry ozone depletion. Therefore, this process can be used as a practical and acceptable method for the risk-free disposal of infectious hospital wastes.

Keywords: Decontamination; Infectious waste; Ozonation; Biological index

Comparison of continuous and batch reactor efficiency of electrocoagulation process removing organic pollutant using iron electrodes

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Abstract

In recent decades, industrial wastewater treatment and reuse have become of great importance due to the presence of organic pollutants that have a detrimental effect on the environment. Furfural is one of the most important organic compounds in industrial wastewater, and treating effluents containing it is necessary. Therefore, the aim of this study was to remove furfural from aqueous solutions with two types of continuous and batch electrocoagulation reactors. The effects of various operating parameters such as initial furfural concentration (100, 200, and 400 mg/L), electric current intensity (0.5 to 2.5 A), solution pH (3, 7, and 11), and hydraulic retention time (5 to 180 min) in both types of reactors were studied. At low concentrations of pollutants, the efficiency of both processes at pH is 7 maximum and increases with increasing electric current intensity. Energy consumption also increases following the increase in the intensity of the electric current. In addition, as the reaction time increases, the furfural removal efficiency increases. Processes follow first-order kinetics. The rate of mineralization increased with increasing reaction time. The results of this study indicate the superiority of the batch reactor in furfural removal and the superiority of the continuous reactor in the rate of mineralization. These results can help to select the type of reactor for the treatment of furfural wastewater on a real scale.

Keywords: Electrocoagulation, Iron electrode, Continuous reactor, Batch reactor

Comparison of Polyferric Chloride and Polytitanium Chloride in the Treatment of Young and Old Municipal Solid Waste Leachate

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Abstract

Leachate is a dark liquid containing high organic matter, nitrogen and toxic metals and other pollutants that originates from waste landfills. Improper selection and use of landfill leachate can be potentially dangerous for human health and damage the environment. The present study compared the polytitanium chloride (PTC) and polyferric chloride (PFC) in removal of Pollutants from young and old solid waste leachate. Moreover, synthesis of PTC and PFC coagulants, field emission scanning electron microscopy (FESEM) images, energy-dispersive X-ray spectroscopy (EDX) analysis, Fourier transform infrared spectroscopy (FTIR) analysis of PTC and PFC coagulants and flocs characteristics were examined. At optimal coagulant doses (250 mg/L for PTC and 400 mg/L for PFC), PTC removal efficiencies in old leachate for COD, readily biodegradable COD (rbCOD), color, TSS, turbidity, and total Kjeldahl nitrogen (TKN) were 91.30%, 92.94%, 99.80%, 98.06%, 99.76%, and 98%, respectively and for PFC were 81.15%, 81.17%, 94.23%, 90.32%, 96.09%, and 94.28%, respectively. PTC removal efficiencies in young leachate for COD, rbCOD, color, TSS, turbidity, and TKN, were 71.08%, 80.30%, 70.45%, 83.07%, 88%, and 88.57%, respectively, and for PFC were 65.06%, 71.21%, 61.36%, 80.76%, 84%, and 83%, respectively. According to FESEM-EDX analysis, flocs resulting from PTC coagulant were larger in size and more compacted in structure compared to PFC flocs. The results of this study indicated that PTC had a higher efficiency than PFC; therefore, it can be used as a suitable option for solid waste leachate treatment, especially old leachate.

Keywords: Treatment, Flocculation, Waste Leachate, Polyferric Chloride, Polytitanium Chloride

Microbial inactivation and volatile organic compounds emission in low-heat thermal-based process of infectious health care waste treatment

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Abstract

One of the health and environmental problems of the country was hospital waste, which needs special management due to the potential for creating many health and environmental effects. Waste decontamination has done by various methods, and the use of low-temperature waste decontamination devices in the country's hospitals was increasing. There was also the possibility of producing volatile organic compounds (VOCs) from the exhaust air of these devices. Therefore, this study determined decontamination efficiency and VOC emission of sterilizer devices of four hospital in order to evaluate health and environmental impacts of them. The study has performed in hospitals equipped with sterilizer devices such as autoclave with shredder, autoclave without shredder, hydroclave and dry heating device. The decontamination efficiency of the devices were evaluated by mechanically, chemically and biologically indicators. To determination of air pollutant emission of devices, sampling has done according to 1501 NIOSH method using individual sampling pump and online analyzer (Phocheck device). The amount of health waste and the percentage of infectious waste in the studied hospitals were high and the hospital waste management statue were unfavorable. The results of chemical, microbial and mechanical monitoring of waste sterilizer devices in the relevant hospitals showed that the decontamination efficiency of the devices studied were 82% in terms of mechanical indicators and 100% in terms of chemical indicators. In addition, autoclave with shredder and hydroclave have the highest and autoclave without shredder has the lowest efficiency in decontamination of infectious waste. The evaluation of ammonia emitted from hydroclave were 0.1832 µg/m3 and 12960 µg/m3 before and after operation run. Based on the pollutant measurements, among the oxygenated and aromatic compounds, ethyl alcohol (7271.3 µg/m3) and ethyl benzene (2629.4 µg/m3) had the highest concentration. The highest VOCs emission was measured for hydroclave. The results of the study show the need to pay more attention to hospital waste management. Finally, it has found that more emphasis on the first stages of waste management, i.e. reducing production and proper separation of waste, is more effective in meeting the goal of decontamination of infectious waste and reducing the emission of air pollutants.

Review of Microplastic Removal Technologies in the Wastewater Treatment Plants

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Abstract

Microplastics are less than 5 mm in size, which affects human health after entering various environmental matrices such as soil, water, and air. Municipal wastewater contains a high amount of microplastics. Due to the emerging nature of these pollutants, the information about their removal techniques from wastewater is not enough. In this review article, the efficiency of the processes applied in wastewater treatment plants such as different methods of physical purification, chemical purification, and biological purification on the removal of Microplastics from the wastewater stream have been investigated and clarified. Membrane bioreactor (UF) physical removal technology and FeCl3 with PAM coagulation in chemical removal technology are the higher efficient in removing microplastics from the wastewater. The effectiveness of biological processes in removing or reducing microplastics is less than physical and chemical methods.

Keywords: Microplastic, Removal Methods, Wastewater, Wastewater Treatment Plan

Ventilation-H586, an end to hospital air pollutants

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Abstract

Almost all hospitals are equipped with air conditioning systems to provide a comfortable environment for patients and staff. However, the accumulation of dust and moisture in these systems increases the risk of transmission of microbes and in some cases is associated with the spread of infection. However, the effect of air conditioning on the transmission of microorganisms that lead to infection is largely unclear. Today, despite all kinds of antimicrobial substances and new and different sterilizing devices, the incidence of infections in the hospital is still at a high level. Every year, 2 to 4 million cases of hospital infection occur in the world, which leads to 20 to 80 thousand deaths. The cost of nosocomial infections in the United States is reported to be 4 to 5 billion dollars annually. It is also estimated that 10% of hospital infections are airborne and 16% of intensive care unit infections are the result of transmission of airborne pathogens. The benefits of hospital ventilation include preventing hospitalized patients from contracting other annoying infections, reducing the use of antibiotics, especially broad-spectrum antibiotics, maintaining the health of personnel, preventing additional costs for the hospital and society, and economic losses for the patient, the presence of fungi. And different bacteria in the air of the hospital make air purification and ventilation necessary. Therefore, we decided to solve these problems by making a device.

Ventilation-H586 is a ventilation device with unique features, including specialized filters for absorbing chemicals, a HEPA filter for the purpose of filtering small particles, equipped with an ultraviolet system to remove pathogenic microorganisms, with a Fluxtek HD-50 oxygen generator filter, a tank alcohol with the ability to adjust the amount of liquid distribution, design and construction of the channel network and separate filters to facilitate separation and cleaning, the ability to control the pressure of fire control elements such as extinguishing dampers with the help of the compressor, automatic adjustment in calculating the distribution of ambient air and the ability to control temperature, speed and Air humidity is optimal for patients, employees and visitors, which reduces the possibility of infection in the wards by 60% more than normal ventilation devices.

Evaluation of the phytoremediation potential of Azolla in water contaminated with polycyclic aromatic hydrocarbons (pyrene and phenanthrene)

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Abstract

Background and purpose: Aromatic organic hydrocarbons are a serious threat to the health of the environment and organisms. Considering the importance of the phytoremediation of pollutants in the environment, in this study, the potential of Azolla macrophyte in the absorption and accumulation of pyrene and phenanthrene has been investigated.

Material and methods: In this study, after harvesting Azolla macrophytes from a natural water reservoir and cultivating them in laboratory conditions by designing phytoremediation experiments, after 10 days of treating Azolla macrophytes with concentrations of 10 and 30 mg per litre of pyrene and phenanthrene, the amount of accumulation of these substances in Azolla, Side compounds created due to the decomposition of these substances in the plant tissue and culture environment and the effect of the desired compounds on the growth rate of the plant (fresh weight, dry weight, number of pigments and leaves) through the analysis of the desired substances with liquid chromatography (HPLC), Gas chromatography (GC-MS) and spectrophotometry were evaluated. Data analysis was done by ANOVA statistical analysis by SPSS version 25 software.

Results: The amount of accumulation in the examined samples from the tissue of Azolla at concentrations of 10 and 30 mg/L was 95% and 50% for pyrene and 75% and 40% for phenanthrene, respectively. 10 side compounds resulting from the decomposition of hydrocarbons the effect was detected in the plant tissue. Accumulation capacity, fresh weight, dry weight, and the number of pigments and leaves in the concentration of 10 mg of the treatment for Azolla were higher and there was a significant difference (PV<0.05).

Conclusion: Azolla has a high potential in the accumulation of pyrene and phenanthrene, and the treatment of water sources contaminated with aromatic organic hydrocarbons with Azolla macrophytes is an effective and environmentally friendly method.

Keywords: Azolla, Phytoremediation, Aromatic Hydrocarbons, Bioaccumulation

Evaluation of the effect of the ultrafiltration process on the efficiency of a portable drinking water purifier at home scale

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Abstract

Today, the provision of safe drinking water for areas where it is not possible to build a drinking water source and distribution network is one of the topics of concern for researchers in the field of drinking water. In this regard, the aim of this study is to evaluate the effect of the ultrafiltration process including the backwash system on the efficiency of the portable drinking water purifier at home scale. To purify water by the device, four filters were installed in it, which respectively included galvanized filter (50-micron pore size), polypropylene filter (5-micron size), granular activated carbon and ultrafiltration filter. One sample of raw water and 15 samples of purified water were analyzed in terms of the most common physical, chemical and microbial parameters, heavy metals (arsenic, lead, chromium and cadmium) as well as residual toxins (atrazine, alachlor and 2-4D). Then, the efficiency of the purification device was estimated for each of the examined parameters. The results of the present study showed that the efficiency of the investigated UF water purification device is very high and that the quality of purified water in terms of all physical, chemical and microbial parameters is in accordance with drinking water quality standards (1053 and 1011). The UF water purification device investigated in this study is very useful for providing drinking water in small communities, crisis and unusual conditions, economical and also has a high ability to produce drinking water in accordance with national and international standards.

Keywords: Drinking water, unusual conditions, domestic scale, ultrafiltration, backwashing

Evaluation biogas production of dry anaerobic digester in the treatment of combination disposal activated sludge and plant wastes

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Abstract

Introduction: Due to the increase in the consumption of fossil fuels in the world, as well as the increase in their costs and environmental effects, today the need and interest to replace them with renewable sources of energy has increased. One of the sources of renewable energy is biogas, and anaerobic digestion is one of the method of producing biogas from organic materials that is expanding over time. Also, waste production is a global issue today, and all the countries of the world, due to the numerous environmental problems caused by waste production, in addition to using various solutions, are still looking for suitable solutions for waste management, which can be a suitable source for the production of raw materials for the production of this energy be renewable. Some of the advantages of solid state anaerobic digestion include smaller reactor volume requirements, less energy for heating, and easier handling. In this research, anaerobic digestion of sewage sludge and plant residues was studied.

Method: The study was carried out in reactor in the laboratory. Sampling of produced gases was done on the 10th, 20th and 30th days of the process and GC gas chromatography was used to determine the volume percentage of biogas.

Results: The evaluation results showed that the parameters of temperature, pH, C/N, mixing, microbial active mass have a strong effect on system performance. The average volume of gas produced in the C/N ratio of 25 is the highest, and then the ratios of 20 and 30 are ranked second and third, respectively. Also, the results of anaerobic digestion showed that the average methane gas produced during the process is also the highest amount (2.52 liters) in the ratio of 25: C/N.

Conclusion: Based on the research, dry anaerobic digestion can be a suitable technology for waste treatment such as sewage sludge treatment and plant waste can be an efficient method. Therefore, this method can be used to manage various organic wastes as well as produce clean and renewable energy.

Evaluation of the efficiency of TiO2 / UV nano-photocatalytic process in the removal of humic&fluvic acids from aqueous solutions

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Abstract

Background and purpose: Removing natural organic substances from drinking water sources is necessary to prevent the formation of toxic and carcinogenic disinfection by-products. The use of a nano photocatalytic oxidation process to remove these substances is easier, faster, cheaper and more efficient than other methods. In this study, the efficiency of TiO2 / UV nano-photocatalytic process in the removal of humic&fluvic acids from aqueous solutions.

Material and methods: Batch tests were carried out for investigating the effect of various parameters such as contact time (15,30,45,60 and 75 min), initial pH (4,7, and 9), initial humic&fluvic acids concentration (0.5, 1, 2, 5, and 7 mg/L^{-1}), TiO2 dose (5, 10, 15 and 20 mg/ L^{-1}) and different UV irradiation (8W and 16W) for the removal of humic&fluvic acids from aqueous solutions by using TiO2 / UV at room temperature (20 ± 3°C) in a This was done in a reactor equipped with a magnetic stirrer. Data analysis was done using SPSS version 25 software.

Results: The efficiency of this process in optimal conditions (pH: 4, anatase TiO2: 10 mg/L^{-1}, irradiation time: 60 min, UV=16 W) for removing humic&fluvic (initial HA concentration: 2 mg/L^{-1} and initial FA concentration: 5 mg/L^{-1}) is 89% and 92%, respectively.

Conclusion: TiO2 / UV nano-photocatalytic process is suitable for the photo-degradation and removal of humic&fluvic acids in aqueous solutions.

Keywords: Humic&Fluvic Acid, Photocatalyst, Enhanced Oxidation, Anatase

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Enhanced photocatalytic degradation of diazinon pesticide by low-cost CuO-Kaolin nanocomposite under visible light irradiation based RSM optimized methodology: model for kinetic, cost analysis, reaction pathway, mineralization and toxicity assessment

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Abstract

In the present study, we exhibited the efficient charge separation at copper oxide (CuO) nanoparticles through supporting with kaolin and its favorable potential in degradation of a resistant and toxic pesticide called diazinon (DZ). The prepared CuO-Kaolin was characterized by physicochemical instrumental measurement. Then, the effects of operating parameters on the efficiency of DZ degradation were examined via an experimental matrix designed with design of experiment (DOE). Under optimum conditions, i.e. initial pH=7, initial DZ concentration=30 mg L^{-1}, photocatalyst dosage=0.4 g L^{-1} and in the presence of oxalic acid, folic acid and sodium carbonate (Na_2CO_3) =5 mg L^{-1}, about 87.23 % DZ removal was achieved by CuO-Kaolin after 180 min of reaction. CCD modeling results exhibits that the quadratic model was well fitted to the experimental data (with values of 0.9948 for R^2 and 0.9933 for adjusted R^2). The ANOVA results of the polynomial model prove that the model is quite significant (F-value> 0.001 and p-value< 0.0001). DZ degradation followed a first order kinetics with a kinetic constant (K_{obs}) of 0.0182 and R^2 of 0.9689. Further, estimated electrical energy per order (E_{EO}) consumption for Visible light/CuO-Kaolin system was calculated as 213.66 kWh m^{-3} with operational cost utilization of 173.51 USD kg^{-1} that was revealed this process is highly feasible and economic comparing with other photocatalytic systems (visible light, CuO/visible light and kaolin/visible light). Ten cycle experiments confirmed that the CuO-Kaolin propounded a satisfied stability and recycling potency. By applying the OFAT technique, 96.05 % of DZ degradation and 79.19 % of DZ mineralization could be achieved after 180 min. In addition, the model P-value of 0.004 for DZ degradation and 0.001 for TOC removal efficiency, confirmed the model significance. The five main compounds produced during the VIS/CuO-Kaolin embracing 2-isopropyl-6-methyl-4-pyrimidinol (IMP), diethyl phosphonate, diazoxon, hydroxydiazinon, and diazinon methyl ketone are formed in the path of DZ degradation. The results of toxicity in the photocatalytic removal of DZ by *D. magna* showed LC_{50} and toxicity unit (TU) 48 h equal to 18.79 and 5.32 vol percent, respectively.

Feasibility of purifying dyed effluent from automotive paint industry by vacuum distillation method(Case study of Saipa company)

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Abstract

Introduction: Among the important pollutants in industrial wastewater are dyes, all types of these dyes are used in the automotive industry, wastewater containing water-based dyes, like other types of paint wastewater, has adverse effects on the environment. Many common methods such as biological methods for wastewater treatment paint is not responsive. As a result, processes such as evaporation and distillation in vacuum can be effective for the complete removal of pollutants from paint wastes of automotive industries.

Working method: In this method, paint wastewater is placed under a vacuum and the evaporation temperature of the material is lowered. As a result, color and turbidity materials are separated from the paint wastewater by spending much less heat energy.

Results:

The results of the research show that the use of vacuum distillation method to remove the coating paint of the paint of Saipa Company was completely effective. The removal percentage of COD, turbidity and color using this process was 100%.

Conclusion: The results show that the vacuum distillation method is considered to be a very effective method for reducing COD, turbidity, color and other pollutants in automotive paint industry wastewater which are water-based, and this method can be used to treat the primary coating wastewater of automotive industry paint Halls. used as an efficient method.

Keywords: Paint wastewater, vacuum distillation, automotive industry

Application of Response Surface Methodology for optimization of fluoride adsorption using ionic liquid modified magnetic activated carbon from aqueous solution

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Abstract

Background and Objectives: Fluoride in high concentration is very hazardous to human health limited to skeletal diseases and fluorosis. Response surface methodology (RSM) was employed for the removal of fluoride on ionic liquid modified magnetic activated carbon (IL@mAC) and the process parameters were optimized.

Materials and Methods: In this study, ionic liquid modified magnetic activated carbon nanocomposite was synthesized, characterized by Scanning Electron Microscopy (SEM), Fourier transform infra-red spectroscopy (FTIR) and X-ray Powder Diffraction (XRD) and the adsorption efficiency of IL@mAC for removal of fluoride was investigated under different operational such as pH (2-8), contact time (15-100), initial concentration of F (10-50), and IL@mAC composite (0.01-0.1) at room temperature.

Results: equilibrium experiment showed that the highest removal efficiency (~88%) was obtained using Conditions for the pH (5), the initial concentration of adsorbent (0.1 mg/L), the initial concentration of fluoride (50 mg/L) and the process time(15 min) were obtained. ANONA high correlation coefficients for the proposed model was also obtained (adjusted R^2=0.9527and R^2=0.8048).

Conclusion: Current study showed that adsorption process with optimization of effective operational factors, is highly efficient in removal of fluoride.

Keywords: Fluoride, Ionic Liquid Modification Magnetic activated carbon, Response Surface Methodology, aqueous solution

Investigating the Presence and Influence of Tardigrades on Rotifer as a Biological Indicator and Reducing Organic Pollutants from the Environment (Case study: wastewater treatment plant of Ardakan-Yazd)

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Abstract

Background: Tracking biodiversity changes in sludge is an important part of wastewater treatment plant performance evaluation. In order to obtain information about the quality of wastewater, suitable indicators and biological coefficients are used and their correlation with physical and chemical parameters is evaluated. Therefore, the purpose of this study was to investigate the presence of tardigrades in the wastewater treatment system and their effect on rotifer as a biological indicator and reduce organic pollutants from the environment.
Methods: This study was descriptive-analytical. This study was conducted during one year in the wastewater treatment plant. Necessary samples were prepared from the aeration pond (instantaneous sample) and the incoming and outgoing wastewater (composite sample). In the following, the necessary parameters were measured according to the tests presented in the standard method book for water and wastewater tests.
Results: In this study, the presence of a tardigrade species named Thulinius ruffoi and a rotifer species of proales type was recorded. Observations during one year showed that the number of tardigrades in spring, summer and autumn season was more than tardigrades and at the end of autumn and during winter, the number of tardigrades increased compared to rotifers. In fact, tardigrades acted as predators for rotifers, and with the increase in the number of tardigrades, rotifers decreased. The average parameter of COD in the input wastewater in spring, summer, autumn and winter season was respectively 366.96, 388.33, 480.15, 578.21 mg/L. The average BOD in the input wastewater in spring, summer, autumn and winter season was respectively 188.53, 213.08, 277.41 and 326.68 mg/l.
conclusion: In examining the relationship between the amount of incoming organic matter and the presence of tardigrades, it was observed that with the increase of incoming organic matter, the number of tardigrades increased. Therefore, it can be concluded that there can be a significant relationship between the incoming organic matter and the presence of more tardigrades.

Keywords: Tardigrade, Rotifer, Biological indicator, Organic pollutants, Wastewater

contribution of bottled water in nutrient uptake using the bottled water nutritional quality index (BWNQI) in Iran

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Abstract

Recently, consumption of bottled water has increased due to dry and semi-arid climatic conditions and the problem of severe water shortages. In this study, the share of bottled water in the absorption of nutritional minerals in Iran has been investigated. To calculate the nutritional quality index of bottled water (BWNQI) and evaluate the share of bottled water in nutrient uptake; the concentration of nutrient minerals, the standard level of these substances in bottled water, the recommended amount of nutrient mineral and the total consumption of drinking water in different age-sex groups were analyzed. The results showed that the average share of bottled water in absorbing the recommended amount of the nutrients of fluoride, magnesium, calcium, sodium, copper, zinc, and manganese was 12.16, 4.98, 4.85, 2.12, 0.49, 0.33 and 0.02%, respectively. According to the BWNQI index, the bottled water quality was as follows: 53.5% poor, 36.6% low, 7%, fair, 2.4% good.

Although most of the bottled water studied in this study were mineral water, a significant portion of them have poor nutritional quality, so the supply of minerals needed by the body through bottled water should be given more attention.

Keywords: Water quality, Bottled water, BWNQI, Iran

Investigating the Effectiveness of Poly Titanium Tetra Chloride (PTC) and Poly Ferric Chloride (PFC) in Improving the Quality of the Effluent from the Municipal Wastewater Treatment Plant for Use in the RO Units of May Steel Factory (Optimization by Response Surface Methodology)

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Abstract

The steel industry is one of the main consumers of water, which has grown rapidly in the past decades. One of the main solutions to deal with the problem of water shortage is the optimal use of non-conventional water and the use of chains in accordance with the change in its quality in various sectors of consumption. Therefore, the purpose of this study is to optimize the process of coagulation and flocculation to improve the quality of the effluent of the municipal wastewater treatment plant using two coagulants: Poly titanium tetra chloride (PTC) and Poly ferric Chloride (PFC) to be used in the RO unit of May Steel Factory.

This study was experimental. PTC and PFC coagulants were used in this study. The effects of pH variables (5, 7, 9) and coagulant dosage for PTC (30 to 70 mg/L) and PFC (20 to 60 mg/L) in phosphate removal were investigated using the response surface method and central compound design. The removal efficiency of 93.21% (from 5.6 to 0.38 mg/L) for phosphate was obtained using PTC at pH=7 and the optimal dose of 50 mg/L. Also, the removal efficiency of 89.82% (from 5.6 to 0.57 mg/L) for phosphate was obtained using PFC at pH=7 and the optimal dose of 40 mg/L.

The results showed that due to the same optimal pH for both coagulants and the insignificance of removal efficiency by PTC compared to PFC, as well as the high initial costs for the production of PTC, PFC was chosen as a more suitable coagulant.

Keywords: Optimization, Quality Improvement, Effluent, Reverse Osmosis

Investigating the efficiency of a portable drinking water purifier for times of crisis and unusual conditions

Kiomars Sharafi [1], Masood Moradi [1], Nazir Fattahi [1], Gholamreza Ebrahimzadeh [2], Tooraj Massahi [3*]

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Abstract

Providing drinking water is one of the main problems related to crisis conditions (earthquakes and floods) and also unusual conditions. In this regard, the aim of the present study was to design, manufacture and feasibility of using a portable drinking water purification device, with easy operation, without the need for electricity and chemicals for times of crisis (with an emphasis on earthquakes) and unusual conditions.

In this device (50x52x60 cm), six filters were used for water purification, which included polypropylene filter, granular activated carbon, carbon block, reverse osmosis, hardness enhancer and powdered activated carbon, respectively, and from a pedal pump instead of an electric pump. was used Two devices with the aforementioned characteristics were made, one of which was used for treating surface water with low turbidity (NTU 15-20) and the other for high turbidity (NTU 70-100). For each of the aforementioned devices, 108 samples of raw and purified water in terms of the most common physical, chemical and microbial parameters and 54 samples in terms of heavy metals (arsenic, lead, chromium and cadmium) as well as residual toxins (atrazine, Alachlor and 2-4-D) was analyzed and then the efficiency of the purification devices was estimated for each of the examined parameters.

The results of the present study showed that the efficiency of the water purification device is very high and that the quality of purified water in terms of all physical, chemical and microbial parameters is consistent with drinking water quality standards (1053 and 1011). In addition, the results of the study showed that the cost of producing each liter of drinking water using the water purifier claimed in this study is between 5-8 times lower than the cost of buying each liter of bottled water.

It can be concluded that the portable water purification device claimed in the present study can be very practical, efficient and economical for crisis and unusual conditions.

Keywords: Drinking water, crisis conditions, unusual conditions, water purifier, portable

Investigating the efficiency of a portable drinking water purifier for times of crisis and unusual conditions

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In this device (50x52x60 cm), six filters were used for water purification, which included polypropylene filter, granular activated carbon, carbon block, reverse osmosis, hardness enhancer and powdered activated carbon, respectively, and from a pedal pump instead of an electric pump. was used Two devices with the aforementioned characteristics were made, one of which was used for treating surface water with low turbidity (NTU 15-20) and the other for high turbidity (NTU 70-100). For each of the aforementioned devices, 108 samples of raw and purified water in terms of the most common physical, chemical and microbial parameters and 54 samples in terms of heavy metals (arsenic, lead, chromium and cadmium) as well as residual toxins (atrazine, Alachlor and 2-4-D) was analyzed and then the efficiency of the purification devices was estimated for each of the examined parameters.

The results of the present study showed that the efficiency of the water purification device is very high and that the quality of purified water in terms of all physical, chemical and microbial parameters is consistent with drinking water quality standards (1053 and 1011). In addition, the results of the study showed that the cost of producing each liter of drinking water using the water purifier claimed in this study is between 5-8 times lower than the cost of buying each liter of bottled water.

It can be concluded that the portable water purification device claimed in the present study can be very practical, efficient and economical for crisis and unusual conditions.

A Study on Effectiveness of Zeolite and Activated Carbon Impregnated with Monoethanolamine in Removal of Carbon Dioxide from Methane Combustion Gas

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Abstract

Importance and Aim: Removing carbon dioxide from combustion gas reduces the emission of this greenhouse gas and helps reduce the effects of global warming and climate change. Therefore, finding a suitable sorbent for this purpose is very important. Considering that monoethanolamine is one of the known sorbent for carbon dioxide, the purpose of this research is to determine the effectiveness of zeolite and activated carbon coated with monoethanolamine in removal of carbon dioxide from methane combustion gas.

Methods: Granular activated carbon (GAC) and natural clinoptilolite zeolite were coated using different amounts of monoethanolamine (MEA) by impregnation method. 5.0 grams of adsorbents containing amines were filled inside a copper tube with a length of 20 cm and a diameter of 1.5 cm, and methane combustion gas was passed through it with a flow rate of 100 ml/min by a suction pump. Experiments were performed with carbon dioxide initial concentration of 2000 ppm at temperatures of 25, 50, and 75°C by placing the tube containing sorbent in a hot water bath equipped with a thermostat. Concentration of carbon dioxide was continuously measured and recorded by TES 1370 ND IR CO_2 analyzer.

Results: The capacity of zeolite and activated carbon coated with monoethanolamine for adsorption of carbon dioxide at 50°C was 20 and 10 mg/g respectively. Zeolite and activated carbon without amine did not adsorb carbon dioxide. As the temperature increased from 25 to 75 degrees Celsius, the carbon dioxide adsorbed increased by about 20%. As the temperature increased, the saturation time of the adsorbent decreased.

Conclusion: Zeolite containing monoethanolamine showed better efficiency in absorbing carbon dioxide than activated carbon containing amine. Considering the cheapness of zeolite compared to activated carbon, it can be concluded that the use of amine-coated zeolite is a good way to removal of carbon dioxide from the combustion flue gas.

Keywords: carbon dioxide, zeolite,activated carbon,amine

Removal Efficiency of Arsenic from Aqueous Solution Using Microbial Desalination Cell

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Abstract

Microbial desalination cell (MDC) is a new method for desalination. MDC's energy is supplied by converting chemical energy of organic compound to electrical energy by exoelectrogenic bacteria. The aim of this study is to survey the amount of removal of arsenic (As) from aqueous solutions by MDC. To examine the efficiency of the process, synthetic As were prepared with concentrations of 100–600 µg/L in deionized water. The removal efficiency was examined at reaction times of 30–120 min, at psychrophilic, mesophilic, and thermophilic phases and dissolved oxygen of 2–6 mg/L. The real water sample of Bardsir, Kerman, Iran, as well as the stimulated wastewater sample was experimented with to examine removal efficiency under the optimal conditions. The optimal conditions for removal of As were obtained as 600 mg/L of As, 6 mg/L of dissolved oxygen, temperature of 25–30 °C, and reaction time of 120 min. Under these conditions, As removal efficiency in the synthetic samples of As, real water sample of Bardsir, and stimulated wastewater sample was obtained as 75, 68, and 56%, respectively. MDC is an effective method in removal of As from aqueous solutions due to relatively high efficiency of MDC in removal of As, environmentally friendly technology and saving energy.

Keywords: Microbial desalination cell, Ion exchange membrane, Arsenic

Hydrodynamic cavitation coupled zero-valent iron for the production of sulfate radicals through sulfite activation for the degradation of Direct Red 83

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Abstract:
The present work aimed to evaluate the application of hydrodynamic cavitation (HC) and zero-valent iron (ZVI) for the generation of sulfate radicals through sulfite activation for efficient degradation of Direct Red 83 (DR83). The effects of operational parameters, including solution pH, the dose of ZVI and sulfite salts, and mixed media composition, were systematically examined. The obtained results show that the removal efficiency of DR83 in the HC/ZVI/sulfite process increased from 49.93 ± 2.49 percent to 20.55 ± 1.03 percent by increasing the pH of the solution from 3 to 9 and after a period of 60 minutes. Also, increasing the dose of sulfite salt from 50 to 200 mg/L led to an improvement in the removal efficiency of about 11%. On the other hand, under optimal conditions, the removal efficiency of DR83 with the initial concentration of 50 mg/L was about 95.54 ± 2.87%. In conclusion, the HC/ZVI/sulfite process can be proposed as a new and promising approach for the treatment of recalcitrant textile wastewater.

Keywords: Hydrodynamic cavitation; Zero-valent iron; Direct Red 83; Sulfate radicals

Evaluation of the efficiency of activated carbon prepared from oak charcoal for the removal of methylene blue dye from aqueous solutions

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Abstract

One of the most widely used and important dyes in dyeing and textile industries is methylene blue (MB) dye. Methylene blue with a complex aromatic structure is resistant to chemicals, heat, light and even biodegradation, and therefore, separating of it from dye contaminated water and wastewater using an appropriate adsorbent is one of the methods considered by researchers. In the present study, the activated carbon prepared from oak charcoal (AC) was used as an adsorbent to remove methylene blue dye from aqueous solutions. The effects of the most important operational variables such as equilibrium or contact time, pH, adsorbent dosage, and initial dye concentration were tested on the methylene blue adsorption process. In addition, the adsorption kinetics and isotherms behavior of the prepared AC for the removal of MB was analyzed, and fitted to nonlinear form of various models. The results showed that solution pH had no considerable effect on MB adsorption at different dye concentrations. However, with increasing the contact time and adsorbent dosage, the MB removal efficiency increased. The results also showed that the pseudo second-order kinetic model and the Liu isotherm model provided the best fit to the experimental data. The results of the present study indicate that prepared AC can be used as a low-cost and environmentally friendly adsorbent for the removal of MB contaminated effluents.

Keywords: Methylene Blue, Aqueous Solutions, Activated Carbon, Adsorption

Investigating the mechanism and performance of cellulose fibers recovered from newspaper waste and functionalized with amino groups in removing crystal violet dye

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Abstract

Crystal violet is known as one of the most famous and widely used dyes, which is often used as a colored substance in the leather, textile and paper industries. This dye is toxic and dangerous for humans and animals at a concentration of about 1 ppb and has carcinogenic and mutagenic properties. Therefore, the purpose of this study is to remove crystal violet dye using cellulose recovered from waste paper and functionalized with amine groups.

In this study, the effectiveness of cellulose recovered from newspaper waste and functionalized with amino groups in removing crystal violet dye has been investigated. The study was carried out in three general stages, the first stage was the preparation of the adsorbent, the second stage was designing the test with the help of R software and conducting absorption tests, and the third stage was data analysis. Absorption tests were carried out considering the desired range of effective factors in absorption, including contact time, pH, dye concentration, and adsorbent dose in experimental conditions and at ambient temperature. Finally, the obtained results were statistically analyzed using R software.

The response surface method (RSM) was chosen to study the effect of combining independent input variables and a dependent output response variable (removal efficiency). Results such as p-value (2.2×10^{-16}), high F-value (560.633), multiple R^2 (0.9929), adjusted R-squad (0.9882) and lack of significance of the model's lack of fit (0.147) showed that the reduced second-order model is very significant for the removal of crystal violet dye by the adsorbent. The maximum removal efficiency of crystal violet dye was 95.1%, which was obtained under optimal operating conditions. Also, the results show that the pseudo-second-order kinetic model is the most appropriate model for dye absorption on cellulose absorbent, and the absorption behavior of crystal violet dye on functionalized cellulose follows the Freundlich model with R^2=0.9955.

Overall, the results of the experiments showed that the waste newspaper can be used as an effective and cheap method to remove crystal violet from aqueous solutions.

Keywords: recovered cellulose fibers, crystal violet dye, newspaper waste, amino groups

Optimization of the Photoelectrocatalytic Process (PECP) with g-C_3N_4/Fe_3O_4 Nanocomposites in the Removal of 2,4 D Herbicide from Aquatic Environments Using Response Surface Methodology (RSM)

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Abstract

The presence of pesticides in the environment has caused environmental hazards. One of the pesticides is 2 and 4-dichlorophenoxy acetic acid (2,4 D), which conventional water and wastewater treatment processes are not able to remove this compound from aqueous media. Advanced oxidation process by producing oxidizing radicals, have the ability to remove this compound. The photoelectrocatalyst process is a class of advanced oxidation process. The aim of this study was to optimize the photoelectrocatalyst process with g-C_3N_4/Fe_3O_4 nanostructures in the removal (2,4 D) of aqueous media using a statistical response procedure model. In this experimental study, a photoelectrochemical reactor equipped with a UV lamp was used. Two graphene electrodes were used as the anode and two titanium electrodes were used as the cathode, which was unipolarly connected directly to the direct current generator. The parameters of pH, direct current, catalyst concentration, reaction time and initial toxin concentration were optimized with the statistical model of the response procedure. Under optimal process conditions, the rate of COD and TOC removal and the synergistic effect were measured. In this study, HPLC, spectrophotometer and TOC analyzer were used to measure the concentration of toxin and COD, TOC, respectively. The results show that under optimal process conditions at pH = 6/4, the catalyst concentration was 0.38 g/l, the flow was 0.99 A, the initial toxin concentration was 20 mg/l and the time was 58 min. It was obtained that 96.58% of the initial concentration of toxin was removed. The rate of COD and TOC removal in the process is less than the amount of toxin removal. Synergistic results also showed that 37% of process efficiency is more than the total efficiency of individual processes. Based on the results, it was found that the efficiency of the process in decomposition, destruction and removal of toxins is appropriate and due to the lack of chemicals and sludge production, environmentally friendly and advanced processes in the treatment of hazardous organic pollutants such as toxins.

Keywords: Photoelectrocatalyst process, 2 and 4-Dichlorophenoxy Acetic Acid, Statistical Model of Response Procedure, Aqueous

Phenyl benzene degradation using the photocatalytic process of silica nanoparticles in aqueous solutions

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Abstract

Phenyl benzene is one of the aromatic amine compounds that has a benzene ring with an NH_2 bond. This compound is toxic and is used in various industries such as pharmaceuticals, dyes, petrochemicals, and plastics. This experimental study was carried out in a semi-continuous reactor on a laboratory scale. The influence of different parameters, including pH, contact time, initial concentration, dose of nanoparticles and radiation intensity, was studied. The concentration of phenyl benzene was measured using a spectrophotometer. The removal efficiency was 97.65% when the following conditions were used: pH 10, nanoparticle dose 2 g/L, initial concentration 200 mg/L, reaction time less than 120 min, and radiation intensity of 40 W. The results showed that the photocatalytic process in the presence of silica nanoparticles has a high efficiency in removing phenyl benzene from aqueous solutions.

Keywords: Silica nanoparticles, Photocatalytic process, Phenyl benzene

Ecological risk assessment of heavy metals in landfill soils of Mashhad

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Abstract

Landfill is one of the most widely used methods of urban waste management, which causes ecosystem pollution, including soil, if environmental laws and standards are not followed. The purpose of this study was to evaluate the ecological risk of heavy metals in the soil of Mashhad landfill.

In this study, 14 points were selected for sampling from the old site of Mashhad's urban waste and soil samples were taken from a depth of 0-30 cm in two wet and dry seasons. Inductively coupled plasma spectroscopy (ICP-OES) was used. The average concentration of studied metals was arsenic (10.36), copper (39.79), cadmium (0.21), chromium (115.38), nickel (66.83), lead (19.42), zinc (62.62) and mercury (<0.1) were in terms of mg/kg of soil.

The results of Pearson correlation analysis to investigate the origin of heavy metals in the soil revealed that there is a positive and strong correlation between nickel-chromium (0.804), zinc-nickel (0.658) and lead-copper (0.594) at a significant level 0.01 and chromium-copper (0.438), nickel-copper (0.431), zinc-copper (0.412) and lead-chromium (0.495) are present at a significant level of 0.05. The values of ecological risk were calculated in the range of 34.42 to 1.56, which is in the range of low ecological risk.

Keywords: Heavy metals, Soil pollution, Ecological risk

Optimization of the photo-electroperoxon process in the presence of persulfate anion using the central design in the removal of penicillin antibiotics from aqueous

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Abstract

The presence of synthetic organic compounds such as antibiotics in the environment has caused environmental issue. One of the antibiotics is penicillin (PEN), which conventional water and wastewater treatment processes are not able to remove this compound from water body. The advanced oxidation process has the ability to remove this compound by producing oxidizing radicals. The photo-electroperoxone process (UV-EPP) is a class of advanced oxidation processes. The aim of this study was to optimize the UV-EPP with graphene-titanium electrodes in the presence of persulfate anion in the removal of PEN from aqueous using a central composite design (CCD). In this experimental study, an electrochemical reactor equipped with a UV lamp was used in the UV-EPP. Two graphene electrodes were used as anodes and two titanium electrodes were used as cathodes, which were directly connected to the DC power. The parameters of pH, direct electric current, ozone gas concentration, persulfate anion concentration and initial concentration of antibiotic were optimized by CCD. In the optimal conditions of the process, the amount of COD and TOC removal and the synergistic effect were measured. In this study, HPLC, spectrophotometer, and TOC analyzer were used to measure the concentration of penicillin antibiotic, COD, and TOC, respectively. The results show that in the optimal process conditions in the UV-EPP at pH=5/5, the concentration of ozone gas was 1.71 mg/l-min, the current was 14/68 mA/cm^2, the initial concentration of PEN was 20 mg/l and the concentration of persulfate anion was 0.38 mg/l, which removed 95% of the initial concentration of PEN. COD and TOC removal rates in the process are lower than PEN removal rates. Based on the obtained results, it was found that the efficiency of the process in the decomposition, destruction and removal of PEN is appropriate and due to the lack of use of chemicals and the lack of sludge production, it is environmentally friendly and advanced processes in the treatment of dangerous organic pollutants such as antibiotics.

Keywords: Photo-electroperaxone process, Penicillin antibiotic, persulfate anion, Central Composite Design, Aqueous

Investigating the efficiency of the nanofiltration process to remove hexavalent chromium from aqueous solutions (a review study)

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Abstract

One of the major persistent environmental pollutants is heavy metals; Chromium is one of the heavy metals, currently its hexavalent form is widely introduced into aquatic environments through various industries. Hexavalent chromium compounds (VI) are very toxic; According to the announcement of the World Health Organization (WHO), this metal will have a wide range of adverse effects on human health and the ecosystem in concentrations higher than the permissible limit (50µg/l). The purpose of this study is to investigate the efficiency of nanofiltration process to remove hexavalent chromium from water environments.

In this study, searching articles published in Google scholar, SID, Science Direct and Scopus databases was conducted and among 135 articles obtained from the search, the relevant findings of 18 studies on the efficiency of nanofiltration process for removal of hexavalent chromium from aquatic environments were selected and investigated.

Investigations show that considering the importance of aquatic environments and high quality water supply, as well as regarding the extent of the effects of hexavalent chromium on human health and the environment, adopting a suitable method from an economic point of view, while providing access to the necessary knowledge with optimal efficiency and it is necessary to present the advantages and disadvantages of this method regarding its removal from aquatic environments.

Nanofiltration, as a membrane method, has the ability to remove a large percentage of heavy metals, including hexavalent chromium, from aqueous environments at low operating pressures.

Keywords: Membrane processes, Nanofiltration, Hexavalent chromium

Investigating the physical, chemical and microbiological quality of Torfeh hospital water in the years 1394-1399

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Abstract

The human body is composed of about 70-75% of water, which makes it a structural environment and the main solvent for the chemical processes of life. Also, water plays an important role in maintaining human health and hygiene and to a large extent recovery after periods of illness, and it is a means of especially knowing that hospitals prescribing medicine in general ways of providing health care. Water is the main cleaning agent in hygiene methods that is supported only by surfactants (soaps and detergents) to facilitate decontamination. Therefore, water is the most important factor in health care delivery systems.

The present study is a cross-sectional study with a descriptive-analytical approach and investigates the quality of water consumed in Torfeh Hospital in Tehran for 6 years (1394-1399). Sampling of water under standard conditions has been done seasonally by the trusted laboratory of the Environmental Organization, and in the laboratory physical parameters (turbidity, electrical conductivity, pH), chemical parameters (total dissolved solids, total hardness, Ca, magnesium, sulfate, nitrate, nitrite)) and microbiology parameters (total coliform count and digestive coliform count) of water consumed in the hospital were measured according to the methods presented in the standard book for water and wastewater tests, 19th edition. The period of sampling and testing was 6 years (72 months) from the beginning of Farvardin1394 to the end of Esfand1399 and the data analysis was done through the EXCELL 2019 program.

By reviewing the findings of this six-year study resulting from the monitoring of water samples taken from different departments of the hospital, the storage tank and the incoming water to the sterilization department and considering that the hospital does not have a dialysis department, it can be concluded that the water in Despite the age of the main building, the consumption network of the hospital complies with the declared standards in terms of quality (physical, chemical and microbial indicators) and according to the requirements of the national accreditation standard of Iranian hospitals (5th edition), it can be used by patients, employees and clients.

Keywords: Water, hospital, physical parameters, chemical parameters, microbiological parameters

Effective photocatalytic degradation of 2,4-dichlorophenol in aqueous solution using ZnO nano photocatalyst under ultraviolet LED lights

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Abstract

2,4-Dichlorophenol (2,4-DCP) one of the most common and abundant pollutants, is widely found in various industrial effluents such as resin and plastic products in the petrochemical industry. The apparent effect of this recalcitrance compound on the health and environment is enhancing its efficient degradation before wastewater discharged into the receiving water. Hence, the removal of 2,4-DCP from aqueous solutions using the photocatalytic UV-LED/ZnO process was investigated. In this experimental study, the removal of 2,4-DCP using UV-LED in the presence of ZnO in the bench scale reactor was examined. The effects of operational parameters such as the pH of the solution (3–11), initial concentration of 2,4-DCP (50–200 mg/L), the amount of ZnO dose (0.003–0.025 mol/L) and different ionic strengths were evaluated. The experimental results indicated that different operational parameters influenced the removal of 2,4-DCP. The highest 2,4-DCP removal rate was obtained at pH = 11 by adding 0.006 mol/L ZnO into the solution with an initial concentration of 50 mg/L 2,4-DCP, removing more than 98.2% of 2,4-DCP. When UV-LED and ZnO were used alone, the removal efficiencies were 32.11% and 30.93%, respectively. Also, the maximum chemical oxygen demand removal rate was 64.45% in optimum conditions and ionic strength was reported to be ineffective. The results indicated that combined ZnO and UV-LED processes in optimal conditions could be used as an alternative technology for the treatment of various industrial wastewater containing 2,4-DCP.

Keywords: 2,4-Dichlorophenol, Photocatalytic, Zinc oxide, Ultraviolet-Light Emitting Diode, Aqueous solution

Photocatalytic removal of tetracycline antibiotic from aqueous solutions using AC/MgO/ZnO composite

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Abstract

In recent years, pharmaceutical antibiotics, which are widely used in the treatment of humans, livestock and farming industries against disease-producing bacteria, have caused increasing concerns because they have been identified as resistant and slowly degradable pollutants. Conventional water and wastewater treatment technologies cannot remove antibiotics completely. Thus, to prevent and minimize the risks related to antibiotics, effluent-containing antibiotics must be treated by an appropriate technique. Therefore, the aim of this study was to investigate and optimize the photocatalytic removal of tetracycline (TC) antibiotic from aqueous solutions using AC/MgO/ZnO composites in the presence of UV light. The effect of some operational parameters including solution pH, photo-catalyst dosage, reaction time, and initial concentration of TC was investigated. The results of the study showed that solution pH had not significant effect on the removal of TC. In addition, by increasing AC/MgO/ZnO dosage and reaction time, the removal percentage increased but by increasing the initial concentration of TC, the removal percentage decreased. The pseudo second order kinetic model provided the best fit to the experimental data. The results of this study indicate that the AC/MgO/ZnO composite can be used as an effective photo-catalyst for TC removal from aqueous solutions.

Keywords: Advanced oxidation process, Photocatalytic degradation, Tetracycline, Composite

Algal Bloom Monitoring Methods and Eutrophication in Lakes and Reservoirs

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Abstract

Recently, the phenomenon of eutrophication in lakes and reservoirs recognized as the predominant cause of the decrease in the amount of dissolved oxygen in water, thereby floss of many aquatic lives, has received great attentions. This phenomenon stems from the entry of nutrients, especially nitrates and phosphates into water sources. Therefore, in such a conducive conditions, single-celled algae multiplies, culminating in phenomenon called algal bloom, which effect the paucity of oxygen penetration in the deep layers of water. Not only does the multiplied algae produce toxins that affect the central part of the nervous system of fish and bring about paralysis of their respiratory system, it also affects the lives of other animals and the surrounding ecosystem and reduces the usefulness of water bodies. Lakes and reservoirs considered as an precious sources of drinking water supply and agriculture have always been the concern of human societies. In this regard, we need appropriate methods to monitor and determine the quality of these water resources in order to make optimal use of these water resources. As mentioned, the phenomenon of algae bloom in lakes and reservoirs is one of the environmental problems, for this reason, researchers are looking for a suitable solution to control this natural occurrence with three methods of physical or mechanical control, biological and chemical methods. In this research, a review of the methods used in lakes and reservoirs in the world to prevent and destroy algae blooms has been conducted. By reviewing the studies done, we can apprehend that the phenomenon of algal bloom is one of the most significant problems that can occur in water resources, and every year many valuable water resources in major countries of the world are involved in this phenomenon. Also, the methods used to monitor lakes and reservoirs from this phenomenon are not definitive treatment methods, and periodically, the water body again undergoes the phenomenon of eutrophication.

Keywords: Algae, Chlorophyll, Eutrophication, Cyanobacteria

Application of metal nano frameworks in removal toxic compounds and POPs

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Abstract:
The rapid spread of water pollution has become a significant risk around the world. In recent years, the fields of pharmaceuticals and agriculture have made great progress to meet health and life needs. However, the discharge of small amounts of pharmaceuticals and pesticides in water has significantly affected human health and the environment.
Different Physical, Chemical, Biological Methods and Processes or a combination of the mentioned methods are used to reduce and eliminate POPs.
Nowadays, due to the low cost, simplicity and fast separation and high performance , the absorption process is used as a suitable method to remove pollutants, that among which , nano-absorbents can perform well and remove water pollutants.
These adsorbents have a high potential to absorb and decompose organic substances and other pollutants and are chemically stable. Metal-organic frameworks (MOFs) are crystalline porous materials that in which metal ions/clusters and organic ligands are continuously attached to each other. Depending on the type of metal ions and organic ligands, MOFs can be produced in several forms. low toxicity and excellent recyclability are other features of this adsorbent.
In this study, The methods of synthesis and application of metal nano-frameworks in removal of toxic compounds and POPs have been investigated.

Keywords: Metal nano- frameworks (MOFs), Adsorbent ,Toxic compounds ,Environment

Study of magneto-hydrodynamic and magneto-phoretic forces in the mechanical trajectory control of magnetic impurities (hardness and salinity agents) in the electrochemical-magnetic system

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Abstract
The paper is focused on the study of controlling the path of ions causing hardness and salinity of water by a combination of electrolysis process and electric and magnetic fields and explaining the mechanism of the process based on magneto-hydrodynamic (MHD) and magneto-phoretic (MP) forces. The results showed that the highest removal efficiency of total dissolved solids (TDS) was 7.64%, the highest removal efficiency of electrical conductivity (EC) was 38.32% and the highest removal efficiency of total hardness (TH) was 36.04%. The greatest impact occurred when these two forces were applied simultaneously. Moreover, $MgSO_4$ and $CaCO_3$ had the greatest effect on the reduction of ions. This effect was due to the presence of oxygen atoms of $MgSO_4$. Oxygen atoms are considered to be a strong paramagnetic particle (magnetic susceptibility of +7699 $\times 10^{-6}$ m^3/mol) due to their unpaired orbitals, which makes them more affected. Besides, the ions that increase the TDS and EC of water (such as NaCl and $MgSO_4$) have a larger rotation diameter or Larmore radius than ions that increase water TH. The circulation of soluble ions around the central electrode was formed by the MHD force that was based on the Lorentz force, and the difference in the concentration of ions in the column was caused by the MP force that was based on the Kelvin force and as a result, more ions were transferred to the spiral paths.

Keywords: Mechanical trajectory, Mineral impurities, Magneto-hydrodynamic force, Magneto-phoretic force, Larmore radius

Effect of Salinity on the Potential Cadmium Phytoremediation from the Polluted Soil by Carpobrotus Rossii

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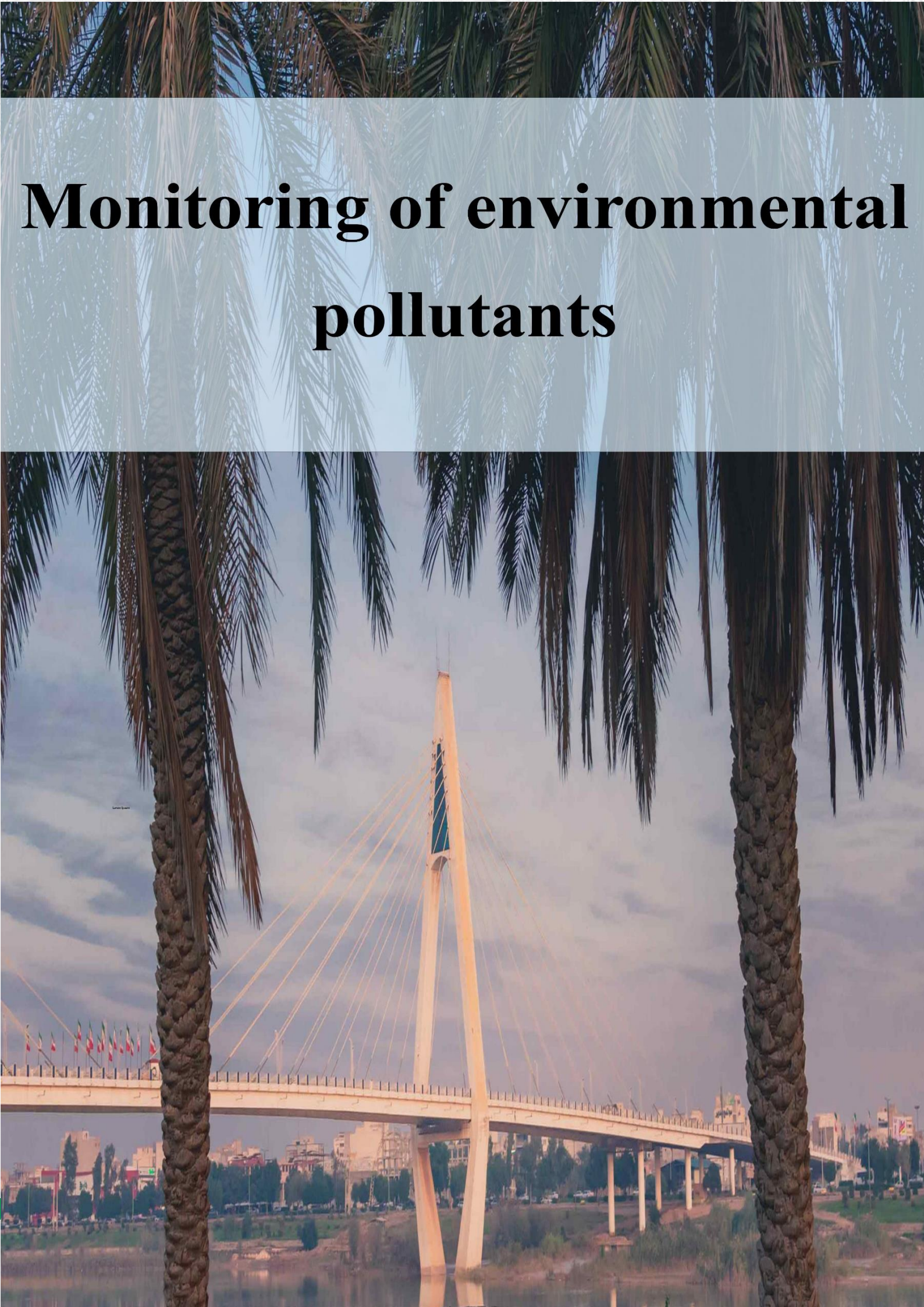
Abstract

Nowadays, heavy metals accumulation in soil due to anthropogenic activities is a major form of pollution, which can lead to worldwide concerns; however, there are many treatment methods to remove them from soil. These kinds of methods are mostly costly and potentially damaging to the land; therefore, phytoremediation is used as an alternative method to decrease heavy metals. In this study, to reduce Cadmium concentration, Carpobrotus Rossii, which has shown great potential to tolerate high salinity and accumulate Cd from contaminated soils, was used. The experiments, in this study, are analyzed and optimized by Central Composite Design (CCD) - Response Surface Methodology (RSM) using R software. The Cd removal by root and the whole plant followed the quadratic model and the R^2 values were 94.95 and 94.81, respectively. The results showed that a decrease in NaCl concentration in Cd-containing solution led to a significant increase in the phytoremediation of Cd by C.Rossii. The results of optimization showed that more than 46% of Cd was intake by root and more than 58% of Cd was intake by the whole plant. The optimum conditions for 58% Cd removal by the whole plant, predicted through a CCD response surface methodology model were as follows: initial Cd concentration of 49 $mgKg^{-1}$, NaCl concentration of 16 dSm^{-1}, time of 17 days, and pH of 6.5. C. rossii's potential in removing 58% of Cd under the obtained optimum condition from the modelling was evaluated in real condition in the laboratory. the results revealed that around 56% of the initial added Cd concentration was removed by C. Rossii.

Keywords: Bioremediation, Cadmium phytoremediation, Heavy Metal, Carpobrotus Rossii, Soil Pollution.

Monitoring of environmental pollutants



Investigating the effect of particulate matter caused by dust on the health of exposed people using the Air-Q model

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Abstract
Background: Air pollution especially particulate matter is seriously threatened for environment and public health. The purpose of this study was estimation of cardiovascular and respiratory disease PM_{10} on human health in Ahvaz city during 2010.
Methods: In this study, first Raw data processing by the use of Excel software (instruction set correction of temperature and pressure, averaging, coding). In final stage estimated of the health effects of PM_{10} with used data processed.
Results: Based on result, the Behdasht ghadim and Naderi stations had the highest and the lowest PM_{10} concentrations. According to result this study, the cumulative cases of cardiovascular death and hospital admissions respiratory disease which attributed to exposure with PM_{10} was 714 and 2028 persons, respectively.
Conclusion: Findings showed that calculate relative risks, attributable proportion, and baseline incidence need to perform epidemiological studies for estimate actually all of the health effects air pollutant. The high percentage of deaths two outcomes can result due to this higher average PM_{10} or perhaps continued days a high concentration in Ahvaz.

Keywords: Health Effects, PM_{10}, Cardiovascular Disease, Respiratory Disease, Ahvaz.

Air Pollution history and projection in the most polluted city in the world

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Abstract

Background and aim

Severe air pollution in Ahvaz has increased the scientific community's attention and policymakers. To understand the trends and characteristics of air pollution in Ahvaz, an analysis of air quality was carried out, and accordingly, we have forecasted 2021 and 2023.

Methods

Air quality data collected at Ahvaz Air Quality Monitoring Network from 2013- to April 2021, were analyzed. Autoregressive time series models were fitted to monthly data and forecasts were made for the next 24 months.

Result

Annual PM10 and PM2.5, concentrations were higher than WHO air quality guideline levels during the entire study period. Ahvaz experienced worse air quality in 2015. The highest average PM and gaseous pollution concentrations were found in traffic areas. The average annual change had decreasing trends for PM10 (-5.65 µg/m-3), PM2.5 (-4.06 µg/m-3, and SO2 (-2.06 ppb), while an increasing trend was found for NO2 (+21.79 ppb), O3 (+37.67 ppb) and CO (+21.04 ppm) during the study period. The forecast shows a negative trend in SO2, PM10, PM2.5, and CO but a rise in O3 and NO2.

Discussion and conclusion

Ahvaz is a center of heavy industry and is seriously polluted with PM, which was mainly from natural sources. However, there is no clear way of preventing events caused by natural sources affected by climate change, such as desert dust outbreaks. Targeted policies to reduce vehicle emissions and an intelligent expert system for emergency response during dust episodes recommended

Keywords: Air pollution; Ambient air quality; Ahvaz; forecast

Toxic effect of cigarette butts leachates on blood markers and different body tissues of *Periophthalmus waltoni* species from the Persian Gulf Region

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Abstract

Cigarette butts (CBs) are the most common, long-lasting, and toxic form of marine and coastal area debris. The toxicants released into the aquatic environment can cause deleterious effects on aquatic organisms. In this study, the in-vivo toxic effects of various CBs leachates (smoked cigarette butts with tobacco (SCBs), smoked CBs without tobacco (SFs), and unsmoked filters (USFs)) on blood markers and histology of fish (*Periophthalmus waltoni*) were evaluated. In three acute, sub-acute, and sub-chronic exposure durations, *P. waltoni* exposed to different CB leachates showed a significant increase in white blood cells, creatine kinase, lactate dehydrogenase, alkaline phosphatase, alanine transaminase, and aspartate transaminase, as well as a decrease in hemoglobin levels. Our results showed that CBs leachates act as a stressor, leading to changes in some blood markers in *P. waltoni* species. Under sub-chronic exposure conditions, the SCBs and SFs exposed groups had adverse effects on hepatic, heart, and gill tissues. As a result of the global increase in CB waste, more emphasis must be placed on environmentally friendly CBs waste management in coastal areas in order to mitigate the potential negative effects on fish and other aquatic organisms.

Keywords: Blood markers; Histological changes; Cigarette butts; Toxic effects; *Periophthalmus waltoni*, Persian Gulf.

(Assessing the health risk of stone mine workers to the Al, Cu, Pb and Ni elements using lichen)

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Abstract

Due to air pollution and its importance and its relationship with human health, as well as the increase in population and the need for construction, the use of natural resources has increased, which has increased air pollution and endangered human health. Stone mining is one of the cases where its destruction and use is increasing. Considering that the use of biological monitoring to assess air quality has been considered in recent decades, in this study, thallophyte lichen (*Ramalina roesleri*) was used to monitor and assess the health risk of quarry workers to the elements copper, aluminum, lead and nickel. The samples of lichens were collected from a place far from pollution (forests of Sawadkooh) and after washing with deionized water and drying at room temperature, they were placed in polymer mesh bags and installed around khatirkooh stone mine and after one month the samples were collected and transferred to the laboratory. The concentration of metals in lichen samples was measured by ICP-MS method. The results showed that lichen contains a significant concentration of Al, Cu, Pb and Ni. The risk assessment of Pb, Ni, Cu elements were lower than 1 and for Al was higher than 1. Therefore, the concentration of Pb, Ni, Cu metals were assessed safe, while the concentration of Al was dangerous via ingestion for the workers of this mine. Al metal as non-essential element for life and the absence of a clear limit for human contact to this element, it is important to pay attention to safety of workers who are exposed to this element.

Keywords: Air pollution, Stone mining, Lichen, Health risk assessment

Exposure to pesticide residues in the Northwestern of Iran: A Probabilistic health risk study based on consumption of apple using Monte Carlo Simulation

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Abstract

The presence of pesticide residues in fruits and vegetables poses serious health concerns, particularly when fresh fruits and vulnerable to pesticide hazards are consumed by children. The aim of this study was to determine the pesticide residues and non-cancer risk assessment in apple products of Maragheh County in 2020. Chronic non-carcinogenic risk assessment from pesticide residues in the samples was performed for age groups of adults (women and men) and children using the Monte Carlo Simulation (MCS). The samples of apples were taken every 15 days from the Central Fruit and Vegetable Market of Maragheh during the summer and autumn months. A total of 30 apple samples were analyzed. The quick, easy, cheap, effective, rugged, and safe method (QuECheRS) was applied to extract pesticide residues form apple samples and gas chromatography-mass spectrometry (GC/MS) was used to identify and quantify the compounds. Amongst the seventeen studied pesticides, thirteen pesticide residues were detected. The highest concentrations observed in apple samples were related to Chlorpyripos pesticides with 1.05 mg kg^{-1}. 100% of samples contained pesticide residues above Maximum Residue Level (MRL) . More than 75% of the apple samples contained ten or more pesticide residues. About 45-80% of pesticide residues in apple samples were removed after the washing and peeling processes. The results of the health risk assessment showed that the pesticide of chlorpyrifos had the highest health quotient (HQ) for men, women, and children with values of 0.046, 0.054 and 0.23, respectively. Based on the cumulative risk assessment (CRA), there is no considerable health risk for the age group of adults from apple consumption (HI<1). Nevertheless, the children are at significant non-carcinogenic health risk due to consumption of unwashed (HI=1.3) apples. In general, the results indicate that the high occurrence of pesticide residues in apple samples can be considered a serious public health problem, especially for children. Hence, continuous monitoring, stricter regulations, training, and improving the awareness level of farmers and the public regarding residual of pesticide in fruits and vegetables are recommended.

Keywords: Apple, Pesticide residues, Risk assessment, Monte Carlo Simulation, Maragheh

Polycyclic aromatic hydrocarbons (PAHs) and butyltins in seawater, sediment, and fish samples from Ghazaleh estuary, Persian Gulf

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Abstract

Introduction: Ghazaleh estuary is one of the most important estuaries in the Persian Gulf, and due to extensive industrial and commercial activities in this region, there are environmental challenges caused by the entry of various pollutants into the region, including polycyclic aromatic compounds (PAHs) and butyltins (including TBT, DBT, MBT). The aim of this study is to measure PAHs and organic tin compounds in water, surface sediments, fish and in Ghazaleh estuary, Persian Gulf in 2020.

Methods: 13 PAH compounds and 3 organotin compounds were investigated in water, surface sediment and two benthic (Cynoglousus Arel- CA) and benthoplagic (Johnius belangeri- JB) samples. The amount of pollutants was measured using the GC-MS method in the comprehensive laboratory of Jundishapur University of Medical Sciences, Ahvaz.

Results: The mean of PAHs concentration in sea water, sediment, JB and CA fishes were 3481.82 ngl^{-1} and 6082.7 ng g^{-1}dw, 195.5 ng g^{-1}ww, 72.39 ng g^{-1}ww, respectively. The predominant PAHs in seawater, sediment and fishes included four-ring, five-ring and 2 + 3-ring species, respectively. The mean concentration of total organotins in sea water, sediment, and semi-brine fish and flounder was 5.4 ngl^{-1}, 64.1 ng g^{-1}dw, 10.43 ng g^{-1}ww, and 18.40 ng g^{-1}ww, respectively. Also, the predominant type of organotin was dibutyltin dioxide (DBD) in water samples, and tributyltin trioxide (TBT) in sediment samples. In the studied samples, the sources of PAH pollution was both pyrolytic and petrogenic, and the burning of biological materials was also effective in causing pollution in these samples.

Conclusion: The high concentration of PAH and organotin pollutants was considered as a risk factors in the region, so it is suggested to take necessary measures by the responsible organizations to reduce the level of pollution and protect the marine environment

Keywords: Persian Gulf, fish, sea water, sediment, Ghazaleh estuary Polycyclic Aromatic Hydrocarbons (PAH), organotin compounds (OT), TBT.

Investigating the relationship between exposure to urinary levels of endocrine-disrupting chemicals (Triclosan, Methyl triclosan, Triclocarban and 2,4-Dichlorophenol) with blood pressure and lipid profile in children and adolescents in Kerman city

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Abstract

Introduction: Endocrine-disrupting chemicals are one of the emerging factors in non-communicable diseases such as cardiovascular disease. These chemical compounds cause disruption in the endocrine system and exposure to them at sensitive ages of body development (childhood and adolescence) can cause non-communicable diseases. Therefore, in the present study, the relationship between several endocrine disrupting chemicals including Triclosan, Methyl triclosan, Triclocarban and 2,4-Dichlorophenol with blood pressure and lipid profile was investigated in children and adolescence.

Methods: Urine samples were collected from 79 children and adolescents in Kerman city and the amount of Triclosan, Methyl triclosan, Triclocarban and 2,4-Dichlorophenol was measured using GC.MS device. Then the systolic and diastolic blood pressure of the study subjects was measured. Fasting blood samples were taken from these people to measure their blood lipid profile.

Results: The results showed that 53.2% of the participants in the study were boys. The average Systolic Blood Pressure was 24.94 ± 10.74, the average Total Cholesterol was 163.91 ± 30.25. There is a significant positive correlation between the amount of Triclosan, Methyl triclosan, Triclocarban and 2,4-Dichlorophenol (µg/L) with Triglyceride (P-value:<0.05) and with Low-Density Lipoprotein (p-value:<0.05). The inverse relationship between the amount of Triclosan and Methyl triclosan with High-Density Lipoprotein (p-value:<0.05) was observed. No correlation between the amount of analytes and blood pressure was observed.

Conclusion: Exposure of children and adolescents to Triclosan, Methyl triclosan, Triclocarban and 2,4-Dichlorophenol was associated with an increase in blood lipid profile. Considering that the present study was conducted cross-sectionally, it is necessary to conduct a prospective study to confirm the findings of the present study.

Keywords: Endocrine Disrupting Chemicals, Obesity, Blood pressure, Lipid profile, Children

Investigation on the presence and abundance of microplastic in highly consuming marine and farmed fish species in Mazandaran province.

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Abstract

Plastic production has increased dramatically worldwide over the past 60 years and is now recognized as a serious threat to marine environments and human health. In the present research, the number, shape, size, color, and types of microplastics in the digestive tract and in the edible tissues of farmed and consumed sea fish (carp, white, trout, mullet) of the Caspian Sea in Mazandaran province were investigated. The sampling areas included Farah Abad-Sari, Babolsar Faridunkanar, Mahmood Abad, Qaimshahr, and Haraz River. A total of 70 fish samples (45 marine fish and 25 farmed fish) were collected from the regions. After digestion, the microplastics of the samples were extracted and counted with a stereomicroscope. The polymer type of microplastics was identified with a micro-Raman spectroscope. A total of 309 pieces of microplastics were counted, and the number of microplastics observed in the digestive system, gills, and skin of the fish was 232, 67, and 10 pieces, respectively, but no microplastics were detected in any of the fish edible tissue samples. The average number of microplastics in marine and farmed fish were respectively 2.64 and 0.72 pieces were in fish. Also, the results showed that the largest number of microplastics were in the size range of 250-500 micrometers. The predominant shape and color of microplastics were fibrous and white/transparent with an abundance of 97% and 41%, respectively. Identified polymers include light polyethylene (LDPE), polypropylene (PP), polystyrene (PS), and nylon, which had the highest percentage of abundance. This research showed that the pollution of plastic particles in the Caspian Sea is worrisome, so it is necessary to find solutions to reduce the use of plastics and control methods order to enter the water resources, especially the Caspian Sea. Also, wider and more comprehensive research should be done on the effects of microplastics on different aquatic animals at different levels of the food chain.

Keywords: Microplastic, Digestive system of fish, Caspian Sea, Polymer, Micro-Raman

A comparative study of TNF-α biomarker in healthy and asthmatic subjects and their relationship with ambient PM concentrations in dusty and normal conditions

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Abstract

Nowadays, the occurrence of dust storm and the increase of the concentration of ambient particles matter (PM) in the cities have been raised as a serious problem in the air pollution subject, and it has become important to investigate the extent of their health effects. The aim of this study was to determine the correlation between airborne particles matter levels and tumor necrosis factor-alpha (TNF-α) as a pro-inflammatory cytokine in exhaled air condensate (EBC) among two groups of studied subjects in Tabriz, Iran. In this panel study, 23 people with asthma complications and 23 healthy people without any lung complications were selected as two groups of subjects (asthmatic and healthy people). The data related to the concentration of ambient particles matter in different sizes (PM_{10}, $PM_{2.5}$, and PM_1) were obtained from three fixed air monitoring stations located in the study area. In order to investigate the effect of PM on the studied subjects, following the sampling of PM, pro-inflammatory cytokine of TNF-α were also determined in the exhaled breath condensate (EBC) samples via commercial ELISA kits. Daily mean ambient air PM_{10}, $PM_{2.5}$ and PM_1 concentrations during the non-dusty days were 48.37, 18.54 and 6.11 µg m^{-3} and in the dust storms days 221.79, 93.13 and 25.52 µg m^{-3}, respectively. The concentration of TNF-α biomarker in EBC was significantly ($p< 0.001$) higher in asthmatic subjects compared to the non-asthmatic people. TNF-α levels were increased in dust storm days compared to the non-dusty days ($p<0.001$) and were positively correlated with different size of ambient PM (PM_{10}, $PM_{2.5}$, and PM_1) concentrations. Dust storm conditions can increase the pro-inflammatory cytokines and cause adverse effects on pulmonary health. This study confirmed the relationship between the amount of air PM with the levels of pro-inflammatory cytokine and it can be used to estimate the effects of air pollutants on human health.

Keywords: Biomarker; TNF-α; Dust storm; Particulate matter

Challenges related to spreading compost in urban green space: Assessment of microbial risk from accidental ingestion of compost in children

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Abstract

One of the most important concerns for the use of municipal solid waste compost is the health risks associated with exposure to pathogens by the target group. In this study, Risk assessment was calculated by quantitative microbial risk assessment (QMRA) method for children who may accidentally swallow compost spread in public parks while playing. A total of 37 compost samples were analyzed to determine the presence of *Salmonella*, *Campylobacter*, *Cryptosporidium* and *Adenovirus* pathogens. For *salmonella*, suspicious colonies were detected and quantified by polymerase chain reaction (PCR) and *campylobacter*, *cryptosporidium, and adenovirus* using real-time PCR using specific primers, and the microbial risk was calculated for each microorganism . The highest median risk of infection annually and for one-time contact were calculated for *Cryptosporidium*, *campylobacter*, *adenovirus*, *and salmonella*, respectively. It should be noted that the risks of single-contact and annual infection of total microorganisms for children were higher than the standard set by WHO (10^{-3} pppy). According to the results of this study, the use of compost in urban green spaces and exposure to it in parks for children as a sensitive group causes health risks and infections. Therefore, it is necessary for the responsible organization to be more careful in carrying out the composting process and considering the time interval between the spreading time and the availability of compost to the public in order to have a better-quality product and prevent threats to health of society.

Key words: Compost- Municipal solid waste- Quantitative microbial risk- Pathogen- Accidental ingestion

Health risk assessment of gaseous pollutants (NOx, SO_2) released from Qom combined cycle power plant: the effect of changing gas and Gasoil fuel

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Abstract:

This study was conducted to measure the environmental concentration of sulfur dioxide (SO2) and nitrogen oxides (NO_X) and assessing the health risk and their relationship with the fuel change of Qom combined cycle power plant in three air pollution monitoring stations around this power plant. In this study, passive sampling was conducted in three air pollution monitoring stations around the power plant, i.e., Pardisan, Mahdiyeh, and Sagheh stations, and health risk assessment was performed for non-cancerous risks caused by exposure to SO_2 and NO_X through inhalation.The SO_2 Hazard quotients (HQ) values for all groups were less than 1.0. But NO_x HQ values for less than 2 years (infants) and 2 to 6 years (children) are HQ>1 and for other groups were less than 1.0. In addition, the calculation of the hazard index (HI) showed that the HI for NO_X was equal to 3.65, which was more than 1 and is considered a threat to human health. In general, the use of gasoil fuel by power plants significantly increases the emission of pollutants and, as a result, the concentration of pollutants in the surrounding areas, increases the health risk of the residents of this area, especially for children.

Keywords: Health risk assessment, Combined cycle power plant, Gaseous pollutants, Gas, Gasoil

Assessment of ecological risk attributed to Arsenic, Cadmium, Chromium in agricultural soils between Tehran-Qarchak area using Nemerow integrated risk index (NIRI)

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Abstract

Contamination of agricultural soil with heavy metals is a global problem and a serious threat to humans and natural ecosystems, and it is necessary to always monitor and evaluate the related risks. Due to the limitation of studies in the monitoring of all the elements present in the soil, the use of conventional ecological risk assessment methods may not assess the real ecological risk. Therefore, in this study, Nemerow Integrated Risk Index (NIRI) was used in order to reduce the effect of the small number of metals studied. This study was conducted on the agricultural lands between the Tehran south to Qarchak area, because this area is directly exposed to industrial activities and road traffic. Soil samples were first prepared and digested, and the concentrations of arsenic (As), cadmium (Cd) and chromium (Cr) were measured using an ICP-OES instrument. The results showed that the concentration of metals and their pollution index (PI) were in the order of Cr > As > Cd. The average values of PI for As and Cr and pollution load index (PLI) were in "moderate pollution" level. The average value of NIRI in this study was 16.50, respectively, illustrating that the ecological risk attributed to these three metals in the study area was low. However, in some places, the value of PI related to chromium was high, and it is necessary to pay more attention to this region in view of contamination with this metal.

Keywords: Agricultural soil, Ecological risk, Heavy metals, Nemerow Integrated Risk Index

Distribution of Harmful Metals concentration among High-Rate Food crops in Iran: A probabilistic Risk Assessment

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Abstract

Introduction: Ingestion is an important pathway that can increase the absorption of various chemical pollutants such as heavy metals (HMs) into the body. Vegetables and high-rate food crops can contain high concentrations of HMs based on the source of their irrigation water. However, consuming vegetables can reduce the incidence of various diseases and disabilities. This study was conducted with the aim of measuring the concentration of HMs in agricultural products and evaluating carcinogenic and non-carcinogenic risks.

Methodology: In this study, 30 product samples were collected from the popular market of Qom, then the concentration of HMs was determined by inductively coupled plasma-mass spectrometry (ICP-MS).

Results: The results showed that the average concentration of lead, copper, zinc, arsenic and cadmium was 21.1±7.14, 156.44±129.02, 288.46±114.59, 31.51±16.95 respectively. and it was 26.96±23.01 µg/s in µg/kg sample. Also, the results showed that the amount of heavy metals in children was As > Zn > Cd > Cu > Pb and for ELCR adults, Cd > As > Pb. The 95th percentile of the calculated hazard index (HI) of lead, copper, zinc and cadmium in children and adults was 2.84 and 1.88, respectively (target HI>1.0).

Conclusion: Therefore, the continuous consumption of crops can cause adverse effects on the health of children and adults. Also, the 95th percentile of ELCR calculated for Pb, As and Cd in children and adults was E-06.5.93 and E-05.184, respectively, because the ELCR value in this group is in the target of the World Health Organization, therefore, before both A low-priority action or design required further investigation.

Keywords: Agricultural products, Heavy metals, Risk assessment, Chemical pollutants

Health risk assessment of police officers to Al, Fe, Mn and Pb metal pollution caused by urban traffic

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Abstract

A metal such as lead is always the concern of environmental experts due to its destructive effects on the environment and is considered one of the main polluters of the environment. The purpose of this study is to evaluate the health effects of aluminum, iron, manganese and lead metals on human health in Babol city. Sampling was done in the summer of 1400 from designated stations with the help of (SKC) pumps and using a fiberglass filter. ICP-MS was used for metal analysis. The evaluation of determining the level of metal pollution was done using Enrichment Factor Index (EF), Land Accumulation Index (Igeo), Pollution Factor (CF), Pollution Load Index (PLI) and carcinogenic and non-carcinogenic risk. The pollution load index for the two sizes of PM4 and PM100 particles is greater than 1, which indicated poor quality. Lead element showed a negligible carcinogenic risk factor.

Keywords: Heavy metals, Cancer risk, Ecological risk, Air pollution

Quantitative Health Risk Assessment Of Nitrate, Nitrite, And Fluoride In Groundwaters Of Southern Parts Of Hormozgan province, Iran

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Abstract

Contaminant levels in water sources may increase due to human activities, poor waste and wastewater management, and geological factors. Therefore, exposure to these contaminants could pose a risk to public health. This study aimed to assess the health risks due to ingestion exposure to nitrate, nitrite, and fluoride in groundwater in the town of Beshagard, Hormozgan province. Nitrate, nitrite, and fluoride concentrations were measured at 47 locations. Hazard Quotient (HQ) due to nitrate, nitrite, and fluoride exposure was assessed in four age groups.

Further, the uncertainties of health risk assessment were examined using R software (version 6.32) and the mathematical-statistical Monte Carlo technique. According to the findings, the two-year average nitrate, nitrite, and fluoride concentrations were 3.83, 0.06, and 0.63 mg/liter, respectively. The highest HQ value of nitrate (0.136), nitrite (0.033), and fluoride (0.593) were related to the age group of children. According to the results of the probabilistic health risk assessment, the mean HQ values for infants, children, teenagers, and adults were (0.11), (0.71), (0.50), and (0.40), respectively. Therefore, based on the US EPA threshold level, children are at greater risk than other groups. The hazard index (HI) for infants, children, teenagers, and adults was 0.107, 0.761, 0.537, and 0.430, respectively. Given that the highest risk index (HI) was associated with children, nitrate, nitrite, and fluoride concentration increases can cause more adverse health effects in this age group. Therefore, to reduce the concentration of nitrates in water resources, it is suggested to take management and control measures in high-contaminant areas.

Keywords: Nitrate, Nitrite, Fluoride, Risk assessment, Monte-Carlo

Assessment of quality of drinking water sources in the coastal semi-desert region in the southeast of Iran using the water quality index and deterministic and probabilistic health risk assessment

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Abstract

Background: Considering the vulnerability of groundwater pollution, the use of a water quality index for health risk assessment is one of the tools that can be used by the decision-makers of groundwater resource management to protect groundwater from pollution by human activities.
Methods: In this study, fifteen parameters (pH, EC, TDS, turbidity, nitrite, nitrate, fluoride, total hardness, bicarbonate, chlorine, sodium, potassium, calcium, magnesium, and sulfate) were used to evaluate the water quality index of Jask city. Human health risks due to nitrate, nitrite and fluoride contamination were determined in 22 underground water samples.
Results: The results showed that the range of WQI values was between 14.85 and 234.48 with an average of 82.97 and 40.90, 36.37, 9.09, and 13.64 percent of the samples were in the excellent, good, poor, and very poor-quality, respectively. The values of the hazard quotient (HQ) in the deterministic method for exposure to fluoride and nitrite pollution were greater than 1 in some samples for different age groups, but exposure to nitrite did not pose any risk. Monte Carlo simulation showed that in the 95th percentile of all age groups, the value of the hazard index (HI) was greater than 1, and the value of the index was high in the children, then the teenagers, and finally the adult groups. The level of certainty in the group of children, teenagers and adults was determined to be 60%, 65% and 81%, respectively. Based on the sensitivity analysis of results, the most important parameter was obtained. According to the results of WQI and risk assessment, it can be concluded that appropriate measures should be implemented to reduce exposure to drinking water contaminated with fluoride and nitrate in the study area.
Conclusion: Water treatment is needed to improve drinking water in the study area.

Keywords: Drinking water, Water quality index, Monte Carlo simulation, Sensitivity analysis, Jask city

Evaluate the toxicity of the effluent warm water fish farms by application of Batch flow bioassay using Daphnia Magna

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Abstract

Introduction: Assessment of living organisms' contingence to pollutants (bioassay) is an essential tool for the control of pollutants. Bioassay is a suitable method to determine the toxicity of chemicals and toxic wastes and contaminated water effects on the aquase environment and acute toxicity test with Daphnia, a family of crustacean (especially daphnia magna is the most applicable procedure for this propose). The Karun River and its branches, including the Gregar, are considered to be the most important surface stream in southwest Iran and the main source of supplying water, industrial, agricultural and urban needs in Khuzestan province (the most important industrial province of the country).

Method: In this study noncontinuous (batch) method was applied using Daphnia Magna to determine the toxicity of fish farms in Gargar river. Ultimately, 8 ratios (0.005,0.01,0.03,0.15,0.25,0.37,0.55.0.7) were selected by dividing the maximum drainage flow of fish farms on Gargar river flow (mean of 5 years data). Then, the test solutions were prepared based on obtained dilutions and 10 Daphnia of the third generation were released in 150 ml beaker. Per each volume ratio the number of alive organisms were counted and recorded after 24,48,72,96 hours' contiguity. By calculating LC_{50} the toxicity of wastewater of fish farms were obtained at any contiguity time using Probit analysis and R version 3.2.3. Then, the coefficients of SAFE, SAR were calculated in any ratio. The water quality parameters including dissolved oxygen, pH and temperature were also measured and recorded on a daily basis.

Results: The calculated LC_{50}' s at 24,48,72,96-hour for the control (distilled water) were 0.7,0.25,0.55,0.005 ml/ml, respectively. While, the calculated LC_{50}'s at 24,48,72,96 -hours for the case (river water) were 0.55,0.15,0.01,0.005 ml/ml,. In addition, the safety coefficients as well as the application of the safety coefficient ratio were calculated at 3 and 0.015, respectively.

Conclusion: The results showed that, the fish farm wastewater volume ratios in this study, can be discharged into the river. Based on the obtained results, all living organisms (Daphnia magna as very sensitive organism) in receiving waters, for this circumstance, have adequate security against waste water of fish farms and their life will not threatened.

Keywords: Bioassay, Fish farm, Daphnia magna, Gargar river

Evaluation relationship between health, safety and environment (HSE) and radiation received and incidence of cancer among the radiation workers

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Abstract

Radiation have short and long-term effects. Radiologists and radiotherapists are exposed to high levels of radiation compared to other people. The aim of this study was to determine the effect of HSE condition on employees at radiation sections of hospitals and survey incidence of cancer among them. In this study, 17 departments related to radiation in 8 hospitals in Tabriz were examined. This survey is the cross-sectional that done in two parts. 1) Survey of HSE condition at radiation sections of hospitals 2) Investigation of dose received among radiologists and survey incidence of cancer among them. The two-months and annual dose received, in 29 and 54 subjects were more than the standard level, respectively. The results of the HSE condition survey showed, the overall score obtained in all hospitals meanly at three sections of radiation safety, general safety, and emergency safety was 75.5±10.2, 88.2±8.5 and 47±10.6, respectively. Also, in terms of the suspected symptoms of cancer related to a radiation, fortunately no cases were found. High scores on items such as use of individual dosimeters, use of proper PPE, equipment safety checks, device leak testing, the presence of safety warnings and attention to the HSE issues can reduce radiation exposure and the amount of dos received among studied subjects. So, no statistically significant relationship was found between the mentioned items and the incidence of cancer among radiation workers. Positive attitude and observance of HSE principles can have positive effects on the health of radiation workers. Observe safety principles cause reduce received dose and reduce anxiety about catching the occupational disease.

Keywords: HSE, Hospital, Radiation Safety, Occupational disease

Investigating pollution and environmental degradation of hydrocarbons and gas flares of Nargesi oil refinery on Nakhilat date product in the conservation area of Dalki, Vahdatieh and Saadabad cities

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Abstract

Introduction: The distribution of air pollutants in industrial units is one of the things that always affects the environment and the ecosystem of nearby areas. Calculation of emission coefficients is one of the simple and low-cost methods for evaluating the amount of pollution from polluting sources. Among the polluting sources,the emission coefficients of burners are associated with a high error ,because the amount of combustion

in burners is uncertain, especially in emergency situations ,and accurate information about the actual combustion efficiency of burners is not available. Dates are one of the country's strategic products, especially in Bushehr province. The ignition process of burners is considered as the main environmental challenge of this complex. The present paper has been carried out in order to evaluate the emission coefficients of three pollutants SO2, NOX and CO in the burners in order to measure the quality of date products in the suburbs of Nargesi Oil Refinery.

Materials and Methods: In this research, the inverse calculation method based on environmental measurement along with modeling was used to estimate the emission coefficients of the desired gaseous pollutants for a sample of a gas burner in the gas flare units of Nargesi Oil Refinery in Dashtestan. The average emission coefficients of NOx, SO2 and CO pollutants for this sample burner were determined as 1/07, 0/037 and 0/0168 IB/MMBTU, respectively, with uncertainties equal to 5/27, 3/34 and 3/36%.

Results: These emission coefficients with the emission coefficients presented in the references, including the emission coefficients of the US Environmental Protection Agency (EPA)and the Latin American Petroleum Association(ARPEL)showed that both references are used to estimate the amount of emissions of pollutants, especially in the case of CO pollutants. and NOx have a high error. Therefore, the use of general emission coefficients in this case will result in a gross error, and in this case, it is better to analyze the fuel directly on the fuel entering the burner.

Conclusion: In order to determine the actual coefficients of gas burners, careful studies on the effect of environmental conditions on the efficiency of burners along with the measurement of pollutants by simulating gas burners, as well as direct and remote measurement methods to determine emission coefficients Torches are required.

Keywords: Pollution, Hydrocarbon, Oil refinery, Dates, Environment

Investigating the effects of exposure to heavy metals Arsenic, Lead, Chromium and Zinc on blood pressure and lipid profile in children and adolescents in Kerman city

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Abstract

Introduction: Heavy metals are one of the factors affecting obesity and cardiovascular diseases. Increasing exposure to natural and artificial metals has put health at risk. Therefore, in the present study, the relationship between exposure to heavy metals Arsenic, Lead, Chromium and Zinc on blood pressure and blood lipid profile in children and adolescence was investigated.

Methods: In this study, 106 children and adolescents (6 to 18 years old) from Kerman city were examined. Blood lipid profile (Total Cholesterol, Triglyceride, Low-Density Lipoprotein, High-Density Lipoprotein) and Blood Pressure (Systolic and Diastolic) were measured. The amount of metals in the urine sample of the study subjects was measured using an Inductively Coupled Plasma Mass Spectrometer (ICP.MS).

Results: The average age of the subjects studied was 11.42 ± 3.68 years. The average Total Cholesterol was 172.96 ± 44.50 and Systolic Blood Pressure was 83.73 ± 9.00. Metals Arsenic (μg/L) (β = 0.85), Lead (μg/L) (β = 1.08), Zinc (μg/L) (β = 0.07), positive and significant relationship and Chromium metal (μg/L) (β = -125.57) negative and significant relationship with Total Cholesterol was observed. Metals Arsenic (μg/L) (β = 0.53) and Lead (μg/g.cr) (β = 0.40) had a positive and significant relationship with Triglycerides. Metals Arsenic (μg/L) (β = -0.15), Zinc (μg/L) (β = -0.01) had a negative and significant relationship with High-Density Lipoprotein. Arsenic metals (μg/L) (β = 0.71), Lead (μg/L) (β = 0.99), Zinc (μg/L) (β = 0.06) positive and significant relationship and Chromium variable (μg/L) (β = -70/72) negative and significant relationship with Low Density Lipoprotein was observed. Chromium metal (μg/L) (β = 23.61) had a positive and significant relationship and Lead metal (μg/g.cr) (β = -0.13) had a negative and significant relationship with Systolic Blood Pressure.

Conclusion: The present study showed that all the studied children and adolescents are exposed to heavy metals Arsenic, Lead, Chromium and Zinc and the relationship between the examined metals with blood lipid profile and Lead and Chromium metals on blood pressure was observed.

Keywords: Arsenic, Lead, Chromium, Zinc, Blood pressure

Investigation of bacterial and fungal bioaerosols in the outdoor air of Mashhad in the year 2021

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Abstract

background: Bacteria and fungi are present everywhere as the most important and abundant biological aerosols. The concentration of these compounds in the air is important to evaluate the effects of air pollution on human health. Occurrence and exposure to high levels of microbial bioaerosols such as pathogenic bacteria, fungi, fungal spores can be associated with environmental and public health deterioration. In this study, density, concentration and dominant species of bioaerosols were investigated in 6 selected stations in outdoor air of Mashhad In the year 2021.

methodology: This study is descriptive. Sampling of bioaerosols was done using a Quick Take environmental sampler pump with a flow rate of 14 liters per minute and a single-stage Anderson model impactor (SKC Biostage 400). Sampling days were determined using EPA calendar scheduling. The culture medium used for sampling bacterial and fungal bioaerosols was respectively blood agar with niacin antifungal compound and sabro-dextrose agar with penicillin antibiotic.

Results: The results of this study indicate that the total concentration of fungal bioaerosols in all 6 selected stations was higher than bacterial bioaerosols. The highest density of bacterial and fungal bioaerosols among the studied stations was station 2 (89.49±25.99 CFU/m3) and station 3 (102.59±69.55 CFU/m3), respectively. Among the bacterial and fungal bioaerosols, Escherichia coli and Aspergillus species have the largest share, respectively.

Conclusion: In this study, the dominant species that were identified were among the pathogenic factors and can threaten public health, as a result, comprehensive monitoring of the concentration of airborne bioaerosols is very important not only for environmental management but also for evaluating the health effects of air pollution. Identifying the environments that cause more growth of bacteria, fungi or pathogens can be used to create effective protective measures against their health effects.

Keywords: Air pollution, Bioaerosol, Airborne bacteria, Airborne fungi, Mashhad

Investigating the spatial distribution and zoning of nitrate and nitrite concentration in the drinking water distribution network of Shiraz city and the health risk caused by their concentration using sensitivity analysis and Monte Carlo simulation

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Abstract

The purpose of the present study is to investigate the spatial distribution and zoning of nitrate and nitrite concentration in the drinking water distribution network of Shiraz city and the health risk caused by their concentration using Monte Carlo simulation and sensitivity analysis. In this cross-sectional study, the nitrate and nitrite concentration and the health risk caused by them were studied from 26 points of the city's drinking water distribution network. The nitrate and nitrite average concentrations were 22.62 and 0.002 mg/L, respectively. Based on zoning, the concentration of nitrate and nitrite shows an increasing trend from the north to the middle and southeast of the city. The amount of HQ nitrate in the studied groups in the age group of children and adults were 0.919 and 0.394, respectively. In addition, HQ values of nitrite in the age groups of children and adults were 0.001 and 0.00, respectively. These results show that this ion does not have any adverse effects on the studied age groups. Based on the Monte Carlo simulation, HQ95 caused by exposure to nitrate and nitrite ions in the age group of children was greater than one, which indicates the non-carcinogenic risk of nitrate and nitrite for 95% of the population of the study area. Based on the results of the sensitivity analysis, the most effective factor in the health risk caused by nitrate and nitrite ions is the concentration of these ions in the drinking water distribution network. Therefore, reducing the concentration of these ions in drinking water can reduce the risk caused by them.

Keywords: Nitrate, Nitrite, Risk Assessment, Sensitivity Analysis, Monte Carlo Simulation.

Investigating health risks of heavy metals in cabin car dust and air of different vehicles in Ahvaz city

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Abstract

Heavy metals are concern due to their non-biodegradable nature, toxicity and ability to bioaccumulate. During the last few decades, heavy metal pollution in indoor dust has been widely studied in streets,residential houses and schools. This is despite the fact that the quality of the environment inside the cars has not been considered enough. For this purpose, 10 domestic car's(Saipa and Iran Khodro) and foreign cars were selected in 8 areas of Ahvaz city. The condition of choosing the cars for this research it was not to wash the cars for a week. Then, samples were taken from inside of the cooler (air conditioner) filter dusts and the cabin of each car and were collected and coded in special plastic bags. In order to determine the composition of heavy metals, Inductively Coupled Plasma (ICP) spectroscopic analysis was performed for 34 heavy metals. Examining the HQ and HI index in the present study indicates the values of more than 1, in other words, the high risk of heavy metals in dust is Pb > Cu > Cr > Fe > Zn > Cd > Ni respectively for heavy metals, this path in children, HQinh < HQder < HQing, and in adults it follows the trend of HQing < HQder < HQinh. It should be noted that the risk of non-carcinogenic risk except heavy metals Fe and Cu for children is estimated to be higher than that of adults in other mentioned metals. The investigation of the CR index for the three carcinogenic heavy metals cadmium, chromium, and arsenic has exceeded the safe level, and like the HI and HQ indices, the target of heavy metals is the oral route for children and the respiratory tract for adults.

Keywords: Heavy metals, Health Risks, Ahvaz City, Cabin Car Dust

Investigating the concentration of some metals in the fruits available in Shiraz market: health risk assessment

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Abstract

Introduction: With the increase in population and the need for food along with the excessive use of pesticides and fertilizers, the contamination of agricultural products has become an increasing concern for the public and policy makers of developing countries.

Methods: In this study, the concentration of some elements in the fruits of Shiraz city market was evaluated using ICP-MS device.

Results and discussion: the highest average concentration (in micrograms per kilogram) in aluminum (519.69), chromium (VI) (20.63), iron (802.80), nickel (60.40), lead (35.52)), copper (208/05), cobalt (6/79), mercury (4/38), zinc (856/57), manganese (966/09), arsenic (7/50) and cadmium (4/40) in order were black plum, nectarine, black plum, peach, black plum, cherry, pear, cherry, banana, banana, cherry and cherry. It was children and adults. The cancer risk of toxic PTEs was in the safe range for children and adults (except for nickel) and the cumulative cancer risk of elements in some apples and peaches was not safe for adults (<10-5).

Conclusion: This study shows that most fruits are safe for human consumption, but the monitoring of elements in fruits should be considered.

Keywords: Fruits, Selected elements, Risk assessment, Shiraz

Assessment of Hospital Infections Frequency in One of the Major Teaching Hospitals of Iran

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Abstract

Background: Nosocomial infections are serious problems that reduce the quality of health care, affect the lives and health of patients, and impose huge costs on health systems. The purpose of this study is to investigate the frequency of nosocomial infections in one of the largest teaching and research hospitals in the country.
Methods: This cross-sectional descriptive study was carried out using data related to nosocomial infection in one of the largest teaching hospitals in Iran, between 2017 and 2021. Data were extracted using the HIS system and referring to the files of patients with infections. Data analysis was done using descriptive statistics including mean and standard deviation, frequency and frequency percentage, and using SPSS software version 25.
Results: In total, among the 266,089 hospitalized patients, 10,596 were infected with nosocomial infections during the five-year period under investigation (incidence of infection among hospitalized patients was 3.97%). Neurosurgery ICU was identified as the most prone to infection with more than 44% of infection, and urinary tract infection accounted for the most type of hospital infection with 30.86%. Acinetobacter, present in 20.35% of hospital infections, was identified as the most common microorganism causing infection, and the urinary catheter, with nearly 2,500 cases of infection, was identified as the most effective treatment tool in causing infection.
Conclusion: Despite the acceptable situation of hospital infection prevalence in this study, the general trend indicated an increase in the rate of these infections in the five-year period under investigation. In order to improve the situation of hospital infections in our country as much as possible, it is necessary to design and implement interventions based on social marketing in order to remove obstacles to improve the current situation, in addition to correct policy making and designing innovative prevention programs.

Keywords: Nosocomial infection, Frequency, Teaching hospital

Investigating the quantity and quality of solid waste produced in the comprehensive health service centers in Yasouj city in 2021

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Abstract

Background: In today's civilized world, the hot topic of "garbage" is one of the important environmental challenges. Providing medical services in the pursuit of improving health indicators leads to the production of all kinds of waste in the health and treatment centers. This research aimed to investigate the quality and quantity of solid waste produced the comprehensive health service centers in Yasouj city.

Methods: In this descriptive and cross-sectional study, 16 health-treatment centers and 16 health centers in Yasouj city were examined in 2021. The amount of waste produced per day in each center, the amount of components of the waste were analyzed through the separation and weighing of waste during two seasons, summer and winter, and the data were analyzed using SPSS and Excel software .

Results: The total production waste in all health-treatment centers and health centers were 110.58 and 86.9 kg per day, respectively. The production rate of ordinary waste, infectious waste, sharp waste, and chemical and pharmaceutical waste in health-treatment centers was 78.42, 26.91, 4.35, and 0.9 kg per day and in health centers 58, 24.97, 3.93 and 0 kg per day respectively. According to the results, ordinary wastes were the most types of production wastes in the study area and were significantly ($p<0.05$) more than other wastes. There was no significant difference between the amount of infectious, sharp, and chemical waste in health-treatment centers and health centers ($p>0.05$).

Conclusion: The obtained results indicate that the total amount of waste production in the health-treatment centers and health centers was less compared to similar studies in other health centers. However, considering the potential health and environmental risks of these wastes, it is necessary to consider specialized training in this field for personnel and to continue monitoring continuously.

Keywords: Health, Treatment, Waste, Yasouj

Investigating the quality of mineral and bottled water supplied in Saveh city

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Abstract

background: Water is the most important food item with the highest consumption, for this reason, the consumption of healthy drinking water is one of the most important health issues that affect the health of the consumer. Nowadays, the consumption of mineral and bottled water has spread among the people, and the most important thing is people's trust in the consumption of such substances, so it is necessary to investigate its quality by the monitoring bodies or organs. The main goal of the plan is to investigate the physical, chemical and microbiological quality of mineral and bottled water in Saveh city.

methods: 5 brands of mineral and bottled waters of Saveh city including (4 common brands offered in most areas of the city and 1 brand produced by Saveh city or a brand that is less available in the city) were selected. The samples were transferred to the laboratory of Saveh University of Medical Sciences and were examined based on the guidelines of standard methods for the examination of water and wastewater for physical, chemical and biological parameters.

Results: The average concentration of total dissolved solids in 5 brands A, B, C, and E was equal to 276, 270, 140, 187 and 155 mg/L, respectively. The average fluoride was 1.2, 0.48, 0.99, 1 and 0.5 mg/L, respectively. Also, the amount of UV $_{254\ nm}$ in the mentioned brands was 0.034, 0.017, 0.029, 0.031 and 0.026 1/Cm, respectively.

Conclusion: All the samples were free of any contamination of coliform bacteria, faecal coliform and heterotrophic microorganisms. The values of the physical and chemical parameters measured in this research were compared with the relevant standards and the results showed that all the measured concentrations were lower than the maximum allowed measured by the National Standards Institute of Iran, the World Health Organization, the Food and Drug Organization and the International Water Association of Bottled Water. Also, most brands have fluoride in the standard level.

Keywords: Mineral waters, Bottled water, Saveh, Water quality

Investigating the air quality of Yasouj-Gachsaran road tunnels in 2020

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Abstract

Background: Polluted air in tunnels is an issue that is of particular importance due to the traffic of vehicles and as a result the accumulation of pollutants. If the tunnels do not have proper ventilation, the concentration of pollutants can cause many health risks. The study aimed to measure CO and NO_2 pollutants in tunnels No. 4 and 5 of Yasuj-Gachsaran road.

Methods: In this study, the air of tunnels No. 4 and 5 of Yasouj-Gachsaran road was sampled to measure CO and NO_2 pollutants. For this, air sampling was done at three points of each tunnel. These points were selected in the first and last 100 meters of the tunnel (point a and c respectively), as well as in the middle of the tunnels (point b). Sampling was done monthly and with 3 repetitions (with a time interval of 30 minutes). CO was measured by a portable analyzer CO/CO_2 meter made by AZ Company, Taiwan, and NO_2 was measured by BABUC/A gas pollutant environmental analyzer made in Italy, model 2004.

Results: The overall averages of CO and NO_2 in the tunnels ere 43.9 ± 13.7 ppm and 0.18 ± 0.12 ppm, respectively. The highest concentrations of CO and NO_2 were 70 ppm and 0.36 ppm, respectively, which were observed in tunnel No. 5. The average concentrations of CO in tunnels No. 4 and 5 were 43.4 ± 12.6 ppm and 44.3 ± 14.8 ppm, respectively; these concentrations for NO_2 in tunnels No. 4 and 5 were 0.168 ± 0.08 ppm and 0.177 ± 0.1 ppm, respectively. The highest concentrations of CO and NO_2 were at point b, which were 62 ± 6.2 ppm and 0.29 ± 0.032 ppm, respectively.

Conclusion: There was no significant difference in the concentration of pollutants in different tunnels and months of the study; but the concentration of pollutants in the middle of the tunnels was significantly higher than the beginning and end points, so it is necessary for people passing through this tunnel to reduce exposure by using appropriate methods.

Keywords: Pollution, Tunnel, Air, Yasuj

Investigating the pollution level and the heavy metals concentration in the sediments of Kermanshah wetlands

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Abstract

Wetlands are very important and sensitive aquatic ecosystems in terms of their unique characteristics. Unfortunately, nowadays many wetlands have suffered a decline in environmental quality due to industrial and agricultural activities. In the hydrological cycle, more than 99.9% of heavy metals are stored in the sediments and soil of wetlands. Therefore, sediment analysis is a suitable method to measure regional pollution. Heshilan Wetland is considered one of the unique ecosystems of Iran and provides drinking and agricultural water. In this research, due to the environmental and health importance of Heshilan lagoon, the content of heavy metals zinc, lead and cadmium in sediments has been measured. Also, the pollution intensity of wetland sediments was measured using Mueller's ground accumulation indices, pollution index and comprehensive pollution index in 128 samples. Digester method and atomic absorption device were used to measure heavy metals. According to the obtained results, the average index of land accumulation showed the following trend: cadmium > zinc > lead. The results of the study show that the sediments of this wetland are favorable in terms of heavy metals compared to international standards and there is no significant pollution and the level of pollution is within the safe range of drinking water. However, regular and continuous monitoring of the wetland as a unique and valuable ecosystem is necessary to control the entry of pollutants, adjust the pollutants that have already entered and prevent new pollution.

Keywords: Wetland, Sediment, Heavy metal, Pollution Index

Occurrence and exposure assessment of microplastics in indoor dusts of buildings with different applications in Bushehr and Shiraz cities, Iran

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Abstract

The increase in annual usage of plastics for different purposes has led to an increase in microplastics (MPs) particles in various environments including inside of buildings. In the present study, levels and characteristics of MPs in the indoor dust of buildings with different uses including residential house, mosque, hospital, kindergarten, and university in two cities, Bushehr port and Shiraz in Iran, were determined. Thirty dust samples from various buildings were collected. The average numbers of MPs in the indoor dust of buildings of Shiraz and Bushehr were 90.8 and 80.8 items/mg, respectively. Fiber and polyethylene (PE) were the most common shape and polymer types of identified MPs, respectively. The highest number of MPs was observed in the indoor dust of kindergartens with a mean number of 121 items/mg in Bushehr and 104 items/mg in Shiraz. Except for mosques, a significant difference (p-value <0.05) were not observed between the MPs levels of buildings with similar applications in Bushehr and Shiraz cities. In addition, the high daily intake to MPs via indoor dust ingestion and inhalation were found for infants in kindergartens and mosques. The results of this study showed that MPs are present in high concentrations in indoor environments and may pose a high exposure risk for different age groups.

Keywords: Daily intake; Indoor dust; Kindergarten; Hospital; Mosque

Determination of 2, 4-dichlorophenoxyacetic acid concentration in Ahvaz water distribution network

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Abstract

Background: 2, 4-dichlorophenoxy acetic acid is a well-known herbicide which can be dangerous for both human and animal health in different ways such as its presence in drinking water. The purpose of this study was survey on 2,4-D concentration in Ahvaz drinking water.

methods: A descriptive cross-sectional study was based on 10- month sampling program in six points of distribution networks were conducted. For this purpose, the samples were collected before, during, and after cultivation.To separate and measure the concentration of 2, 4-D, HPLC instrument (Knuar, Germany) and EZ-chrome software equipped with a four-channel pump (model k-1001) and UV-vis detector (model degasser, k-2600) was applied.

Results: All measured concentrations were less than the maximum allowable concentrations recommended by the National Standards Organization of Iran (1053) and WHO guidelines. In this study, the total THMs determined in autumn, winter and spring ranged from <0.004-2.98µg/L, 0.02-2.41µg/L and 0.01-0.04µg/L, and in summer less than the LOD, respectively.

Discussion, and conclusion: Different studies have shown that pesticides residue concentration in water samples have a relationship with the amount of pesticides used in an area, physical and chemical refractory properties of pesticides and environmental conditions. Thus, using resistant pollutants such as pesticides will be a serious threat to health of water consumers if they are not properly controlled.

Keywords: 2,4-D, Distribution network, Drinking water, Ahvaz

Biosorption of Tetracycline and Reactive Blue 19 by Pseudomonas Putida PTCC 1694 from Aqueous Solution

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Abstract

The study looked at the ability of Pseudomonas putida (P. putida) microbial biomass to biosorption of reactive blue 19 and tetracycline antibiotics from aqueous solutions. The biosorption of reactive blue 19 and the tetracycline antibiotic by the living microbial biomass of P. putida was investigated in a batch system under several conditions such as concentration parameter, contact time, biomass value, pH, temperature, and ionic size. The results of the experiments showed that the optimum sorption values were at pH of 7, the initial concentration of 50, the contact time of 24 h, the temperature of 37°C, and the biosorbent dosages of 0.1 g/L for tetracycline and 1 g/L for reactive blue 19. The specifications of biomass surface complexities in biosorbent were confirmed by SEM and FTIR. The isothermal data of the experiments were analyzed using the Langmuir and Freundlich isotherm equations. The results of the model describing the biosorption data showed that the Langmuir model had a better adaptation to experimental data compared to the Freundlich isotherm (R^2 values for tetracycline was 0.42 and for reactive blue, it was 0.8919). The maximum biosorption capacity for tetracycline was 19.84 mg/g and for dye was 5.94 mg/g. According to the results obtained, *P. putida* strain has an acceptable biosorption capacity and can be used as a native strain for bio-synergy of activated sludge in the removal of TC and RB19 compounds from aqueous solutions.

Keywords: P. putida; Tetracycline antibiotic; Reactive blue dye; Biosorption

The relationship between mortality from respiratory diseases primary and secondary school students of Tehran's air pollution during the years 1390 to 1400

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Abstract

introduction and importance of the issue: Air pollution affects the health of the community. In recent years, Tehran's citizens have been faced with the problem of Tehran's air pollution many times, and the increase in air pollution has had a profound effect on human daily life, and annually, many people are suffering from respiratory illnesses and leading to their deaths. This study aimed to estimate the number of deaths from respiratory disease attributable to air pollution in Tehran in the first grade students of primary and secondary schools (children 6 to 16 years) in the years 1390 to 1400, respectively.

Materials and Methods: This is a cross-sectional study conducted in Tehran. Data on mortality from respiratory disease during the study period (1390 to 1400) of the Environmental Protection Agency and the cemetery were received. Statistical methods such as correlation coefficient and linear regression equation were used to analyze the data of deaths from respiratory diseases using Excel and SPSS software.

Results and discussion: The results showed that 451 children in the period 1390 to 1400 because of breathing problems have lost their lives in Tehran. There was also a significant relationship between mortality from the studied diseases and air pollution. There was no significant relationship between the gender of the deceased and the cause of death (sig = 0.819). Children 6 years old are less sensitive to air pollution (48). The average age of 11.68 years was dead. 399 of the dead were boys and 290 are girls. Most deaths (251 cases) due to respiratory failure due to abscess and only 18 people had lost their lives.

Conclusion: In general, the highest correlation between air pollution and mortality associated with different months of September and October months. This means that the death rate has risen as much as the temperature dropped. Given the rapid population growth and increasing well-being of the community, which is a major cause of air pollution in the near future, air pollution can pose a serious threat to the health of community members, especially vulnerable groups such as children and the elderly.

Keywords: Air pollution, Mortality, Respiratory diseases, Children, Tehran

Distribution trend of BTEX compounds in ambient air of urban solid waste landfill sites and surrounded environment: A case study on Ahvaz, Southwest of Iran.

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Abstract

Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) are classified as hazardous air pollutants that have been identified at landfill sites and surrounding environments. Therefore, in the present study, BTEX concentrations were measured at new and old solid waste landfill sites of Ahvaz during cold and warm seasons. Ahvaz, as one of the megacities in the southwest of Iran, produces more than 1,000 tons per day of solid waste. The produced solid waste is transported to the new site of Borumi landfill site which is located in 31° 17'28 "N and 31° 18'31" N latitude and 48° 48'12 "N and 48° 50'15" longitude. Air samples were taken in both cold and warm seasons from 6 points including, one point in the new site, three points in the old site, a point between two sites, and one point in the city boundary (as background point). Air sampling was performed in the prevailing wind direction (the south-east wind) and the meteorological parameters including temperature and relative humidity were also measured during air sampling. The results showed that the emission rate of BTEX compounds in the old and new landfill sites of Ahvaz is considerable. So that, the highest concentrations in the old landfill site in the warm season for benzene, toluene, ethyl-benzene, and xylene were 173.82, 234.51, 246.18 and 20.84 ppm, respectively. However, these values in the cold season were 16.6, 50.04, 2, and 70.28 ppm, respectively. It shows that the concentration levels of BTEX were significantly higher in the warm season compared to the cold one.

Keywords: Volatile Organic Compounds, BTEX, Municipal Solid Waste, Landfill Sites, Ahvaz.

Measurement of concentrations of heavy metals (cobalt, lead, cadmium, nickel and vanadium) in water tanks Balance of merchant ships entering the Persian Gulf (Bushehr port)

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Abstract

Introduction:Shipping is one of the most important ways of transporting non-native species.The present research aims to investigate the concentration of heavy metals(cobalt,lead,cadmium,nickel and vanadium) entering through the balance water of ships in two seasons(winter2020 and summer2021)in It was carried out in Bushehr port area.The transfer of chemical substances as well as different animal and plant species through water balance is one of the reasons for the importance of this global problem.

Materials and methods:Sampling was done seasonally in the winter of 2020 and the summer of 2021 from the water and sediments in the balance water tanks of ships entering Bushehr port customs.The routes of South America and Southeast Asia were carried out.9samples were prepared from water and sediment in each ship and after preparation by EPA method,the concentration of heavy metals was measured using ICP device.

Results:The average concentration of heavy metals lead,cobalt,cadmium,nickel and vanadium in water samples in two seasons in the South American route were1/54±4/31,1/19±3/41,1/02±1/73,1/45±3/33and 0/01±0/5(mg/liter)and in the Southeast Asian route,the average metals were 0/92±4/20,0/75±1/92,0/32±1/25, 0/61±1/66and0/01±0/05.Also,the average concentration of the mentioned metals in the sediment samples of reservoirs on the South American route in two seasons were 10/62±65/50, 4/45±27/60, 0/001±0/10, 3/30±47/83 and 1/56±25/46 (mic.gr per kg) and its max amount is 10/75±67/50, 4/47±29/50, 0/001±0/10, 1/95±50/93 and 2/00±25/70 (mic.gr per kg) and on the route of Southeast Asia, the average metals in two seasons were 23/45±94,3/21±29/03,0/001±0/10,5/05±55/50and 3/25±41/32(mic.gr per kg)and its max amount is 29/41±106,3/67±32/90, 0/001±0/10,3/79±61/12and2/76±41/85(mic.gr per kg).Also,by comparing the

concentration of metals in water and ship sediments,no significant difference was observed between the two seasons.Also,the amounts of metals for both routes and both seasons in the sediments of reservoirs are significantly different from the amounts in water Shet($P<0.05$).After evaluation,statistical data was analyzed based on Excel and SPSS.26.

Conclusion:The comparison of the concentration of the above metals with the standard values of ROPME water and EPA sediment showed that the concentration of the mentioned metals in the water and sediments of the balance water tanks of the investigated ships,according to the values considered in the standard,was within the standard range.The discharge of its balance water in the region does not cause environmental pollution of the mentioned heavy metals.

Keywords:Balance water, Heavy metals, Bushehr Port, Persian Gulf

Detection of SARS-CoV-2 from Settled dust and Surface in Indoor Environment of Hospital and Associated Health Risks

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Abstract

The aim of this study was to investigat the potential contamination of SARS-CoV-2 in the indoor environment of Amir al-muminin hospital in Maragheh city. Samples were taken from surfaces and settled dust using a passive approach and particulate matter in the active approach from different hospital wards. Result Show that 15% of settled dust samples (N=4/26) and 10% of surface samples (3/30) detected positive contamination to SARS-CoV-2. Contaminated dust samples were at observed 13.8% and 9.1% at a distance of fewer than 1 m and more than 3 m away from the patient bed. In surface samples, 11% of samples in low-touch and 8% from high-touch surfaces area obtained positive for CoV-2 RNA. Furthermore, a positive correlation was observed between relative humidity, $PM_{2.5}$,and present/absent SARS-CoV-2. On based principal component analyzer (PCA). 41.9% of the total variance included present/absent SARS-CoV-2, relative humidity and $PM_{2.5}$. This factor supported the possible emission of SARS-CoV-2 in the high values of relative humidity and $PM_{2.5}$. According to a result of the risk assessment, the annual mean infection risk mean of SARC-CoV-2 for hospital staff with illness and death as an endpoint of response were 2.6×10^{-2} and 7.7×10^{-4} per person per year.
Finally, the study represents surfaces and settled dust with transmission risk and resuspended potential of SARS-CoV-2 bioaerosols in indoor air.

Keywords: Risk, SARS-CoV-2, Settled dust, Surface, RT-PCR, Aerosols

Amounts of plastic input to the Persian Gulf and the Gulf of Oman

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Abstract

Background: It has been reported that a huge amount of plastic waste is present in marine environments. This study evaluated solid waste generation, management, disposal approaches, and the amount of plastic waste entered into the Persian Gulf and the Gulf of Oman.

Method: In this study, the analysis of generated waste, and also the management and final disposal of waste in the Persian Gulf and Gulf of Oman littoral states were investigated. In the next step, the amounts of plastic waste that have improper management (waste plastics with inadequate management + plastic litter) were determined. Then, by using three hypothetical scenarios (15%, 25%, 40% of plastics that are mismanaged and enter the sea ecosystem), the amount of plastic entering the Persian Gulf and the Gulf of Oman was estimated.

Result: The results showed that waste management in the Persian Gulf and Gulf of Oman littoral states is not in a favorable situation. On average, about 65% of waste in the Persian Gulf region and 81% of waste in the Gulf of Oman region are managed inadequately and incorrectly. The amounts of plastic entering the Persian Gulf and the Gulf of Oman were estimated to be about 204-543 kt/year and 32-85 kt/year, respectively, and in 2050, it was predicted to be about 354-945 kt/year and 65-174 kt/year, respectively. Therefore, the amounts of waste plastic entering the Persian Gulf and the Gulf of Oman will increase by 42 and 51 percent, respectively, until 2050.

Conclusion: According to the prediction made in this study, the trend of plastic entering these seas is increasing. So, the need to pay more attention to the pollution control and protection of these areas by their littoral states countries, and also other countries must be considered. Therefore, it is recommended that all littoral states countries in the Persian Gulf and the Gulf of Oman have a detailed and regular plan to reduce waste production and prevent the entry of plastics into this sensitive ecosystem to reduce the damage caused to them.

Keywords: Plastic, Mismanagement, Marine pollution, Persian Gulf, Gulf of Oman.

Abandoned Covid-19 personal protective equipment along the Bushehr shores, the Persian Gulf: An emerging source of secondary microplastics in coastlines

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Abstract

During the Covid-19 pandemic, personal protection equipment (PPE) was widely used to control the virus further spared. In this study, the presence of PPE wastes along the coastline of Bushehr port, the Persian Gulf from nine stations was investigated (4 times during 40 days), and their potential for microplastics (MPs) creation was preliminarily assessed. In total, more than 2380 PPE were collected in the study area. No significant differences were found between various beaches regarding their types and common activities. In addition, the estimated disposal rate of PPE per day and year is 350 and 127,750 items, respectively. More than 10% of the collected PPE from Bushehr's coastal areas on each sampling day were damaged. Based on the microscopic analysis, the left surgical masks and torn plastic gloves in the coastal regions are emerging sources of secondary microfibers and MP particles (mostly fragments and films) in the marine environments, respectively.

Keywords: Coronavirus, Face masks, Plastic gloves, Marine pollution, Micropollutants

Characteristics of microplastics in compost produced by Mazandaran compost factories

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Abstract

Plastic waste in landfills is exposed to environmental conditions such as pH changes, high salinity, temperature fluctuations, and microbial decomposition, which may lead to larger plastics fragmentation and converting them to smaller and microplastic particles. Therefore, this study was designed to determine the characteristics of microplasts in the compost manufactured by Mazandaran Compost Factories.

This study is an analytical-cross-sectional study. Samples were taken from three compost factories (Babol, Behshahr and Tonkabon) using random sampling method. The method of analysis and separation of microplastic samples was done based on density difference and digestion, and a stereo microscope was used to observe microplastics.

According to the results, the average concentration of microplastics in all studied samples was 16981/48 item/kg and the highest average concentration of microplastics was in Behshahr compost 1818622/22 item/kg and the lowest in Babol city 15744/44 item/kg. According to the Kruskal-Wallis test, no statistically significant difference was observed between the different investigated stations ($p>0.05$), the most observed shape, color and size belong to fibers (75%) and transparent white (56%) and 500 to 1000 µm (40%), respectively. Polyurethane, nylon, low density polypropylene and polycarbonate polymers acetate were identified.

The present study has shown the presence of microplastics in the compost of Mazandaran fertilizer and compost factories.

Keywords: Compost, Microplastics, Mazandaran

Investigating the quantity and quality of solid waste produced in the comprehensive health service centers in Yasouj city in 2021

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Abstract

Background: In today's civilized world, the hot topic of "garbage" is one of the important environmental challenges. Providing medical services in the pursuit of improving health indicators leads to the production of all kinds of waste in the health and treatment centers. This research aimed to investigate the quality and quantity of solid waste produced the comprehensive health service centers in Yasouj city.

Methods: In this descriptive and cross-sectional study, 16 health-treatment centers and 16 health centers in Yasouj city were examined in 2021. The amount of waste produced per day in each center, the amount of components of the waste were analyzed through the separation and weighing of waste during two seasons, summer and winter, and the data were analyzed using SPSS and Excel software .

Results: The total production waste in all health-treatment centers and health centers were 110.58 and 86.9 kg per day, respectively. The production rate of ordinary waste, infectious waste, sharp waste, and chemical and pharmaceutical waste in health-treatment centers was 78.42, 26.91, 4.35, and 0.9 kg per day and in health centers 58, 24.97, 3.93 and 0 kg per day respectively. According to the results, ordinary wastes were the most types of production wastes in the study area and were significantly ($p<0.05$) more than other wastes. There was no significant difference between the amount of infectious, sharp, and chemical waste in health-treatment centers and health centers ($p>0.05$).

Conclusion: The obtained results indicate that the total amount of waste production in the health-treatment centers and health centers was less compared to similar studies in other health centers. However, considering the potential health and environmental risks of these wastes, it is necessary to consider specialized training in this field for personnel and to continue monitoring continuously.

Keywords: Health, Treatment, Waste, Yasouj

Determination of 2, 4-dichlorophenoxyacetic acid concentration in Ahvaz water distribution network

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Abstract

Background:2, 4-dichlorophenoxy acetic acid is a well-known herbicide which can be dangerous for both human and animal health in different ways such as its presence in drinking water. The purpose of this study was survey on 2,4-D concentration in Ahvaz drinking water.

methods : A descriptive cross-sectional study was based on 10- month sampling program in six points of distribution networks were conducted. For this purpose, the samples were collected before, during, and after cultivation.To separate and measure the concentration of 2, 4-D, HPLC instrument (Knuar, Germany) and EZ-chrome software equipped with a four-channel pump (model k-1001) and UV-vis detector (model degasser, k-2600) was applied.

Results : All measured concentrations were less than the maximum allowable concentrations recommended by the National Standards Organization of Iran (1053) and WHO guidelines. In this study, the total THMs determined in autumn, winter and spring ranged from <0.004-2.98µg/L, 0.02-2.41µg/L and 0.01-0.04µg/L, and in summer less than the LOD, respectively.

Discussion, and conclusion : Different studies have shown that pesticides residue concentration in water samples have a relationship with the amount of pesticides used in an area, physical and chemical refractory properties of pesticides and environmental conditions. Thus, using resistant pollutants such as pesticides will be a serious threat to health of water consumers if they are not properly controlled.

Keywords: 2,4-D, Distribution network, Drinking water, Ahvaz

Arsenic levels in human breast milk: A systematic review and meta-analysis

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Abstract
Exposure to toxic metals due to their stability, bioaccumulation, and high toxicity is one of the major global health concerns. These metals are transmitted to the fetus by maternal blood through the placenta, and exposure lasts throughout life. For the general population, exposure occurs primarily through the consumption of water and food, including breast milk. This systematic review presents the potential toxicity of arsenic (As) in breast milk, focusing on the potential risks to newborns and infants. Multiple keywords, such as “human milk” and “breast milk”, associated with “toxic metal”, “heavy metal” or “arsenic” were used to search in related databases. Of the articles found in the database, studies were eligible for qualitative review, and were included in the meta-analysis. The data showed that the lowest and highest levels of As were 0.07 ± 0.04 µg/L and. 28.30 ± 27.75 g/L, respectively. The overall pooled average concentration (% 95CI) of As in breast milk was (0.12, 0.11 % 95CI.). The target hazard quotient (THQ) value of As greater than indicates a possible cause of adverse effects during infancy. The results showed that the infants were in a safe limit for cancer risk through consuming breast milk. Exposure to significant metals is completely related to disease development. Moreover, knowledge creation by mental acts and continuous observation are necessary and suggested to gauge heavy metal effects in future studies.

Keywords: Toxic metals, Arsenic, Breast milk, Exposure, Systematic review, Meta-analysis.

Climate change and health

Investigating the effects of climate change on human health with a focus on mental health (a review study)

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Abstract

Today, climate fluctuations are one of the most important challenges in the world that have affected various aspects of human life. Changing climatic parameters such as global warming and its consequences such as deforestation, forest fires, droughts and floods can lead to destructive effects on the human body and mind. Therefore, the purpose of this study is to investigate the effects of climate change on human health, especially mental health. The results of this study showed that some of the psycho-physical symptoms affected by climate change include: mood disorders, irritability, anxiety, mental and physical weakness, high blood pressure, headache, etc. Also, the results revealed that the groups that are most affected by the consequences of climate change and mental-physical health are: indigenous people, children, the elderly, women, people with low socio-economic status, outdoor workers and immigrants. In general, the results showed that the events caused by temperature increase, heat waves, floods, droughts, tornadoes, storms, deforestation and forest fires lead to an increase in distress symptoms, suicide rates and mental disorders (depression, anxiety, sleep disorders, PTSD, etc.) in the society, with the difference that some events such as temperature rise and drought at a low speed and some such as floods at a high speed cause these disorders in the society. According to the results of this study, it is hoped that this important issue in the country will receive more attention from the relevant experts.

Keywords: Climate disturbances, health, mental disorders, global warming

Assessment of climate change impact on stormwater quality parameters (case study: Shushtar, Iran)

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Abstract

Climate change is one of the biggest challenges facing the environment, society, and economy. The effect of climate change must also be considered to increase quality and sustainability. One of the important effects of climate change is the increase in the frequency and intensity of rainfall, which will have a direct and significant role in the quantity and quality of urban runoff. Therefore, in this study, the effects of climate change on the quality parameters of urban runoff will be investigated in Shushtar. In this study, the SWMM qualitative simulation model was calibrated for the study area by qualitative sampling and using two rainfall data. Then, by using the meteorological data of the basic course (1995-2014) and checking the statistical parameters, the appropriate model for the future period (2065-2046) of climate change was selected. Also, using the LARS-WG software and the exponential microscale HADCM3 model the daily precipitation under the RCP4.5 scenario was extracted for the study area. Finally, the quality parameters were simulated for the future period. The results of this study showed that in the future, the output TSS values with a probability of 60% in values less than 250 mg/l, the output COD values with a probability of 60% in values less than 100 mg/l, and the probability of pollution in the runoff with values of 0.3 mgr/l zinc. Considering the efficiency of the SWMM model in the study area, this model can be used for urban development design. In addition to this, the obtained results indicate that the issue of climate change and its impact on urban runoff is inevitable, so it is necessary to consider this issue for proper planning for sustainable urban development.

Keywords: climate change, urban runoff, water quality, build-up and wash-off coefficients, SWMM model

Other issues related to environmental health

Microbial Biopesticides: An Enigma for Human and Environmental Health

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Abstract

Consumer demand for organically cultivated food has been rising globally, providing an incentive for organic farmers, households, and communities [1]. Organic farming focuses on improving the health of soils, ecosystems, and most importantly of the consumers. Rather than using synthetic inputs like chemical fertilizers, insecticides, and herbicides; augmentation of beneficial soil microorganisms catalyzing analogous functions is favored [2]. However, the biosafety and environmental considerations following the mass application of microbial formulations in the environment are rarely known and are almost never scientifically validated [3, 4]. Safety testing and risk assessment need to be a standard practice for ensuring the safety of both human and environmental health. Although there are direct positive effects of bio-inoculants, it must be acknowledged that the large-scale application of antagonistic microorganisms can lead to a series of hazardous secondary effects which are uncontrolled and are only assumed innocuous [5].

This presentation will focus on the deleterious effects of such microorganisms on human and environmental health. The main idea is to spark a scientific debate for considering the need for polyphasic identification, characterization, formulation, and safe delivery technologies of agriculturally important microorganisms. In addition, a blueprint for safety assessment of commercial formulations for regulatory bodies (at pan-global scale) would also be presented.

Keywords: Seed biopriming; Biosafety; Polyphasic characterization; Organic farming; Crop Protection.

Health and economic impact assessment of walking and cycling as transportation modes in Tehran megacity

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Abstract:
In the present study, health and economic benefits of walking and cycling as active transport modes were investigated against the risks of exposure to air pollution and traffic accidents in Tehran using the Health Economic Assessment Tool (HEAT). The impacts were estimated separately in two age groups (20-44 and 45-74 years old for walking, 20-44 and 45-64 years old for cycling) in the next 10 years based on the number of prevented deaths and economic benefit. In walking mode by increasing the proportion of the population from the reference level to 16.2% and the time duration to the range of 10-30 minutes, the number of prevented deaths, reduction in mortality rate, the economic profit will increase in the range of 53-199 and 727-2703, 1.19-4.48 and 3.85-14.34%, and 4190-15700 and 57400-214000 billion Rial for the age groups of 20-44 and 45-74, respectively. Increasing the population ratio to 1.2% and the time duration of activity by the range of 15-40 min for cycling mode, the number of prevented deaths, reduction in mortality rate, and the economic benefit will increase in the range of 17-72 and 40-172, 0.38-1.62 and 0.39-1.69%, and 1340-5690 and 3160-13600 billion Rial for the age groups 20-44 and 45-64, respectively. Also, the investigation of increasing $PM_{2.5}$ concentration from 15.4 to 99 μg/m^3 showed that although the number of prevented deaths will decrease, the benefit-to-risk ratio is still more than one.
Therefore, the results demonstrated that in the current conditions of Tehran, the benefits of physical activity outweigh the risks caused by air pollution and traffic accidents and promoting active transportation modes has significant economic benefit due to the reduction of mortality rates, especially in the age group of older adults due to their higher mortality rate.

Keywords: Walking, Cycling, Health impacts, Economic impacts, Air pollution

Survey of knowledge, attitude and performance of people in Mazandaran province regarding source separation of household waste in 2021

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Abstract

Nowadays, recycling is one of the ways to save mankind from the mass of waste it produces, and waste separation from the source is the first and most important link in the discussion of urban waste recycling, which requires and is based on the participation of people in source separation plans. Therefore, the current research was conducted with the aim of investigating the awareness, attitude and performance of the people of Mazandaran province regarding the separation from the source of household waste in 2021. This cross-sectional descriptive-analytical study was conducted by researcher-made-questionnaire whose link was provided online to qualified people. The samples were selected from the three regions of the east, west and center of the selected cities based on available sampling method. The study variables were described based on percentage, mean and standard deviation. Analysis of variance was used to compare the mean scores in the levels of variables, Pearson's correlation test was used to examine the relationship between the scores of awareness, attitude and performance dimensions, and linear regression was used to examine the effect of independent variables. Finally, the data was analyzed in SPSS software (version 22). For the entire studied population, the average of knowledge, attitude and the performance score was 5.03±1.18, 61.01±9.45, and 11.43±5.19 respectively. There was a significant correlation between the average scores of the dimensions of awareness and attitude (correlation coefficient=0.70), awareness and performance (correlation coefficient=0.68) and attitude and performance (correlation coefficient=0.063). According to the results of the research, the average score of performance (about 23 percent of the maximum performance dimension score) is at an undesirable level (<50 percent) so in order to increase the level of performance, training through media and social media, holding workshops training and the use of incentive are suggested to increase people's participation in the separation of waste from the source of production.

Keywords: Awareness, Attitude, Practice, Waste, Source separation

Investigating the employment Situation of Environmental Health Engineering Graduates in Mashhad University of Medical Sciences between 2010-2021

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Abstract

Undoubtedly, human resources are one of the most important capitals for the economic growth and development of any country. The higher education system is one of the key elements in the link between scientific knowledge and its applications in order to achieve economic progress. Creating employment and using efficient and expert forces in each field is one of the concerns of any management system. After training, these forces must be properly distributed in geographical, type of profession, expertise and gender terms and be used by proper supervision to have the best effect. Due to the lack of information and documentation about the employment status of BS and MS degree students in the field of environmental health engineering of Mashhad University of Medical Sciences, this study was to determine their employment status.

In this descriptive-cross-sectional study, all students who graduated from the field of Environmental Health Engineering of Mashhad Health Faculty in 2013-2014 were included. The data gathering tool was collected through a questionnaire that was prepared according to the studies of other researchers and similar studies in this regard. Collected data were analyzed with SPSS 25 software using descriptive statistics and chi square test.

Data analysis showed that 77% of graduates are women and 23% are men. 83% of males are employed, 13% are unemployed, and 46% of females are employed and 44% are unemployed. 80% of the employees were working according to their field of study, and 68% of the employees were working in the public sector, 23% in the private sector, and 9% were self-employed. Chi-square test showed a significant relationship between gender and employment status (p=0.005).

The results show that most of the employees were working in the public sector and a very small percentage were working in the private sector. Also, the job title of the majority of employees is appropriate to their field of study. Information about the employment status and distribution of graduates of related fields of medical sciences can be very effective and helpful in estimating the capacity of accepting students and providing human resources needed by the public and private sectors in the country.

Keywords: Graduates, Employment, Environmental health, Mashhad

Electrochemical denitrification of aqueous solutions using Ti/RO2 anode and graphite cathode: RSM modeling and Monte Carlo sensitivity analysis

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Abstract
The process of electrochemical oxidation of solutions containing nitrate is aimed at obtaining N_2 from NO_3^-. In this study, Ti/RuO_2 and graphite were used as anode and cathode, respectively, to treat aqueous solutions containing different concentrations of nitrate ions. Initial nitrate concentration (2.75-55 mg NO_3-N/lit), voltage (2.5-30 V), pH (3-13), electrode distance (ED= 0.5-3.5 cm), and time (10 -180 min) were the main parameters studied for the electrochemical oxidation (EO) of synthetic aqueous solutions containing sodium nitrate ($NaNO_3$). In operational conditions, mathematical models were obtained using the response surface method. ANOVA was reported as significant for four out of five independent variables. RStudio software was used for optimization, and sensitivity analysis was performed using the Monte Carlo method. Spearman's correlation was used to analyze the sensitivity of the variables. Spearman's maximum rho was equal to 0.302 for the pH variable. The optimal conditions for nitrate removal efficiency were obtained at 30 (mg/L (NO_3-N)), voltage = 30 V, pH = 9.8, ED = 0.7 cm, and t = 90 minutes. The efficiency of 96.6% was obtained in optimal conditions. The nitrate removal process followed second-order kinetic. The performance of the process at the optimum point was investigated in two subjects: the experiments of groundwater samples containing nitrate and the addition of monovalent and divalent salts. Nitrate removal for groundwater samples and samples containing salt was obtained by 51% and 90%, respectively. Determining the characteristics of the electrodes before and after all the experiments were done with a scanning electron microscope (SEM), X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FTIR).

Keywords: Electrochemical denitrification, Response surface method, Nitrate, Ti/RuO_2

Investigating the effects of dust storms on the quality of life and health of exposed people

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Abstract

Background: Dust storm is the accumulation of fine solid particles that is distributed and limits horizontal visibility to an average of one or two kilometers. Dust is a common natural disaster in desert areas. The main cause of this phenomenon is strong winds that occur following rapid changes in air pressure and temperature at certain times of the year in the region. Prolonged exposure to airborne particles increases mortality. Iran's location in the arid and semi-arid belt of the world, lack of annual rainfall, as well as its proximity to the deserts of neighboring countries such as Iraq, Syria and Saudi Arabia have caused the occurrence of dust. The purpose of this study is to investigate the dust storm, its consequences and to provide prevention strategies in this field.
Methods: In this study, investigated the texts of air pollution and research related to the toxic and dangerous air pollutants published by industries and their control strategies. From January 2000 to December 2020, were searched based on database of PubMed (Medline), Web of Sciences (WOS), The Cochran Library, Scopus (Embase) and Google Scholar. Finally, 10 studies were selected based on criteria.
Results: Many problems including cardiovascular disease, respiratory disease, asthma, chronic lung disease, respiratory and cardiovascular system dysfunction, decreased immune system, headache, dizziness, gastrointestinal disease, increased risk of cancer (lung, stomach cancer) , Intestines, eyes, liver and brain) due to industrialization, technological development and rapid population growth, increasing urbanization, greenhouse gas emissions, increasing desertification and deforestation, occurrence of dust phenomenon, uncontrolled growth of vehicles The engine is the entry of various pollutants and the destruction of the environment, which causes a phenomenon called air pollution. Solutions to reduce emissions, reduce adverse effects and improve and improve air quality can reduce air pollution, including strict rules and regulations of motor vehicles, polluting factories and power plants, increase the use of natural gas, use Concentrated heating and cooling devices, removal of chimneys, creating a passageway for pedestrians between parks, proper location of highways and freeways, high ratio of air to fuel and flame temperature are suitable.
Conclusion: According to research related to the subject, to accurately estimate the health effects of dust storm, epidemiological and economic studies are needed to accurately calculate the consequences of dust.

Keywords: Dust Storm, Air Pollution, Consequences, Prevention Strategies, Health Effects

Flood and erosion impacts on environmental pollution and management options in this field

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Abstract

Backgrounds and Objectives: According to statistics prepared by the United Nations have entered most losses and damage to human societies among the natural disasters, floods and storm. Since the floods every year are causing loss significant of life and financial, the main aims of planning in this area are flood control and mitigation. The aim of this study is to instigate the effects of flooding and erosion on environmental pollution management options in this field.

Materials and Methods: This descriptive study was conducted in during 2014. In the present study, Data's was collected based on available reviewed articles. After processing and modification on the basis of data collected, estimated the effects of flooding and erosion.

Results: The environmental impact caused changes in watershed physical, changes in shape and topography of the area influence erosion and brought in sediment, soil erosion; change the biological characteristics of water. The main effects of this including the water borne diseases such as typhoid, cholera, and create the appropriate environment for the growth of hosts and vectors of some diseases such as Shystvzvma, malaria

Conclusion: Pollution due to by flood can be caused toxic acceptor waters, high PH of this water and reducing dissolved oxygen. Measures taken to reduce the effects and risks of erosion is: the correct and appropriate use of land, establishment of appropriate vegetation, soil conservation through crop management and plant residues in the ground or putting mulch sprayed.

Keywords: Flood, Erosion, Crisis, soil, Environmental Impact

Investigating the relationship between exposure to bisphenol A and obesity and blood pressure

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Abstract

Environmental exposure to bisphenol A (BPA) is a widespread and growing concern. BPA is a high-volume industrial chemical used in the production of polycarbonate plastics and epoxy resins for food and beverage packaging and health products. This substance has many negative effects on human health, including causing confusion in the body's endocrine function. The increasing consumption of plastic and its products worldwide has resulted in almost ubiquitous exposure to BPA in humans and animals. And for this reason, concern has emerged about the potential harmful effects that may occur from BPA entering foods and beverages. Several epidemiological studies related to BPA have found a link between BPA, obesity and hypertension and cardiovascular diseases. The purpose of this study is to review the literature related to the relationship between bisphenol A (BPA) and obesity and blood pressure. The research shows that there is a significant relationship between BPA and the incidence of obesity and blood pressure. This review provides a roadmap for existing research and suggestions for future directions to analyze the relationship between exposure to BPA and its effect on obesity and blood pressure.

Keywords: Bisphenol A, obesity, blood pressure, Endocrine disorders, Cardiovascular disease

Survey on the level of environmental literacy in high school female students (case study: Mehriz city)

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Abstract

In this century, human environmental literacy (awareness, attitudes, and practices) is considered one of the most critical factors affecting environmental issues that can be reduced only by changing human behavior. On the other hand, doing environmental education in students is particularly important compared to others. Therefore, this study aims to investigate the environmental literacy of students in Mehriz city.

In this descriptive-analytical study, the sample size was determined based on the Cochran formula of 180. Random sampling was done from six high schools in Mehriz city, Yazd province. The data collection tool was a researcher-made questionnaire in four sections: demographic, awareness, attitudes, and practices. The data was analyzed using SPSS 22.

Internet, with several 117 people, was the most, and newspaper and radio, with 6 and 6 respectively, formed the least methods of obtaining environmental information for the students of Mehriz city. The score of the awareness index was reported as 91.11% (good), 8.88 %(moderate), and zero percent (poor). In the attitude index, it was 89.44% (good), 10.55% (moderate) and zero percent (poor). In the performance index, 76.11%, 23.88%, and zero percent of students were classified as good, average, and poor, respectively.

This study showed that the environmental literacy of high school female students in Mehriz city is at a medium-high level, so there is still a need to include effective environmental education in all educational centers. Using visual media and teaching families can help facilitate instruction.

Keywords: Environmental literacy, Awareness, Attitudes, Practices, Student.

Investigating the effect of Echinophora platyloba on the fungal plant of almond and peach leaves and comparing it with Burdofix fungicide

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Abstract

Background and purpose: With the increasing use of medicinal plants in medical treatment, it has found a special place in the treatment of diseases. One of these plants is Echinophora platyloba. Since almond and peach trees cover a large area under cultivation in Chaharmahal and Bakhtiari province, therefore, the poisons used, the concentration of these poisons and their effectiveness are very important. Considering the antifungal properties and characteristics of the plant in question, the aim of this study is to investigate the effect of Khosharizah plant extract on the fungal contamination of almond and peach leaves and compare it with Berdofix fungicide in different concentrations.

Method: The leaves of a number of almond and peach trees infected with fungus were cultured in Sabro dextrose agar culture medium. After extracting by our serration method, 500 grams of khusharizah plant were prepared and blank discs were placed in the concentrations of 0, 75, 150, 300 and 600 mg/ml. After drying in the incubator, the discs impregnated with different concentrations of the extract were placed on the surface of the mushroom culture medium by streak culture method. The above steps were carried out to compare the effectiveness of plant extract with chemical poisons, for 18% Bordofix poison.

Results: 75 mg/ml concentration of extract on Alternaria, 150 and 600 mg/ml concentrations on Cladosporium, 600 and 150 mg/ml concentrations on Penicillium, all 75, 150, 300 and 600 mg/ml concentrations on It has a point inhibitory effect on the genus Aspergillus, and no concentration of the above concentrations has an inhibitory effect on the genus Fusarium, and the concentration of 100% Bordofix 18% has an inhibitory effect on all studied fungi except Fusarium, and other concentrations did not have an inhibitory effect on the rest of the fungi.

Conclusion: The use of the extract of this plant in the above concentrations can have a spot inhibitory effect on the mentioned fungi. Also, the use of the above chemical poison to prevent the growth of fungi is not recommended due to its low concentration and lack of inhibitory effect.

Keywords: Echinophora platyloba, Peach tree, Berdo ficus, Almond tree.

Investigation of the prevalence of Malt fever in Izeh city during the years 1390 to 1400

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Abstract:
Introduction: Malt fever causes many problems, including economic and sanitary. This study was conducted for the epidemiology of this disease in this city.
Materials and methods: This study was a descriptive study, the statistical population of which was patients suffering from Malt fever in Izeh city. which was used for data analysis using spss software.
Findings: The total number of infected people was 78, most of them (56.3%) were from rural areas, and men (58.8%) were more infected than women, but the average age of patients at the time of infection was lower in men than in women. The age group was 25-44 years. In terms of consumption of dairy products and contact with animals, consumption of local raw milk (73.8%) and contact with live animals (61.3%) were the most important factors.
Discussion and conclusion: Malt fever is still one of the health problems in Iran, especially in Izeh city. Considering the wide variety of disease distribution in the country, a comprehensive health strategy needs to be explained according to the epidemiological characteristics of the region in question.

Keywords: Brucellosis, Malt fever, Epidemiology, Izeh

Evaluation of the quality of non-homemade bread produced in Ben County in 2018-2019

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Abstract

Background and objectives: Bread, as the most valuable and inexpensive source of energy, is included in the dietary pattern of Iranian households. Nowadays, unauthorized chemicals such as baking soda, sodium dithionite, and extra salt are used in order to accelerate the production process, eliminate defects due to lack of proper fermentation, and increase dough resistance this study aimed to investigate the quality of Taftoon bread in bakeries of Ben County in 2018-2019.

Materials and Methods: in this study 117 samples were collected randomly from the bakeries of Ben. The pH and salt levels were measured according to the 2628 and 2577 standards of the Institute of Standards and Industrial Research of Iran. Blanket content, dough plasticity percentage, and organoleptic properties of samples were measured according to the 2628 standard. The results were analyzed by SPSS.22 software.

Results: According to the results, the pH of bread in 5.9% of bakeries in Ben County was >6. The average salt content was 1.48 ± 0.39 g/100 g bread. The amount of Blanket in the samples was zero and all samples had favorable organoleptic properties.

Conclusion: The amount of baking soda was not high in the bread in the study population, however, it is used in some bakeries. The average salt content in the samples was much higher than the standard level. The use of baking soda and salt content are required constant monitoring and control by health employees. It is recommended to train bakeries and consumers, increase production, and use bulk bread to maintain public health.

Keywords: Bread quality, Baking soda, Salt, Ben County

Investigating the amount of water consumption in Mashhad, before and during the outbreak of corona disease, 2018&2019.

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Abstract

Background: In the two last years, the world has been facing the Covid-19 pandemic. The occurrence of this pandemic has changed the pattern of water consumption and aggravated the water shortage in some countries. Consumers' lack of attention to the correct use of water in times of crisis such as outbreaks of diseases can put communities at risk of water shortage.

Methods: Information related to the amount of water consumption in the first six months of 2018 and 2019, before and during the outbreak of the Covid-19, was collected by referring to Mashhad Water and Sewerage Company. Other variables affecting the amount of water consumption such as the number of subscribers, the amount of consumption in rich and poor areas, the type of houses in terms of apartments and villas were collected. The collected data were analyzed in terms of the amount of water consumption changes (before and during the Covid-19) using Excel.

Results: The results of the study showed that the amount of water consumption in the first six months of 2019 during the Covid-19 pandemic was nearly 5 million cubic meters more than the same time in 2018. Per capita water consumption in the prosperous areas was more than the less rich areas. Regarding the type of houses, the per capita water consumption of villa houses and apartments increased about 6% and 3.8% compared to before the pandemic respectively. Also, the per capita amount of water consumption per subscriber in the villas of H (prosperous area), was more than twice the per capita consumption of the villas of S (poor area).

Conclusion: During the Covid-19 pandemic, water consumption has increased, and this could be due to health standards to prevent further spread of the disease. Several factors such as the level of well-being of subscribers, cultural factors, type of building, access to amenities can be effective on the amount of water consumption in outbreaks. Considering the importance of water in world, it is important to increase the level of awareness of consumers in order to improve the way of consumption.

Keywords: Water, Consumption pattern, Virus, Corona

The Epidemiological Study of Brucellosis in Andika during 7 years (2014-2021)

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Abstract

Background: Brucellosis is the most common zoonotic disease worldwide. Brucellosis is primarily caused by Brucella abortus and It causes potential infertility in men and women.The aim of this study was conducted to investigated the epidemiology of Brucellosis in 2014-2021 in Andica city.

Materials and methods: In this epidemiological study, information was obtained from the medical records of brucellosis patients in the health vice-chancellor of Jundishapur University of Medical Sciences, Ahvaz during 2014-2021. Finally, the collected data was analyzed by SPSS software version 22, and a T-test was used to compare the averages.

Results:A total of 162 patients were reported during 2014-2021. The highest number of brucellosis outbreaks was observed in 2015. In this study, 42% of them were men and 58% were women, 62.3% were from the village and 37.7% were from other areas. In terms of occupational exposure, the highest frequency was observed in housewives with 30.2%. In terms of age group, the highest rate of infection was in the age group of 21-30 years with 21%

Conclusion: The result of this study showed that, the patients were mostly rural and female. This study showed that the prevalence of brucellosis in Andica city is decreasing. As a result, disease control in animals reduces human cases.

Keywords: Brucellosis - Malt fever - Andica - Non-pasteurized dairy products - Animal contact - Animal husbandry

Determining the main factors controlling the salinity of the groundwater of the unconfined coastal aquifer of Sari Plain based on statistical analysis

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Abstract

The quality of ground water depends on various factors such as geology, lithology, hydrogeological characteristics of the aquifer, land use, physical conditions of the boundaries of the aquifer, etc. Studying these factors helps researchers to manage groundwater quality. In this research, the ground water quality of an unconfined coastal aquifer located in the Sari plain of Mazandaran province has been investigated. In this coastal aquifer, due to the excessive exploitation of ground water for agricultural purposes, the salt water of the sea has penetrated into the aquifer and caused salinity in the northern part of the Sari plain. In this research, based on determining the type of ground water using the modified Piper diagram, drawing the map resulting from the Piper diagram, checking the Pearson correlation between the existing anions and cations, as well as applying principal component analysis, salinity control sources and composition change, the groundwater quality of the coastal aquifer of Sari Plain was determined. The results of hydrogeochemical investigations and statistical analyzes of the samples in the plain showed that the first factor is the intrusion of salt water from the Caspian Sea, and the rise of fossil salt water from the bottom of the aquifer due to excessive exploitation. The second factor is carrying out cation exchanges due to the presence of clay and silt in the lithology of the coastal alluvial aquifer and the third factor is the impact of domestic sewage, agricultural activities and the use of nitrate and sulfate chemical fertilizers. Therefore, the salinity factors of Sari unconfined aquifer are caused by man-made activities, by managing the optimal exploitation of the unconfined coastal aquifer, it is possible to prevent the progress of the aquifer salinity and take an effective step towards preserving the environment and sustainable development of the unconfined coastal aquifer of Sari plain.

Keywords: Ground-Water, Salinity, Cation Exchange, Principal Component Analysis (PCA), Unconfined Coastal Aquifer.

Earthquake Planning and Crisis Management with an Emphasis on the Facilities, Utilities, and Services of the Health Care Centers of Tiran - Karvan County, Central Iran

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Abstract

Crisis management constitutes a key measure for reducing earthquake-induced injuries which most importantly revolves around preventing the consequences of natural disasters in the sense of minimizing risks and vulnerabilities. A glance at the history of environmental events reveals that Iran is among the most vulnerable countries to earthquake. The risk of venomous animal bites may increase following earthquakes due to the destruction of their habitats. Controlling disease vectors and reservoirs and eliminating major health-threatening pests in residential areas are among the most important services offered in times of crisis, particularly following an earthquake. Ectoparasites living on domestic animals and pets can also increase the incidence of zoonotic diseases. Increased incidence of lice and itch mite infestation as well as fungal infections can aggravate injuries in earthquake-stricken societies.

Health care centers (HCCs) are among the major institutions involved in crisis management whose capacities, limitations and weaknesses have to be identified and overcome to enable better disaster preparedness.

This was an descriptive - analytical survey based on the quantitative and qualitative characteristics of county HCCs. Twenty quantitative and qualitative indicators were derived from the studied HCCs and analyzed using the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis technique. The top crisis management strategies were identified and a number of strategies and solutions were proposed.

The HCC utilities such as water, electricity, gas, and heating and cooling systems were in average condition, whereas the facilities of the majority of HCCs were in vulnerable-to-average condition. In addition, they sustained relatively high degree of instability which calls for reassessment and effective policies to minimize weaknesses and eliminate threats using strengths and opportunities. About 91.7% did not engage in waste sorting, putting them in a substandard condition. Approximately 66.7% of HCCs were equipped with fire extinguishers , 16.7% were equipped with fire alarm systems, and 16.7% lacked any kind of fire extinguishing utilities.

It is recommended that the condition of County HCCs be enhanced by distributing new HCCs based on the population density, expanding the road network and creating vast, wide-open spaces to enable field hospital construction in times of crisis.

Keywords: Crisis management, Earthquake, Strategy, Health care centers

The necessity of implementing the water safety program (wsp) in the urban water supply system

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Abstract

Ensuring the quantitative and qualitative stability of drinking water in the water supply system is one of the basic elements of the Water Safety Plan. The water safety program is a systematic approach that guarantees the continuous supply of safe water for consumers by emphasizing the prevention of water pollution from the catchment area to the point of consumption. The present study was a review of the studies done in Iran with the aim of updating the water safety program in the urban water supply risks system and identifying the risks in the water supply system and reducing or eliminating the existing.

Materials and methods: In this study, the quality assurance software of the water safety program was used as a guide to evaluate the safety situation and identify the risks in the urban water supply system. For this purpose, we have used library resources to collect information, and the necessary information in line with the approach of the water safety program was completed by using the documents available in the relevant organizations and interviews with the experts of these organizations, and their analysis was done by the determine the risk level using the opinions of expert experts, and then control and corrective measures e considered as software in the Excel environment. Also, after identifying the risks, the RPN number is calculated to.

Findings: The results show that wear, breakage and leakage of distribution network transmission lines are at a high risk level. Also, the average results of the overall evaluation of the WSP stages in different studies show that the processes related to the formation of the WSP team have been given less attention compared to the rest of the processes. . The results of the surveys show that organizations do not focus on the first step of WSP development. And the process related to hazard identification and risk assessment has received more attention and has more compliance with the water safety program. The third step of the implementation of a water safety program is related to the control and validation criteria, which has been given less attention in the study. One of the key parts of the water safety program is the validation of WSP efficiency, which in the present study was in compliance with the water safety program.

Conclusion: Due to the insufficient efficiency of the traditional methods of water quality control, there is a potential of creating various pollutions in the water supply system, especially through the vulnerable points of the system. This result indicates that the water safety guidelines can replace the traditional methods of process inspection and control and With the help of risk assessment and step-by-step implementation of the WSP program as an important evolutionary solution for preventive measures and reducing the level significant results of existing risks, were achieved.

Effective environmental factors, health strategies and, prevention of SARS-CoV-2 virus prevalence; a review

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Abstract

The SARS-CoV-2 virus has been identified in China since 2019 and is still progressing as a tense threat to human health worldwide. This virus can cause an acute respiratory infection in the host and terminate to death in acute status. To distinguish the environmental factors affecting the prevalence of this disease and to constitute an appropriate health strategy, databases were reviewed, and the most effective parameters and environmental factors were recognized. Coronavirus is mainly transmitted from person to person through respiratory droplets, but the disease could also be spread through secondary routes such as air, close contact, and contaminated surfaces. The transmission of coronavirus through food has not been conclusively proven, but there are concerns about the food preparation, storage, infected staff, and proper use of personal protective equipment. The possible transmission is through contaminated water and sewage, especially in the areas where patients have symptoms such as diarrhea and vomiting. In this study, we describe the essential strategies needed to prevent the spread of Covid-19 disease. This study develops a prevention model and health strategy that includes training and updating information, improvement programs, risk assessment, environmental monitoring, operational measures as well as supportive approaches and programs, which can be used step by step to reach a healthy environment, increase compliance with protocols and decrease the incidence of Covid-19.

Keywords: SARS-CoV-2; COVID – 19; Environmental factor; Environmental health; Health strategy

Needs Assessment of Establishment of Hazard Analysis Critical Control Point (HACCP) System in Restaurants of Sarcheshmeh Copper Complex

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Abstract

Introduction: Considering the need to improve health indicators in order to increase food safety, the establishment of food safety systems and regulations in accordance with the latest scientific findings are of particular importance. The use of the HACCP system helps to identify and control risks in the stages of food raw materials entry, preparation, cooking and distribution.

Methodology: This descriptive-analytical study was conducted in 2021-2022 and in 10 restaurants of Sarcheshmeh Copper Complex in Rafsanjan. To collect data, the methods of observation, interview and completing the questionnaire were used. In order to do this, different departments of each restaurant were referred to, including storage and cold storage of food raw materials, preparation, cooking, serving and distribution of food. During this study, the level of knowledge, attitude and performance of employees regarding health indicators, the way of health performance in the restaurant and compliance with important points during the stages of food raw material entry to food distribution were investigated.

Findings: The results of the research showed that the average score (out of 100) of the employees of different departments of restaurants was 75.50, 87.50 attitude and 94.50performance. The results of the research showed that most of the employees had a sufficient attitude towards compliance with health issues, but their performance was defective especially during food preparation. This study showed that the employees do not have enough knowledge about the temperatures of keeping food raw materials and cooking food. 50% of the restaurant staff stated that the ultimate goal is to provide delicious food.

Conclusion: The results of this study showed that the current situation is favorable, but considering the importance of food preparation in environments with a large population and the possibility of widespread food poisoning, as well as for the principled and sustainable implementation of health issues in all stages of the entry of raw materials. From food to food distribution, establishment of hazard analysis and critical control points (HACCP) system is necessary.

Keywords Food safety, HACCP, Restaurant

The Epidemiological Study of Brucellosis in Andika during 7 years (2014-2021)

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Abstract

Background: Brucellosis is the most common zoonotic disease worldwide. Brucellosis is primarily caused by Brucella abortus and It causes potential infertility in men and women.The aim of this study was conducted to investigated the epidemiology of Brucellosis in 2014-2021 in Andica city.

Materials and methods: In this epidemiological study, information was obtained from the medical records of brucellosis patients in the health vice-chancellor of Jundishapur University of Medical Sciences, Ahvaz during 2014-2021. Finally, the collected data was analyzed by SPSS software version 22, and a T-test was used to compare the averages.

Results:A total of 162 patients were reported during 2014-2021. The highest number of brucellosis outbreaks was observed in 2015. In this study, 42% of them were men and 58% were women, 62.3% were from the village and 37.7% were from other areas. In terms of occupational exposure, the highest frequency was observed in housewives with 30.2%. In terms of age group, the highest rate of infection was in the age group of 21-30 years with 21%

Conclusion: The result of this study showed that, the patients were mostly rural and female. This study showed that the prevalence of brucellosis in Andica city is decreasing. As a result, disease control in animals reduces human cases.

Keywords: Brucellosis - Malt fever - Andica - Non-pasteurized dairy products - Animal contact - Animal husbandry

Degradation of Ciprofloxacin Using ultrasound/ZnO/ Oxone process From Aqueous Solution- lab-scale analysis and optimization

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Abstract
Nowadays the existence of antibiotic compounds in pharmaceutical wastewaters is one of the new problems that can be considered in environmental pollution. The removal of ciprofloxacin from aqueous solutions is examined in the present study by using peroxymonosulfate (Oxone =PMS) activated with hybridized ultrasonic waves and synthesized ZnO nanoparticles.
Operational parameters like ZnO nanoparticles dosage, initial pH, and peroxymonosulfate concentration, and their effect on the removal of the antibiotic have been investigated. The results showed 98.3% antibiotics removal observed with an initial pH of 3, ZnO nanoparticles dosage of 1 g/L, and peroxymonosulfate concentration of 1 g/L. This process had a high removal efficiency and was suitable for the removal of ciprofloxacin from aquatic environments.

Keywords: Peroxymonosulfate (Oxone), Ultrasonic waves, Ciprofloxacin removal, ZnO nanoparticles

Reactive Blue 19 Decolorization from Aqueous Solutions with the Photo-Fenton Oxidation Process in presence of nano CoFe2O4 synthesized as a nano magnetic heterogeneous catalyst

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Abstract:
Reactive Blue 19 removal from synthetic textile wastewater was investigated by using a $CoFe_2O_4$@methylcelloluse activated with peroxymonosulfate and the ultrasound process. $CoFe_2O_4$@methylcelloluse as a new magnetic nano-biocomposite was prepared using a convenient and rapid microwave-assisted technique characterized by field-emission scanning electron microscope-energy dispersive spectroscopy, mapping, transmission electron microscopy, the Brunauer-Emmett-Teller, Fourier-transform infrared spectroscopy, X-ray powder diffraction, thermal gravimetric analysis, and vibrating-sample magnetometer. Then, the effective parameters including pH (4–10), reaction time (0–30 min), $CoFe_2O_4$@methylcelloluse (0.2–1 g/L), and PMS concentration (0.5–10 mM) in the sonocatalytic degradation of Reactive Blue 19 were investigated. The maximum removal efficiency of Reactive Blue 19 was achieved as 97% for synthetic wastewater under the optimal conditions of pH = 4, $CoFe_2O_4$@methylcelloluse dosage (0.6 g/L), reaction time = 30 min, and PMS (5 mM) in the presence of ultrasonic waves (60 kHz) at the ambient room temperature of 22 ˚C. The $CoFe_2O_4$@methylcelloluse catalyst was simply isolated using a magnet and recycled with no remarkable loss of catalytic activity following usage in four runs. The results showed that the $CoFe_2O_4$@methylcelloluse sonocatalysis process is practical, effective, and inexpensive for degrading complex and resistant dyes such as Reactive Blue 19. This process can be effective for the destruction of organic dyes in the dye industrial wastewater.
Keywords: Reactive Blue 19, Peroxymonosulfate, Ultrasonic Waves, Cobalt Ferrite

Effect of Polycyclic aromatic hydrocarbons (PAHs) on lung cancer and the risk factors related to cancer.

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Abstract

Polycyclic aromatic hydrocarbons can increase the risk of Cancer in human. Bladder, liver, stomach, lung, skin, gastrointestinal and nervous are the famous cancers that PAHs can dramatically increase the risk of getting them. Although there are natural sources of PAHs, human-induced sources still dominate and can be subdivided into outdoor and indoor sources .One of the most important pathways by which humans are exposed to PAHs is inhalation and the majority of PAHs present in the atmosphere come from incomplete combustion or from pyrolysis.
The purpose of this review study was the epidemiological literature on the side effect of polycyclic aromatic hydrocarbons (PAHs) on lung cancer and the risk factors related to cancer.
703 articles according to different databases: PubMed, Web of Science, Springer, Cochran and Science Direct were retrieved. 81 full-text articles entered into the analysis process. Finally, 36 articles were selected in this study.
The literature was shown PAH exposure occurs in everyday life through tobacco smoke exposure, consumption of charcoal smoked meats, and air pollutant inhalation. The concentration of PAHs correlates with the lifetime lung cancer risk of PAHs.

Keywords: Polycyclic Aromatic Hydrocarbons (PAHs), Risk Factors, lung cancer, respiratory diseases

The effect of climatic and weather factors on the incidence of scorpion stings

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Abstract:
Iranian scorpions include more than 51 species of scorpions from 23 genera and 4 families. Most of the medically important species in the world belong to the genera Hemiscorpius, Parabuthus, Mesobuthus, Tityus, Leiurus and Androctonus. The distribution of scorpion species varies in different regions and according to weather conditions. Scorpion bite is a serious public health problem in the south and southwest of Iran. This study was conducted to investigate the effect of climate and weather factors on the occurrence of scorpion stings. Methodology: In this study, weather factors (ambient temperature, rainfall and humidity level, wind speed, sunshine hours and evaporation rate) were investigated and the effect of each of these factors to make the subject susceptible to scorpion stings. The review was placed. Results: According to the studies conducted, the incidence and prevalence of scorpion stings are directly related to the increase in temperature, and most cases of scorpion stings occur in the hot months of the year and in the summer season. Scorpion humidity increases. There is no significant relationship between wind speed and scorpion sting. Since the increase in the hours of sunlight is directly related to the increase in temperature, therefore, with the increase in sunlight, the air temperature is higher and the incidence of scorpion stings is higher. The results of this study showed that scorpion stings have a direct relationship with water evaporation as well as temperature and sunlight (3, 7). Therefore, the phenomenon of scorpion sting can be a phenomenon related to weather conditions, where the temperature and relative humidity of the environment can play the first role, but it should also be kept in mind that these factors can have a multi-factorial effect and each factor alone cannot have a decisive result.

Keywords: climate, scorpion stings, weather factors