EuroSciCon

DAY 1

Scientific Tracks & Abstracts

4th Edition of International Conference

Environmental Science & Technology

March 29-31 2018 | Vienna, Austria

DAY 1

March 29, 2018

Sessions

Earth Science and Climate Change | Environmental Health Science | Renewable Energy | Bio-Assessment | Toxicology

Session Chair
Abdelhadi Abdelwahab Mohamed Abdalla
Arabian Gulf University, Bahrain

Session Chair
Muharrem INCE
Munzur University, Turkey

Session Introduction

Title: **Process optimization for Pb(II) removal from alcoholic beverage by clay: Using Box–Behnken experimental design**
Muharrem INCE, Munzur University, Turkey

Title: **Hybrid perovskite solar cells**
Sam Hsien-Yi Hsu, University of Hong Kong, Hong Kong

Title: **Deep learning applications for predicting dengue fever outbreak**
Sumiko Anno, Shibaura Institute of Technology, Japan

Title: **Potential of 5-Aminolevulenic acid on date palm water use efficiency under desert climate**
Abdelhadi Abdelwahab Mohamed Abdalla, Arabian Gulf University, Bahrain

Title: **RSM based modeling of nitrate removal from drinking water using nano-photocatalyst process**
Bastam Ghanbari, Islamic Azad University, Iran

Title: **Ecofriendly herbal leather dyes: An approach to mitigate health risks and minimize environmental and water pollution**
Tahira Aziz Mughal, Lahore College for Women University, Pakistan

Title: **University of South Africa emisebeni primary school greening project: Mofolo park, Soweto, Gauteng, South Africa**
Queline Bersiks, University of South Africa, South Africa

Title: **Evaluation of mesoporous graphene oxide-TiO_2 nanocomposite for CO_2 capture of thermal power plants with idealized PSA process**
Ali Reza Noorpoor, University of Tehran, Iran

Young Research Forum

Title: **A comparison of trace metal levels in doxorubicin induced rat liver using ETAAS**
Ali Onal, Munzur University, Turkey

Title: **Remediation policy after mining works in the Kyrgyz Republic**
Gulzhan Makhmudova, University of Tsukuba, Japan

Title: **The association between ambient $PM_{2.5}$ exposure and the risk of natural abortion in China: A retrospective cohort study**
Tongjun Guo, National Human Genetic Resources Center, China

Title: **Application of response surface methodology to optimize the process variables for copper ion determination in beer using clay**
Ali Onal, Munzur University, Turkey

Title: **Phototrophic PHB production with cyanobacteria by using low solids digestate**
Katharina Meixner, BIOENERGY 2020+ GmbH, University of Natural Resources and Life Sciences, Austria

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Ince M et al., J Environ Res, Volume 2

PROCESS OPTIMIZATION FOR PB (II) REMOVAL FROM ALCOHOLIC BEVERAGE BY CLAY: USING BOX–BEHNKEN EXPERIMENTAL DESIGN

Ince M, Kaplan Ince O and **Onal A**
Munzur University, Turkey

Environmental pollution which is a result of rapid technological development is a serious apprehension for ecosystem. Heavy metals are harmful for all living creatures and considered as the most toxic environment pollutants due to toxic effects on human health in concentrations above the permissible limits, cause widespread concerns. Among the contaminants present in environment, heavy metals receive considerable attention from scientists and engineers because they can indefinitely persist in nature and accumulate through the food chain causing a serious risk. Lead is deposited mostly in bones along with liver and kidney. The presence of high levels of lead may cause long-term health risks to humans and ecosystems because of bioaccumulation characteristics. A three-level four-factor Box–Behnken experimental design (BBD) combining with response surface modelling (RSM) was performed to optimize lead removal from alcoholic beverage on natural clay in the present case. The BBD method was selected as the statistical prediction method with the aim of reducing the number of experimental runs which will directly save time and chemicals and thereby reducing the overall cost. Various independent process variables including solution pH (X_1: 3.0–7.0), contact time (X_2: 2–60 min), adsorbent dosage (X_3: 0.01-0.1 g) and agitation speed (X_4: 50–150 rpm) were chosen for optimization. The optimal conditions for the lead removal were found to be 5, 31 min, 0.075 g, and 100 rpm, for the solution pH, contact time, adsorbent dosage and the agitation speed, respectively. Under these conditions, maximum lead removal efficiency was obtained to 120 mg g-1. The significance of independent variables and their interactions were tested by means of the analysis of variance (ANOVA) with 95% confidence limits and based on the ANOVA statistical value, the adsorption of lead onto clay has been found to be highly significant, with very low probability (p) values (<0.001).

Recent Publications

1. **Ince M, Kaplan Ince O (2017) Box–Behnken Design approach for optimizing removal of copper from wastewater using a novel and green adsorbent. Atomic Spectroscopy 38(6):200-207.**
2. **Ince M, Kaplan Ince O, Asam E and Önal A (2017) Using food wastes biomass as effective adsorbents in water and wastewater treatment for Cu(II) removal. Atomic Spectroscopy 38(5):142-148.**
3. **Ince M, Kaplan Ince O and Yaman M (2017) Optimization of an analytical method for determination of pyrene in smoked meat products. Food Analytical Methods 10(6):2060-2067.**
4. **Kaplan Ince O, Ince M, Yonten V and Goksu A (2017) A food waste utilization study for removing lead (ii) from drinks. Food Chemistry (214):637–643.**
5. **Yonten V, Ince M, Tanyol M, Yildirim N (2016) Adsorption of Bisphenol A from aqueous solutions by *Pleurotus eryngii* immobilized on Amberlite XAD-4 using as a new adsorbent, Desalination and Water Treatment 57(2016):22362–22369**

Biography

Ince M has received his PhD degree in Analytical Chemistry at Firat University, Turkey in 2008. He worked as a Research Analytical Chemist in Science Education Department at Mus Alparslan University, Turkey from 2009-2012 as Assistant Professor. He has been working at Munzur University since 2012. From 2013-2016, he served as a Head of Department of Chemical Engineering at the Munzur University, Turkey. He became Editorial Board Member of the *International Journal of Food and Nutrition Sciences, International Journal of Toxicology and Environmental Health, Journal of Environment and Waste Management, International Journal of Pure and Applied Sciences, International Research Journal of Chemistry and Chemical Sciences and Science Journal of Analytical Chemistry.* Currently, he is working as an Associate Professor at Munzur University, Turkey. He is an author and co-author of more than 22 papers that published in journals with good impact factors.

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Sam H Y Hsu et al., J Environ Res, Volume 2

HYBRID PEROVSKITE SOLAR CELLS

Sam H Y Hsu, Chengxi Zhang, Chun Hong Mak and **Rugeng Liu**
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Lead-free organic-inorganic tin halide perovskites were prepared and investigated by a rapid screening technique utilizing a modified scanning electrochemical microscope (SECM). We studied liquid junction photoelectrochemical (PEC) cells based on p-type methylammonium tin halide ($MASnI_{3-x}Br_x$) perovskites employing the benzoquinone (BQ) redox couple, $BQ/BQ^{\bullet-}$, in dichloromethane (CH_2Cl_2). We found that the optimized Sn-based mixed halide perovskite, $MASnI_{0.5}Br_{2.5}$, exhibits enhanced performance and stability in liquid-junction PEC cells, with a power conversion efficiency of 1.51% (an increase of 20.8%) and a photovoltaic lifetime of 175 min (an increase of 75.0%), in comparison to MASnI3 perovskites.

Recent Publications

1. **H-Y Hsu, L Ji, H S Ahn, J Zhao, E T Yu and A J Bard (2015) A liquid junction photoelectrochemical solar cells based on p-Type $MeNH_3PbI_3$ perovskite with 1.05 V open-circuit photo voltage. Journal of the American Chemical Society 137(46):14758–14764.**
2. **H-Y Hsu, L Ji, M Du, J Zhao, E T Yu and A J Bard (2016) Optimization of lead-free organic–inorganic tin (II) halide perovskite semiconductors by scanning electrochemical microscopy. Electrochimica Acta 220:205–210.**
3. **H H-Y Hsu, L Ji, M Du, J Zhao, E T Yu and A J Bard (2016) Optimization of $PbI_2/MeNH_3PbI_3$ perovskite composites by scanning electro- chemical microscopy. Journal of Physical Chemistry C 120:19890–19895.**
4. **H-Y Hsu, J H Vella, J D Myers, J Xue and K S Schanze (2014) Triplet exciton diffusion in platinum polyyne films. Journal of Physical Chemistry C 118:4282–24289.**

Biography

Sam H Y Hsu has obtained his PhD degree under supervision of Professor Kirk S Schanze at University of Florida. After that, he received the two-year Postdoctoral and Research Associate's appointments respectively with Professor Allen J Bard and Professor Edward T Yu in Center for Electrochemistry and Department of Electrical and Computer Engineering at University of Texas at Austin. His research interests involve the material design, synthesis, processing, imaging, spectroscopy and solar energy application, aiming to explore fundamental properties and interactions of hybrid perovskite semiconductors and functional metallopolymer materials for developing efficient solar energy conversion processes. He has keen interests in photoinduced charge transfer processes, interfacial electron transfer, electrochemical hydrogen generation, and photoredox reactions for photovoltaics and solar fuel production. The investigations between material phenomena rely heavily on concepts and techniques of material and physical engineering, consisting of photophysics, electrochemistry, photo electrochemistry, scanning electrochemical microscopy and time-resolved photoluminescence spectra.

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Sumiko Anno et al., J Environ Res, Volume 2

DEEP LEARNING APPLICATIONS FOR PREDICTING DENGUE FEVER OUTBREAK

Sumiko Anno[1], Takeshi Hara[2], Hiroki Kai[3], Yi Chang[4], Ming-An Lee[5], Kei Oyoshi[6], Yosei Mizukami[6] and **Takeo Tadono[6]**

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[2]Gifu University, Japan
[3]Remote Sensing Technology Center of Japan, Japan
[4]National Cheng Kung University, Taiwan
[5]National Taiwan Ocean University, Taiwan
[6]Japan Aerospace Exploration Agency, Japan

The number of dengue fever patients has increased in Taiwan in recent years, and measures are urgently needed to prevent dengue fever outbreaks. The mechanisms underlying the outbreaks must be clarified in order to develop a predictive model and take appropriate precautions. Unfortunately, these mechanisms are complex, and the factors involved in the generation, propagation, and spread of dengue fever have yet to be fully elucidated. However, the outbreaks are known to be influenced by the interplay of factors that include rising temperatures, including rising sea surface temperatures (SSTs); increasing rainfall due to global warming; and rapid urbanization. These factors contribute to inadequate water and sewage treatment systems. Subsequently, water storage containers, as well as discarded automobile tires and other containers that fill with rainfall, allow mosquito breeding and vector dispersion. In addition, rising temperatures, rapid urbanization lead to human displacement and travel, contribute to the spread of dengue virus-infected mosquitoes. Here I present a conceptual framework that helps clarify how these factors contribute to dengue fever outbreaks in Taiwan. This framework uses satellite remote sensing data and deep learning, which is a machine learning technique, as well as our current, ongoing research findings.

Recent Publications

1. **Sumiko Anno (2016) Gene–environment interaction analysis: methods in bioinformatics and computational biology, Pan Stanford Publishing Pte. Ltd., ISBN 9789814669634.**
2. **Sumiko Anno, Keiji Imaoka, Takeo Tadono, Tamotsu Igarashi, Subramaniam Sivaganesh, Selvam Kannathasan, Vaithehi Kumaran, Sinnathamby Noble Surendran (2015) Space–time clustering characteristics of dengue based on ecological, socio-economic, and demographic factors in northern Sri Lanka, Geospatial Health, 10(376):215-222,.**
3. **Sumiko Anno, Keiji Imaoka, Takeo Tadono, Tamotsu Igarashi, Subramaniam Sivaganesh, Selvam Kannathasan, Vaithehi Kumaran, Sinnathamby Noble Surendran (2014) Assessing the temporal and spatial dynamics of the dengue epidemic in Northern Sri Lanka using remote sensing data, GIS and statistical analysis. Journal of Geophysics & Remote Sensing 3(4):1-5.**
4. **Sumiko Anno, Kazuhiko Ohshima, Takashi Abe, Takeo Tadono, Aya Yamamoto, Tamotsu Igarashi (2013) Approaches to Detecting Gene-Environment Interactions in Human Variation Using Genetic Engineering, Remote Sensing and GIS. Journal of Earth Science and Engineering 3(6):371-378.**
5. **Sumiko Anno, Kazuhiko Ohshima, and Takashi Abe (2010) Approaches to understanding adaptations of skin color variation by detecting gene-environment interactions. Expert Review of Molecular Diagnostics 10(8):987-991.**

Biography

Sumiko Anno is an Associate Professor of Shibaura Institute of Technology. Her research is interdisciplinary, ranging from Molecular Biology to the Earth Sciences, and uses Genetic Engineering, Remote Sensing, and Geographic Information System Technologies. She has received three research achievement awards in Japan and in other countries, including an award for the work that was published in 2016 as *"Gene-Environment Interaction Analysis: Methods in Bioinformatics and Computational Biology"* She is currently interested in exploring the application of artificial intelligence to public health issues.

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Abdelhadi A W et al., J Environ Res, Volume 2

POTENTIAL OF 5-AMINOLEVULENIC ACID ON DATE PALM WATER USE EFFICIENCY UNDER DESERT CLIMATE

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Under hot and desert climate, efficient utilization of the meager water resources is of vital importance. Date palm trees (*Phoenix dactylifera* L.) play crucial role on food security pertaining to its ability to withstand desert climatic conditions and high soil salinity. Eighteen young date palm trees were established for about four years in concrete lysimeters equipped with access tubes for soil moisture monitoring using a calibrated Diviner 2000 capacitance probe. Split plot experiment with main plots as three irrigation water salinities: medium (12-15 dS/m), high (18-20 dS/m) and control (dS/m<1) under 5-ALA and no 5-ALA treatments as subplots. Data collected included actual irrigation water applied (AW) mm and calculated actual water used in evapotranspiration from soil moisture depletion (ET) mm. Physiological water use efficiency (PWUE) was obtained by dividing actual ET by AW for 46 irrigation events that extended over 446 days during 2016-2017. Results showed that salinity has overriding and significant effects on date palm ET and PWUE. 5-ALA and salinity interaction was highly significant in increasing ET under electrical conductivity (EC) <1 while actual date palm ET was reduced under medium and high EC. The application of 5-ALA under EC<1 dS/m resulted in 77% photosynthetic water-use efficiency (PWUE) compared with 31-59% on various combination of 5-ALA and medium and high salinity levels. Various effects of 5-ALA and salinity interactions on flowering and chlorophyll contents were also discussed. Such results are encouraging for further investigations on different levels of 5-ALA applications and fruit quality and food safety.

Recent Publications

1. **A A Salih, A A Mohamed, A A Abahussain and F Tashtoosh (2017) Use of Some Trees to Mitigate Air and Soil Pollution Around Oil Refinery, Kingdom of Bahrain. Journal of Environmental Science and Pollution Research 3(2):167–170.**
2. **Kawkab E Babiker, Abdelhadi A W Mohamed, Imadeldin A Ali-Babiker and Hussni O Mohammed (2015) Managing Rainfall Variability in Arid Rain-fed Agriculture Using Adaptive Varieties and In-suit Water Harvesting. Sudan Academy of Sciences Journal - Special Issue (Climate Change) 11:74-82.**
3. **Asma Ali Abahussain, Abdelhadi Abdelwahab Mohamed, Ahmed Ali Salih, Ahmad Al Safe, Nader Abdul Hamed Mosa and Yahya Othman (2014) Soil Salinization in Some Irrigated Areas of the Kingdom of Bahrain. Journal of Agricultural Science and Technology A 4:112-122.**
4. **Maie Kabbashi Alla Jabow, Ahmed Ali Salih, Abdelhadi A W and Bashir M A (2013) Crop water requirements for tomato, common bean and chick pea in Hudeiba, River Nile State, Sudan. Sudan Journal of Agricultural Research 22:11- 22.**
5. **Abdelhadi A W, H S Adam, Mohamed A Hassan and Takeshi Hata (2004) Participatory management: Would it be a turning point in the history of the Gezira scheme? Irrigation and Drainage 53(4):429-436.**

Biography

Abdelhadi A W has obtained his PhD in Global Science from Kobe University, Japan in 2000 where he spent two years in Postdoctoral studies. He obtained his MSc degree in Agriculture and Biological Science from the University of Newcastle upon Tyne in 1992. He worked for the Agricultural Research Corporation, Gezira Research Station for 22 years and as the Director of Soba Research Station for Saline & Sodic Soils. He worked for the Arab Organization for Agricultural Development before joining the Arabian Gulf University in 2011. He participated in more than 20 international conferences and workshops and published more than 29 papers in refereed prominent journals and is serving as a Referee for more than five reputable scientific journals.

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RSM BASED MODELING OF NITRATE REMOVAL FROM DRINKING WATER USING NANO-PHOTOCATALYST PROCESS

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[1]Islamic Azad University, Iran
[2]Tehran Rural Water and Wastewater Company, Iran

Since the operating cost increased, the need to utilizing modeling tools have been growing to achieve standards over a wide range of operating conditions. Optimization based on past information, give opportunity to save energy as well as reducing construction, operation and maintenance cost which is one of the most important current priority of environmental engineers. Today on the other hand, nitrate removal from drinking water is another priority of environmental experts due to harmful effects on health including cancer, Methemoglobinemia, adverse reproductive effects and etc. Thus finding an effective optimized option to achieve this goals may be extremely helpful.

For this purpose TiO_2 nano-photocatalyst was utilized to treatment of drinking water containing nitrate. Experimental structure design and optimization of responses as well as variables was done by design expert software (version 8) and RSM based central composite design (CCD) approach. To do this reaction Time (T) = 15-180 min, pH=5-9 and Nano-photocatalyst dosage (D) =0.5-1.5 g/L were chosen as independent variables and NO_3 removal was chosen as dependent output response. Nearly 20 runs were developed through CCD for experiment and modelling of results. In order to finding the statistical significance of models and real data F-test ANOVA was utilized.

The amount of P>F less than 0.0001 showed that the obtained model is appropriate for simulation and modelling of nitrate removal from drinking water by nano-photocatalyt.

Result showed that TiO_2 could successfully remove 97.38 % of NO_3 in D=2.5 gr/l, T=180 min, pH =5 (maximum performance) and 36.84 % of NO_3 in D=0.5 gr/l, T=15 min, pH =9 (minimum performance). It can easily found from result that there is a direct relationship between pH, D, T and removal efficiency. The optimum condition of photocatalytic NO_3 removal was achieved equal to; D=1.85 gr/l, T=20 min and pH =7 for 70% removal efficiency and meet standards by using RSM based developed models. Finally photocatalytic NO_3 removal was assessed as a very appropriate method in order to meet environmental requirements, rapid and effective treatment, therefore strongly suggested for practical use.

Keywords— *Modeling, Nitrate, Nano-Photocatalyst, Response Surface Methodology, water.*

Recent Publications

1. **Javid, A.H., Hassani, A. H., Ghanbari, B* and Yaghmaeian, K. The feasibility of utilizing the moving bed biofilm reactor in order to upgrade and retrofit the municipal wastewater treatment plants. International Journal of Environmental Research,7 (2013) 963-972**
2. **Amir Hessam Hassani, Seyed Mehdi Borghei, Hassan Samadyar and Bastam Ghanbari*. Utilization of moving bed biofilm reactor for industrial wastewater treatment containing Ethylene Glycol: Kinetic and performance study. Environmental Technology, 35 (2013), 499–507**
3. **Maryam Faridnasr, Bastam Ghanbari* and Ardavan Sassani; Optimization of the moving-bed biofilm sequencing batch reactor (MBSBR) to control aeration time by kinetic computational modeling: Simulated sugar-industry wastewater treatment. Bioresource technology 208 (2016): 149-160.**

Biography

Bastam Ghanbari graduated in Environmental Engineering–Water and Wastewater from Islamic Azad University, Science and Research Branch (Tehran) at the age of 27. He is instructor of Department of Environmental Health Engineering, Islamic Azad University Tehran Medical Sciences Branch. He also has been Founder and researcher of Water Purification Research Center (WPRC) since 2014. Nearly 20 research projects has been carried out under his supervision in his research's interest area up to now including: Emerging contaminants, Novel batch bioreactors, Novel Biological Nutrient Removal (BNR) systems, Novel integrated bioreactors, Kinetic modelling of biological systems, Utilization of artificial neural network (ANN) to bioreactor modelling, Utilization of response surface methodology (RSM) to bioreactor modelling, Bioreactor computational modeling and optimization, Advanced Oxidation Process (AOPs) integrated Nano photo catalyst, Toxic wastewater treatment.

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Queline Bersiks, J Environ Res, Volume 2

UNIVERSITY OF SOUTH AFRICA EMISEBENI PRIMARY SCHOOL GREENING PROJECT: MOFOLO PARK, SOWETO, GAUTENG, SOUTH AFRICA

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University of South Africa, South Africa

In 2013, University of South Africa (Unisa) and Johannesburg City Parks and Zoo (JCPZ) started a joint venue to conserve and improve Mofolo Park in Soweto, Gauteng South Africa. The park has been partially rehabilitated, but in need of additional investment. The Department of Environmental Sciences, Unisa and the JCPZ Environmental Education team collaborated to start working in schools bordering Mofolo Park. The aim of the project is to enhance environmental learning through informed environmental responses. Contextual profiling was done using questionnaires at six schools. Two considerations needed to be taken into account when selecting the school, which was; which school would gain the most from our project implementation and which school would be able to sustain our project when we exit from the school for them to run the project on their own. The data which was collected indicated that Emisebeni Primary School was ideal to implement the project. Prior to project implementation informal interviews, discussions and observations took place at the school. During the informal interviews, the principal of the school and other staff members, who were involved with existing environmental projects, were consulted. Post to project implementation, data was collected using questionnaires to measure classroom learning and the environmental awareness impact of the project. Action projects created an opportunity for the learners to get out of the classroom. This experience enabled them to look at practical examples to reinforce theoretical teaching in the classroom. Areas that link to the curriculum included: water conservation, healthy living, environmental respect, tree planting and plant requirements and maintenance, ecosystem studies, entrepreneurship and community involvement.

Biography

Queline Bersiks is a Lecturer at the University of South Africa, in the Department of Environmental Sciences specifically in Ornamental Horticulture. She has been the Ornamental Horticulture programme co-ordinator for two years and has been involved in curricula design for open distance education students. For the past four years she has been the departmental representative for community engagement which is where one of her passions lies. She graduated from the School of Horticulture, Royal Botanic Gardens Kew scholarship programme in 2004. Currently she is pursuing Master of Science in Ornamental Horticulture focussing on the propagation of the medicinal plant *Helichrysum rugulosum* for its' commercial horticultural potential in Gauteng, South Africa.

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Ali Reza Noorpoor et al., J Environ Res, Volume 2

EVALUATION OF MESOPOROUS GRAPHENE OXIDE - TiO_2 NANOCOMPOSITE FOR CO_2 CAPTURE OF THERMAL POWER PLANTS WITH IDEALIZED PSA PROCESS

Ali Reza Noorpoor[1], Saeed Nazari Kudahi[1] and **Niaz Mohammad Mahmoodi[2]**

[1]University of Tehran, Iran

[2]Institute for Color Science and Technology, Iran

Graphene based adsorbent has been introduced as the next generation CO_2 adsorbent by the scholars since 2012. CO_2 adsorption capacity on these adsorbents as an indicator has been reported to evaluate their performance in comparison with other adsorbents in the literatures. This parameter is easily estimated by CO_2 adsorption isotherm data. On the other hand, these indicator doses not present the performance of the adsorbents in their end utilization. Recently, some scholars develop an indicator called the efficiency indicator to evaluate the performance of the adsorbents in the idealized pressure swing adsorption (PSA) process. This new indicator is defined as the amount of captured CO_2 to energy needed for compressing the gaseous mixture in the PSA process. In this study, for the first time, the recent indicator was used to evaluate the performance of CO_2 capture on mesoporous graphene oxide - TiO_2 nanocomposite. This adsorbent was synthesized and characterized by N_2 adsorption-desorption measurements, X-ray diffraction, field emission scanning electron microscopy and FT-IR spectroscopy. Subsequently, the pure single-component adsorption isotherms, including CO_2 and N_2 were measured at 298 K to assess the efficiency indicator of CO_2 capture on mesoporous graphene oxide - TiO_2 nanocomposite for different type of thermal power plant. The CO_2:N_2 binary gas mixtures, including the molar ratio of 5:95, 8:92, 10:90 and 15:85 were considered to calculate this indicator for combined cycle power plant, natural gas-fired steam power plant, heavy oil-fired steam power plant and coal-fired steam power plant respectively. The efficiency indicator of CO_2 capture on mesoporous graphene oxide-TiO_2 nanocomposite was calculated to be 2.136, 1.170, 0.875 and 0.432 tonne/GJ for above mentioned power plants. Besides, the results indicated that CO_2 capture on this adsorbent had the higher efficiency in comparison with other adsorbents, including three-dimensional graphene based porous adsorbent, holey graphene frameworks, thermally treated graphene nanosheets and activated carbon.

Recent Publications

1. **Nazari Kudahi S, Noorpoor A R and Mahmoodi N M (2017) Determination and analysis of CO_2 capture kinetics and mechanisms on the novel graphene-based adsorbents. Journal of CO_2 Utilization 21:17-29.**
2. **Asgari S, Noorpoor A R and Boyaghchi F A (2017) Parametric assessment and multi-objective optimization of an internal auto-cascade refrigeration cycle based on advanced exergy and exergoeconomic concepts. Journal of Energy 125:576-590.**
3. **Noorpoor A R and Rohani S (2016) Thermo-economics analysis and evolutionary-based optimization of a novel multi-generation waste heat recovery in the cement factory. Int. Journal of Exergy 21:405-434.**
4. **Noorpoor A R and Nazari Kudahi S (2016) Analysis and study of CO_2 adsorption on UiO-66/graphene oxide composite using equilibrium modelling and ideal adsorption solution theory (IAST). Journal of Environmental Chemical Engineering 4:1081-1091.**
5. **Noorpoor A R and Nazari Kudahi S (2015) CO_2 emissions from Iran's power sector and analysis of the influencing factors using the stochastic impacts by regression on population, affluence and technology (STIRPAT) model. Journal of Carbon Management DOI: 10.1080/17583004.2015.1090317.**

Biography

Alireza Noorpoor was born 1974. In 1992, He moved to Mazandaran University for BSc in Mechanical Engineering (Fluid Mechanics) and graduated BSc in 1996 as top student of department. He continued in M.Sc. from 1997 to 1999. He has completed his PhD at the age of 30 years from Iran University of Science and Technology (IUST) and started to teaching at IUST. In 2010 he moved to University of Tehran. Now, he is associate Professor of Graduate Faculty of Environment at University of Tehran. He is the head of Air Pollution and Energy Systems Research Group (FANPAYA Co.) and Editor-in-Chief Journals: Solar Energy Research (JSER) and Environmental Sciences Studies (JESS). His interest fields are: Computational Fluid Dynamics (CFD), Air Pollution, Bio-gas, Carbon Capture and Energy Systems Engineering. He has published more than 200 papers in journals and conferences. He has held more than 10 International conferences at University of Tehran.

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Young Research Forum

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A COMPARISON OF TRACE METAL LEVELS IN DOXORUBICIN INDUCED RAT LIVER USING ETAAS

Onal A[1], Ince M[1], Kaplan Ince O[1], Benzer F[1] and **Kandemir F M [2]**

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[2]Atatürk University, Turkey

Doxorubicin (DXR) is a cancer drug that is widely used for cancer chemotherapy. Because of prominent cytotoxicity to normal cells or tissues, clinically limits applications. When used long term, DXR causes several side effects, resistance and toxicity to normal tissues. To decrease the DXR toxicity and improve bioavailability, various carrier systems have been development to maintain the tumor inhibition effect. Recently, many researchers have been investigated DXR effect on normal cells or tissues. They used an agent whose name is CMN it possess antioxidant activity besides effect of anti-inflammatory, antioxidant, antiproliferative, antiangiogenic, hepatoprotective, antimetastatic, antidiabetic, antiarthritic antithrombotic, and antiatherosclerotic in cell culture and animal studies. Various preclinical studies revealed that CMN is well known for its potential to inhibit carcinogenesis induced by chemical carcinogens both initiation and progression stages. The present study was designed as thirty five wistar albino male rats were randomly divided into five groups of seven rats in each group. Group I was identified as the control group and only CMN was injected to group II. While DXR was injected group III, group IV was treated with DXR+CMN and DXR+CMN was injected to group V in higher dose CMN. The objective of this study was to assessment and compares levels of some elements including copper, iron, zinc and selenium, and in the liver of control group and doxorubicin induced rats tissue. All trace metals were analyzed using electrothermal atomic absorption spectrophotometry (ETAAS). Results revealed that Cu, Fe, Zn, Se amount and Cu/Fe, Cu/Zn, and Cu/Se ratio were present in different levels in the each of five groups. In liver, there was not statistically any differences among Cu, Fe, Zn and Fe concentrations of group I and II ($p>0.05$). Group IV Se concentration was found statistically the lowest and Fe concentration of group IV was found the highest.

Recent Publications

1. **Ince M, Kaplan Ince O, Asam E and Onal A (2017) Using food wastes biomass as effective adsorbents in water and wastewater treatment for Cu (II) removal. Atomic Spectroscopy 38(5):142-148.**

Biography

Onal A received his technician degree from Munzur University, Department of Food Technology at 2011 and he is a student Department of Food Engineering at the Munzur University. He is the author of more than 3 papers that published in journals with good impact factor in their area and her research areas including Atomic Absorption Spectroscopy; Trace and Toxic Element Analysis; Instrumental Analysis; Problem Solving in Chemistry and Food Science.

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REMEDIATION POLICY AFTER MINING WORKS IN THE KYRGYZ REPUBLIC

Gulzhan Makhmudova and **Kenichi Matsui**
University of Tsukuba, Japan

This paper examines the current situation of land remediation after mining operations in the Kyrgyz Republic. It focuses on the legal and political frameworks for land remediation. The question of the remediation has not gained much academic attention in the Kyrgyz Republic, especially as it is related to remediation policies, but this matter is urgent in the country. As part of the former Soviet Union, the mining industry was of great importance in the Kyrgyz Republic. According to the National Statistical Committee of Kyrgyzstan, the mining industry of the Kyrgyz Republic in 2014 had an indicator of more than 53.9% of the value of all industrial products, while the share of the mining industry in GDP in 2014 was more than 10%, which in turn is 47.1% of total exports and 11% of tax revenues. According to official data, there are deposits of gold, antimony, mercury, tin, molybdenum, coal and brown coal, oil and gas, non-metallic minerals, groundwater and other minerals in Kyrgyzstan. In the last twenty years, discoveries of large gold deposits and other valuable minerals in the last twenty years brought Canadian and other international corporations to exploit. As a result, many pollution cases have been reported along with violent protests among local residents. There are many unresolved and partially resolved issues on disposal, reclamation of disturbed lands after mining, including radioactive waste. The Kyrgyz government has updated some strategies to deal with conflicts and remediation issues. This paper reveals some recent development of legal and political actions to deal with land degradation and remediation.

Biography

Gulzhan Makhmudova has completed her Bachelor's degree and Honors Diploma majored in Ecology-Legal Protection in International University of Kyrgyzstan. After that, she proceeded to the Master's degree in International Law and European Law for two years. At the same time, she also worked at State Agency on Environment Protection and Forestry under the Government of the Kyrgyz Republic as a Specialist. Following graduation, she started to work at The State Committee of Industry, Energy and Subsoil Use of the Kyrgyz Republic as Leading Specialist, and awarded rank of Junior Inspector of Public Service, where she works to present time. She has a great passion about environment. That's why she chose to pursue further education at Graduate School of Life and Environmental Sciences, University of Tsukuba to broaden her horizon. Her field of interest's Environmental Remediation in Mining, Environmental Policy and Management, Environmental Protection and Legislation, Industrial Safety in Mining Industries.

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Tongjun Guo et al., J Environ Res, Volume 2

THE ASSOCIATION BETWEEN AMBIENT $PM_{2.5}$ EXPOSURE AND THE RISK OF HYPERTENSION IN CHINA: A RETROSPECTIVE COHORT STUDY

Tongjun Guo[1, 2], Yuanyuan Wang[1, 2], Jun Zhao[1], Ya Zhang[1], Hongguang Zhang[1], Zuoqi Peng[1] and **Xu Ma[1]**

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Objectives: The main objective of this study is to explore the effect of ambient particulate matter ($PM_{2.5}$) exposure on hypertension.

Methods: In this study, we investigated the blood pressure of 1,998,795 participants and their individual $PM_{2.5}$ exposure values in China from 2014 to 2015 from National Free Pre-pregnancy Check-ups Project and the Ministry of Environmental Protection of the People's Republic of China. In this research, the $PM_{2.5}$ exposure time was divided into five periods (3 days before survey, 1 week before survey, 1 month before survey and 2 months before survey as well as 3 months before survey). We calculated the average concentration and the corresponding quartiles of $PM_{2.5}$ in these five periods. We used logistic regression to explore the association between $PM_{2.5}$ exposure and hypertension in different periods, and compared the effects of different quartiles of levels of $PM_{2.5}$ exposure on hypertension in each exposure phase. The effects were adjusted for age, body-mass index (BMI), education level, second-hand smoking and drinking.

Results: A total of 1,998,795 participants were included, among which 89,255 (4.5%) were hypertension. Each 10 μg/m³ increase of $PM_{2.5}$ was associated with increases in the risk of hypertension of 9.56% (95% CI 9.29-9.83) in the period of 3 days before survey, 15.68% (95% CI 15.33-16.02) in the period of 1 week before survey, 27.22% (95% CI 26.71-27.72) in the period of 1 month before survey, 16.54% (95% CI 16.13-16.96) in the period of 2 months before survey, and 7.75% (95% CI 7.40-8.10) in the period of 3 months before survey. We found that $PM_{2.5}$ exposure during 1 month before survey had the highest significant increase in the risk of hypertension, and we then explored the dose association between hypertension and $PM_{2.5}$ exposure based on quartiles. Compared with the lowest quartile of $PM_{2.5}$ exposure, the second, third and fourth quartile all increased the risk of hypertension, and fourth quartile $PM_{2.5}$ exposure during 1 month before survey was the most obvious increased, and the odds ratio was 1.674 (95% CI 1.643-1.706)

Conclusion: We observed that ambient $PM_{2.5}$ exposure played an important role in human health and could increase the risk of hypertension.

Recent Publications

1. Guo T, Wang Y, Zhang H, Zhang Y, Zhao J, Wang Y et al. (2017) The association between ambient temperature and the risk of preterm birth in China. Science of the Total Environment 613-614:439-446.

Biography

Guo Tongjun, a master candidate majoring in Epidemiology and Health Statistics in the National Research Institute for Family Planning, Peking Union Medical College, China. He focus in the data analysis of reproductive health, having strong interest in the relationship between environment and health. He has published an article entitled "The association between ambient temperature and the risk of preterm birth in China" in the science of the environment journal.

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Onal A et al., J Environ Res, Volume 2

APPLICATION OF RESPONSE SURFACE METHODOLOGY TO OPTIMIZE THE PROCESS VARIABLES FOR COPPER ION DETERMINATION IN BEER USING CLAY

Onal A, Kaplan Ince O and **Ince M**
Munzur University, Turkey

People's anxieties also increase because of the increased awareness of what the toxic substance levels in the environment and the effects of these toxic substances may be. Pollutions caused by heavy metals stand in aqueous wastage of many industries. They are released into the aqueous system through a variety of sources. Heavy metals show toxic effects because they cannot biodegrade in nature. The heavy metal such as copper, because of their toxicity influence, contamination demonstrates a major problem. Cu^{2+} has high prior for removal from environments amongst heavy metals because of hazardous effect and considered as one of the most toxic one. When excessive intake of copper, it can be travelled through the food chain *via* bioaccumulation, the increase of Cu^{2+} in human body causes some major diseases such as brain, skin, pancreas, and heart diseases. That is to say, the metal may show toxic effects even if the metal concentration is low. Experimental studies were accomplished based on a Box–Behnken Design (BBD) and examined using response surface methodology. The aim of present research was to apply BBD for modelling of Cu^{2+} from alcoholic beverages pre-treated clay was conducted in batch experimental conditions. The independent factors importance and their interactions were investigated using analysis of variance. The present study includes the Cu^{2+} adsorption through the process of adsorption from aqueous medium onto clay. Effect of several factors such as solution pH and stirring time were studied. Under the optimum conditions (adsorption solution pH 5.0, stirring time 62.5 min, adsorbent dosage 0.15 g, solution final volume 212.5 mL), pre-concentration factor of the proposed method was approximately 50. Optimized method was applied to alcoholic beverage. Clay was characterized by X-ray diffraction; Fourier transformed infrared spectroscopy and scanning electron microscopy coupled with energy dispersive X-ray analysis.

Recent Publications

1. **Ince M, Kaplan Ince O, Asam E and Onal A (2017) Using food wastes biomass as effective adsorbents in water and wastewater treatment for Cu (II) removal. Atomic Spectroscopy 38(5):142-148.**

Biography

Onal A received his Technician degree from Munzur University, Tunceli Vocational School Department of Food Technology at 2011 and he is a Student in Department of Food Engineering at the Munzur University. He is the author of more than three papers that published in journals with good impact factor in their area and his research areas including Atomic Absorption Spectroscopy, Trace and Toxic Element Analysis, Instrumental Analysis, Problem Solving in Chemistry and Food Science.

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K.Meixner et al., J Environ Res, Volume 2

PHOTOTROPHIC PHB PRODUCTION WITH CYANOBACTERIA BY USING LOW SOLIDS DIGESTATE

K. Meixner[1,2], C. Troschl[2], I. Fritz[2] and **B. Drosg[1,2]**
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[2]University of Natural Resources and Life Sciences, Austria

With rising environmental pollution caused by persistent and petroleum-based plastics, the interest in biodegradable materials like poly-ß-hydroxybutyrate (PHB) increases. Currently, PHB production is based on heterotrophic bacteria, using organic carbon sources from crops. To avoid the competition to food and feed production cyanobacteria, metabolizing CO_2 e.g. from exhaust gas, can be used. For cultivating cyanobacteria at larger scales high amounts of mineral nutrients are needed. Due to this reason alternative nutrient sources, such as digestate, are required. In this study photoautotrophic PHB production with cyanobacteria was investigated, with emphasis on increasing the ecological and economic efficiency of the process by using anaerobic digestate as nutrient source as well by using the residual biomass. The results obtained herein demonstrate that low solids digestate, produced by anaerobic digestion thin stillage, is suitable to produce PHB with Synechocystis salina. By using digestate supernatant diluted 1/3, biomass and PHB concentrations of 1.6 g/L and 89 mg/L, respectively, were achieved within 40 days in a tubular photobioreactor system with a working volume of 200L. In mineral medium, optimised with regard to biomass and PHB production in a single cultivation stage, biomass and PHB concentrations of 2.1 g/L and 123 mg/L were obtained. The PHB quality was hardly influenced when digestate was used as nutrient source. Additionally, anaerobic digestion of residual biomass yielded in 348 Nm³ CH4/t VS, being comparable with maize silage, a frequently used substrate in biogas plants. Other options would be to use the residual biomass as animal feed or fertiliser, since it still contained lipids (14 mg/g TS), proteins (242 mg/g TS) and carbohydrates (6 mg/g TS). Based on these results it can be concluded that photoautotrophic PHB production has a high potential to be connected to already existing processes, at which digestate and CO_2 accrue.

Keywords - Biorefinery, digestate, polyhydroxy butyric acid, Synechocystis slina

Recent Publications

1. **Meixner K, Kovalcik A, Sykacek E, Gruber-Brunhumer M, Zeilinger W, Markl K, Haas C, Fritz I, Mundigler N, Stelzer, F, Neureiter, M, Fuchs W, Drosg B (2018) Cyanobacteria Biorefinery - Production of poly(3-hydroxybutyrate) with Synechocystis salina and utilisation of residual biomass. J Biotechnol. 2018; 265:46-53**
2. **Kovalcik A, Meixner K, Mihalic M, Zeilinger W, Fritz I, Fuchs W, Kucharczyk P, Stelzer F, Drosg, B (2017) Characterization of polyhydroxyalkanoates produced by Synechocystis salina from digestate supernatant. Int J Biol Macromol. 2017; 102:497-504**
3. **Meixner, K; Fritz, I; Daffert, C; Markl, K; Fuchs, W; Drosg, B (2016) Processing recommendations for using low-solids digestate as nutrient solution for poly-beta-hydroxybutyrate production with Synechocystis salina. J BIOTECHNOL. 2016; 240: 61-67.**
4. **Wagner J, Bransgrove R, Beacham TA, Allen MJ, Meixner K, Drosg B, Ting VP, Chuck CJ (2016) Co-production of bio-oil and propylene through the hydrothermal liquefaction of polyhydroxybutyrate producing cyanobacteria. BIORESOURCE TECHNOL. 2016; 207: 166-174**
5. **Meixner K, Fuchs W, Valkova T, Svardal K, Loderer C, Neureiter M, Bochmann G, Drosg B (2015) Effect of precipitating agents on centrifugation and ultrafiltration performance of thin stillage digestate. SEP PURIF TECHNOL. 2015; 145: 154-160.**

Biography

K. Meixner is PhD student at the Institute of Environmental Biotechnology of University of Natural Resources, Vienna. Her research foci are algae/cyanobacteria biotechnology, biorefinery, biogas production and digestate treatment. Currently, she is "Junior Researcher" at the Austrian Research Competence Centre "Bioenergy2020+" for the area "bioconversion and biogas systems".

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DAY 2

Workshop

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Kenneth M. Haberman, J Environ Res, Volume 2

A COMPARISON OF APPROACHES USED TO MANAGE EXCESS SOIL FROM BROWNFIELD SITES – IRELAND, THE UNITED KINGDOM AND THE UNITED STATES

Kenneth M. Haberman

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The redevelopment of commercial and industrial properties, which are commonly referred to as brownfields, frequently involves soil excavation for environmental or construction-related purposes. In many cases, the soil or fill material that needs to be excavated cannot be reused on the same property becomes excess soil that must be transported off-site. The excess soil may need to be transported off-site if it is determined to be hazardous or if it is determined to be unsuitable for geotechnical purposes or because there is no room for the soil to be reused on site in the context of the new redevelopment. Regardless, even when the excess soil is not contaminated, a significant amount of excess soil is transported off-site and disposed in landfills, which results in increased costs to the redevelopment project. There is a growing awareness that off-site disposal of excess soil in landfills, including marginally contaminated soil, is not sustainable and that excess soil should be viewed as a commodity or a product and not a waste. Government agencies in multiple countries have expressed concerns about implementing new environmental guidelines and regulations pertaining to the reuse of excess soil could undermine long-standing environmental policies and practices that were intended to protect human health and the environment. In recent years, there is a growing interest by both government agencies and private-sector organizations in a number of countries to find new ways to promote the beneficial reuse of excess soil in a manner that can also protect human health and the environment. This presentation/paper is intended to compare policies and procedures that apply to the beneficial reuse of excess soil in three countries – Ireland, the United Kingdom and the United States.

Biography

Kenneth M. Haberman has over 35 years of experience specializing in the areas of environmental investigation and remediation and regulatory policy development. Ken served as the President of Landmark Environmental, LLC from 2000 to 2015. Ken is currently an Executive Vice-President. Ken is a former Board Chair of Minnesota Brownfields, a non-profit organization that promotes current brownfields initiatives. Prior to the establishment of Landmark, Ken was a Vice-President at Barr Engineering Company. Ken also worked for the Minnesota Pollution Control Agency for nearly 16 years, primarily as a manager in the Voluntary Investigation and Cleanup Program and the Superfund Program. Ken has a Master's Degree in Environmental Studies from Bemidji State University and a Bachelor's Degree in Biology and Earth Science from the University of Minnesota. Ken participated in the Fellowship Program at the University of Minnesota, Humphrey Institute of Public Affairs in 1999 and 2000.

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DAY 2

Scientific Tracks & Abstracts

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DAY 2

March 30, 2018

Sessions

Renewable Energy | Environmental Health Science | Environmental Chemistry | Environment Technology and Innovation

Session Chair
Tahira Aziz Mughal
Lahore College for Women University, Pakistan

Session Introduction

Title: Comparison of copper level in some wild edible mushrooms collected from Tunceli Province, Turkey
Muharrem INCE , Munzur University, Turkey

Title: Sedimentation and mixing analysis in cattle manure feedstock in a stirred tank of anaerobic digestion
Ali Reza Noorpoor, University of Tehran, Iran

Title: Assessment and optimization of a novel solar dual organic rankine cycle trigeneration system based on exergy and exergoeconmic analyses
Fateme Ahmadi Boyaghchi, Alzahra University, Iran

Title: Environmental and economical assessment of tree diversity in green space of lahore, pakistan
Tahira Aziz Mughal, Lahore College for Women University, Pakistan

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Ince M et al., J Environ Res, Volume 2

COMPARISON OF COPPER LEVEL IN SOME WILD EDIBLE MUSHROOMS COLLECTED FROM TUNCELI PROVINCE, TURKEY

Ince M, Alp H, Kaplan Ince O and **Onal A**
Munzur University, Turkey

The consumptions of wild-growing edible mushrooms as a component of healthy human diet and they contain basic nutrients, high proteins, vitamins as well as minerals required for human growth and development. Because levels of essential elements especially copper are very important but are able to accumulate various toxic metals, this could represent a serious risk to consumer health. For instance, many people collect wild edible mushrooms in Turkey substantially contributing to food intake. They have also been reported to have medicinal properties. Some mushrooms have immunomodulatory, anti-carcinogenic and anti-mutagenic properties and is still in use as a healthy food for the prevention of cancer. The heavy metals accumulation in macrofungi has been found to be affected by various factors including environmental. Environmental factors contain pH, amount of organic matter, soil metal concentrations, and fungal factors including mushroom species, development stages and biochemical composition. Copper is present in all tissues and is required for cellular respiration along with it is essential element in mammalian nutrition. Also Cu plays a vital role in central nervous system development and is a cofactor for countless enzymes. Serious damage can occur in case of excessive Cu intake to body, when it is not taken in sufficient quantity may result in incomplete development. In this study four wild mushrooms species as *Agaricus campestris, Langermannia gigantea, Pleurotus eryngii var. eryngii, Pleurotus eryngii var. ferulae* that collected from three different region of Tunceli were analyzed. Copper analysis was done using ETAAS and results were evaluated statistically by SPSS. When evaluated in terms of species Cu concentrations were similar statistically in *Agaricus campestris* and *Langermannia gigantea, Pleurotus eryngii var. eryngii* and *Pleurotus eryngii var. ferulae*. When evaluated from the point of view of the region, there is no difference in terms of copper concentrations in the regions.

Recent Publications

1. Ince M and Kaplan Ince O (2017) Box–Behnken design approach for optimizing removal of copper from wastewater using a novel and green adsorbent. Atomic Spectroscopy 38(6):200-207.
2. Ince M, Kaplan Ince O, Asam E and Önal A (2017) Using food wastes biomass as effective adsorbents in water and wastewater treatment for Cu(II) removal. Atomic Spectroscopy 38(5):142-148.
3. Ince M, Kaplan Ince O and Yaman M (2017) Optimization of an analytical method for determination of pyrene in smoked meat products. Food Analytical Methods 10(6):2060–2067.
4. Kaplan Ince O, Ince M, Yonten V and Goksu A (2017) A food waste utilization study for removing lead (II) from drinks. Food Chemistry 214:637–643.
5. Yonten V, Ince M, Tanyol M and Yildirim N (2016) Adsorption of bisphenol a from aqueous solutions by *pleurotus eryngii* immobilized on amberlite XAD-4 using as a new adsorbent. Desalination and Water Treatment 57:22362–22369.

Biography

Ince M has received his PhD degree in Analytical Chemistry at Firat University, Turkey in 2008. He worked as an Assistant Professor and Research Analytical Chemist in Science Education Department at Mus Alparslan University, Turkey from 2009 to 2012. He has been working as an Associate Professor at Munzur University since 2012. From 2013-2016, he served as a Head of Department of Chemical Engineering at the Munzur University, Turkey. He became Editorial Board Member of the *International Journal of Food and Nutrition Sciences, International Journal of Toxicology and Environmental Health, Journal of Environment and Waste Management, International Journal of Pure and Applied Sciences, International Research Journal of Chemistry, Chemical Sciences Journal and Science Journal of Analytical Chemistry*. He is an author and co-author of more than 22 papers that published in journals with good impact factors.

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Ali Reza Noorpoor et al., J Environ Res, Volume 2

SEDIMENTATION AND MIXING ANALYSIS IN CATTLE MANURE FEEDSTOCK IN A STIRRED TANK OF ANAEROBIC DIGESTION

Ali Reza Noorpoor[1], Soroush Dabiri[1] and **Mohammad Hadi Varahram[2]**
[1]University of Tehran, Iran
[2]Ministry of Science, Research and Technology, Iran

It is necessary to move towards renewable energy resources, since the human has faced through global warming and fossil fuels depletion. Additionally, the livestock, agricultural and industrial activities have leaded to contamination of water, soil and atmosphere. With this in mind, anaerobic digestion (AD) is recognized as a cheap and easy approach for eliminating organic harmful materials, as well as generating energy. In the present study, an anaerobic digestion tank specialized for cattle manure was analyzed. Computational fluids dynamics (CFD) method was employed to estimate the behavior of the cattle manure feedstock, while agitating. Mixing, as well as sedimentation quality, was evaluated with respect to the concentration of the total solids in the fluid, which affected the rheological (non-Newtonian) characteristics of the feedstock. The sedimentation of soil within the digesting tank was simulated *via* discrete phase model (DPM) and velocity gradient method. ANSYS Fluent commercial code was utilized to solve continuity and Navier-Stokes, as well as turbulence, equations. The solver was steady state while analyzing both the mixing quality and sedimentation. By evaluating the achieved velocity and pressure fields, it is concluded that the mixing quality is appropriate for all the models with feedstock with total solid concentrations of 2.5% to 12.1%. However, the mixer is not efficient enough to avoid sedimentation. Finally, some recommendations for simulating the chemical reactions are presented for the future studies.

Recent Publications

1. **Nazari Kudahi S, Noorpoor A R and Mahmoodi N M (2017) Determination and analysis of CO_2 capture kinetics and mechanisms on the novel graphene-based adsorbents. Journal of CO_2 Utilization 21:17-29.**
2. **Asgari S, Noorpoor A R and Boyaghchi F A (2017) Parametric assessment and multi-objective optimization of an internal auto-cascade refrigeration cycle based on advanced exergy and exergoeconomic concepts". Journal of Energy 125:576-590.**
3. **Noorpoor A R and Rohani S (2016) Thermo-economics analysis and evolutionary-based optimisation of a novel multi-generation waste heat recovery in the cement factory. Int. Journal of Exergy 21:405-434.**
4. **Noorpoor A R and Nazari Kudahi S (2016) Analysis and study of CO_2 adsorption on UiO-66/graphene oxide composite using equilibrium modelling and ideal adsorption solution theory (IAST). Journal of Environmental Chemical Engineering 4:1081-1091.**
5. **Noorpoor A R and Nazari Kudahi S (2015) CO_2 emissions from Iran's power sector and analysis of the influencing factors using the stochastic impacts by regression on population, affluence and technology (STIRPAT) model. Journal of Carbon Management 6:101-116.**

Biography

Alireza Noorpoor was born 1974. In 1992, He moved to Mazandaran University for BSc in Mechanical Engineering (Fluid Mechanics) and graduated BSc in 1996 as top student of department. He continued in M.Sc. from 1997 to 1999. He has completed his PhD at the age of 30 years from Iran University of Science and Technology (IUST) and started to teaching at IUST. In 2010 he moved to University of Tehran. Now, he is associate Professor of Graduate Faculty of Environment at University of Tehran. He is the head of Air Pollution and Energy Systems Research Group (FANPAYA Co.) and Editor-in-Chief Journals: Solar Energy Research (JSER) and Environmental Sciences Studies (JESS). His interest fields are: Computational Fluid Dynamics (CFD), Air Pollution, Bio-gas, Carbon Capture and Energy Systems Engineering. He has published more than 200 papers in journals and conferences. He has held more than 10 International conferences at University of Tehran.

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F A Boyaghchi et al., J Environ Res, Volume 2

ASSESSMENT AND OPTIMIZATION OF A NOVEL SOLAR DUAL ORGANIC RANKINE CYCLE TRIGENERATION SYSTEM BASED ON EXERGY AND EXERGOECONOMIC ANALYSES

F A Boyaghchi and **M Chavoshi**
Alzahra University, Iran

This research proposes and models exergetically and economically the novel trigeneration system made up a dual organic Rankine cycle (DORC) integrated with the solar flat plates. The proposed system is undertaken to deliver electricity power, heating and cooling effects. The desired system is equipped with an ejector cooling cycle to provide the cooling load. In order to enhance the system operation, copper oxide (CuO) nanoparticles are utilized inside the heat transfer medium in the solar subsystem. The impacts of several substantial design parameters are evaluated on the annual exergy efficiency as well as the total product cost rate of the system for various insolation for each month. Two groups of working fluids namely R1234yf-R245fa and R423A-R236fa are applied inside the DORC. Sensitivity analysis implies that the increment of the ejector outlet pressure has a positive effect on both exergetic and cost performance of the system for all studied working fluids. Additionally, an evolutionary algorithm is used to find the optimum exergetic and economic performance of the system. Optimization results show that the annual exergy efficiency and the total product cost rate are improved within 24.4% and 11.8%, respectively for R1234yf-R245fa and they are modified by about 19.3% and 15.3%, respectively for R423A-R236fa.

Recent Publications

1. Boyaghchi F A and Nazer S (2017) Assessment and optimization of a new sextuple energy system incorporated with concentrated photovoltaic thermal-Geothermal using exergy, economic and environmental concepts. Journal of Cleaner Production 164:70-84.
2. Boyaghchi F A and Asgari S (2017) A comparative study on exergetic, exergoeconomic and exergoenvironmental assessments of two internal auto-cascade refrigeration cycles. Applied Thermal Engineering 122:723-737.
3. Boyaghchi F A, Mahmoodnezhad M and Sabeti V (2016) Exergoeconomic analysis and optimization of a solar driven dual-evaporator vapor compression-absorption cascade refrigeration system using water/CuO nanofluid. Journal of Cleaner Production 139:970-985.
4. Boyaghchi F A and Montazerinejad H (2016) Multi-objective optimisation of a novel combined cooling, heating and power system integrated with flat plate solar collectors using water/CuO nanofluid. International Journal of Exergy 21(2):202-238.
5. Boyaghchi F A, Chavoshi M and Sabeti V (2015) Optimization of a novel combined cooling, heating and power cycle driven by geothermal and solar energies using the water/CuO (copper oxide) nanofluid. Energy 91:685-699.

Biography

F A Boyaghchi has completed her BSc, MSc and PhD degree in the Energy Conversion field from the University of Science and Technology (IUST), Tehran, Iran. Now, she is working as an Associate Professor of Mechanical Engineering Department in the Faculty of Engineering and Technology at Alzahra University. She is the Head of Mechanical Engineering group and has her expertise in solar thermal system design, environmental assessment and optimization. Renowned for her pioneering works in the area of renewable energy technologies. She has authored and co-authored more than 50 refereed journal and conference papers and a book chapter published by Elsevier.

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