

## **Estimating the protective value of Taleghan dam's ecosystem and distinction between used and non-used value using AHP approach**

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### **Abstract**

Regarding the importance of natural resources in preserving natural ecosystem and human being survival, protecting these resources and preventing their demolition will be necessary. Taleghan Lake, Alborz, is studied to determine the protective value and measuring the willingness of people. Using the AHP approach, this study is different by using and non-using value of the lake. Results from Lagit Model showed that there was 72% decrease in people's willingness to pay for offered price in lieu of 1% increase in it. Results from the estimation have also estimated the maximum willingness to pay amounting to 41400 rials for each person per month. On the basis of AHP approach 3150 rials and 10350 rials out of 41400 rials have been estimated as used and non-used value, respectively for each person per month. Results from the model for distinguishing between the used and non-used values are indicative of allocating more amounts for used value compared with non-used value. This can be led to depletion of natural and environmental resources of the lake. Therefore, we have to find some policies in order to create a balance between used and non-used functions in the region.

### **Keywords**

AHP approach, conditional evaluating, protective value, Taleghan Dam.

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## **Determination of Ecological Vulnerability of Patom District of Kheyroud Forest Using of the Object-Oriented Vulnerability Method**

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### **Abstract**

Deforestation in the past decades has risen. So, the proper development of human activities in forests requires the environmental limitations to be considered during forests management process. One of the appropriate measures is the determination of ecological vulnerability. In the present study, Patom District of Kheyroud Forest was classified based on the ecological sustainability, using Object- Oriented Vulnerability Method. The results showed that 26% of the study area is located in middle sensitive class, 46% in sensitive class and 28% in very sensitive class. Overall, we infer that Patom District of Kheyroud Forest has the high ecological vulnerability that it should be considered by forest managers.

### **Key words**

ecological vulnerability, environmental limitations, forest management, kheyroud forest, object-oriented vulnerability method

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## Comparison of Zeolite (Clinoptilolite) and Activated Carbon, in Ammonia Removal during Transport of Live Rainbow Trout Fry (*Oncorhynchus mykiss*)

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### Abstract

Increasing the concentration of ammonia in water can cause fish death. This study was conducted to compare the performance of conditioned activated carbon and zeolite in ammonia (TAN = Total Ammonia Nitrogen) removal in a simulated transport of rainbow trout fry in 40-liter plastic bags. Hence, responses of zeolite and conditioned activated carbon in ammonia (TAN) removal at different concentrations of absorbents, i.e. 0, 5, 10 and 15  $\text{g l}^{-1}$  and transportation times i.e. 12 and 24 hours and fry densities i.e. 20, 50 and 80 fry.bag<sup>-1</sup> were compared, respectively. Both time and fish density had significant effect on TAN production ( $P < 0.001$ ). A significant difference was found between zeolite and conditioned activated carbon in TAN removal ( $P < 0.001$ ). The results obtained by zeolite were more satisfactory than activated carbon.

### Keywords

activated carbon, ammonia, density, zeolite.

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## **Hazard assessment of Zargandeh waste water treatment plant using PHA & JSA**

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### **Abstract**

For the purpose of assessing Zargandeh waste water treatment risks, preliminary risk assessment and evaluation of safety were conducted. For this purpose air pollution and visual impact were assessed and scored after identifying the activities and various water treatment processes, equipment, and staff positions and the amount of pollution due to wastewater treatment plant. Values were measured in the treatment facilities 'drainage (Summer 2011) conforms to the standard set by Iran's Environmental Protection Ministry. Results of this investigation (using PHA & JSA methods) showed those 58 environmental risks for three dangerous occupations and 30 precarious situations in the plant dividing into 16 risks with an acceptable level without appeal, 10 the risk with an acceptable level with the revised management and 4 unacceptable level of risk 28 with undesirable level of risk. In addition, 30 dangerous situations separated to unacceptable and poor category that the six cases applying for unacceptable situation and 24 cases applying for poor (undesirable) situation. Hence this study, public health and safety training for all personnel, monitoring the behavior of individual employees, especially during maintenance, establishing appropriate procedures for waste collection and disposal of various waste water treatment process, developing safety standards and guidelines, and their implementation in all areas seem to be essential to protect both staff and environment.

### **Keywords**

job safety assessment, preliminary hazard assessment, risk assessment, risk priority number, Zargandeh waste water treatment plant.

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## Study of phytoremediation of soil contaminated by cadmium and chromium and their bio-accumulation in spinach plant (Spinacia Oleracea)

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### Abstract

In recent decades, Phytoremediation is one of the methods which has been a lot of attention. In this process by using of green plants can be removing or eliminate pollutants from water, soil and sediments. Therefore, to achievement the objective, this experiment was done in pot culture using completely randomized design with different levels of Cadmium concentrations ( $\text{CdCl}_2 \cdot \text{H}_2\text{O}$ ) including 0, 5, 50, 100  $\text{mg kg}^{-1}$  and also chromium concentrations ( $\text{CrCl}_3$ ): 0, 50, 100, 150  $\text{mg kg}^{-1}$  with three replications. Spinacia Oleracea was used to remove or reduce the concentration of Cadmium and Chromium. Metals were determined by acid digestion method and atomic absorption set. Results were analyzed with SPSS (version 16) and Macro software. Tables and graphs were traced with Excel software. Results indicated that Cadmium and Chromium concentration in shoot significantly affected by their concentration in soil ( $P < 0.01$ ). Cd shoot concentration in Spinacia oleracea was increased by increasing of Cd in soil. Also, results showed that Cd and Cr root concentration was more than shoot. Therefore, according to the results, Spinacia oleracea is appropriate for absorption of Cadmium and Chromium in phytoremediation technology.

### Key words

cadmium, chromium, contaminated soils, phytoremediation, Spinacia Oleracea.

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## Nature-based tourism zoning with consideration of environmental criteria

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### Abstract

Tourism as a growing industry needs special attention in developing countries. During last decades, nature based tourism has been growing faster than other tourism fields and it seems to grow even faster. Ever growing demand for nature based tourism emphasizes the necessity of a holistic planning for preserving environment against degradation. Objective of this study is to present a nature based tourism planning in arid and semi-arid areas. Khatam township in south of Yazd province was selected as case study. First, criteria for nature based planning were chosen from foreign and domestic literature. Then Delphi method was implemented for screening and prioritizing these criteria resulting in 11 criteria and 29 sub-criteria ordered based on percentage and degree of importance. Each criterion was measured or mapped by a number of one to four sub-criteria and each sub-criterion by one indicator. Sub-criteria referred to climate were used to determine tourism climate index and time constraints. Subjective maps were developed by spatial sub-criteria. Using Spatial Multi Criteria Evaluation (SMCE) to find proper fields for nature based tourism; four zones were chosen with a total area of 17278 (ha) which is equal to 5% of study area. Employing qualitative sub-criteria in TOPSIS method and distance to ideal solution was used for prioritizing zones. Results showed that the smallest zone has the highest priority. Constraints on tourism activities were developed on sustainable nature based tourism framework basis in arid and semi-arid areas using tourists demands projected in questionnaires.

### Key words

Delphi method, desert and semi-desert areas, environmental criteria, Khatam Township, spatial multi-criteria evaluation, TOPSIS, Yazd province.

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## Investigation and comparison of mercury (Hg) content and its weekly intake by body in some Imported and Iranian kinds of rice

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### Abstract

This study has paid to investigation and comparison of content Hg in imported rice from Indian country and cultivated rice (*Oryza sativa*) in Borojerd and Isfahan provinces in Iran. 30 types of Indian imported rice and 5 type Iranian rice available in market of Iran in 4 repeat from every type. The first step, grains of raw rice were digested by acid digestion method and then were analyzed for Hg by adsorption atomic. To assess the weekly intake of Hg by rice, from daily consumption of rice was calculated. And it was compared with the Provisional Tolerable Weekly Intake (PTWI) established by WHO. The results showed that average concentration of Hg in imported rice was 2.16 ng/g dry wt and ranged from 1.12 to 3.96 ng/g dry wt, as average concentration of Hg in Iranian rice was 0.4 ng/g dry wt and ranged from 0.03 to 0.89 ng/g dry wt. So the Hg content in the Imported and Iranian rice samples were found below the limit of standard recommended by The Chinese National Standard Agency. Also average weekly intake of Hg from Imported and Iranian rice respectively were 41 ng/kg body weight/week that ranged from 38 to 45 ng/kg body weight/week and 8 ng/kg body weight/week that ranged from 5.9 to 9.6 ng/kg body weight/week that were below the maximum weekly intake recommended by WHO and approximately were equal with 0.082% and 0.016% PTWI recommended by WHO. To perform test of mean comparison identified that there are different significantly between content Hg in Iranian and Imported rice in level 5%. And average contents heavy metal Hg in Imported rice were significantly ( $P < 0.05$ ) higher than Iranian rice.

### Keywords

adsorption, heavy metal mercury, Indian, Iran, rice.

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## Surveying phenological characteristic of *Quercus infectoria* outside of Zagross region for introducing and creating diversity in urban green space

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### Abstract

Urban green space is a fundamental and attractive element of cities around the world all through the year. Selecting species resistant to dryness is an essential decision for planting them in the urban green space in arid and semi-arid regions. One of the most important experiments to introduce new plants in new regions is phenology of different species. In this study, the phenological characteristics of *Quercus infectoria* have been identified using two different methods namely descriptive and analytical digital photography. In total, ten trees in the campus of Isfahan University of Technology have been fortnightly monitored for two years. The time of phenological phenomenon of each tree was registered in information forms, and different parts of the tree were photographed with a digital camera. The spectral spectrum of the leaf and fruit of the tree were produced and the colours were analyzed in RGB system, with radiometric resolution of  $2^8$  for each colour. For determining the effect of temperature on colour changing in time, the 2G-RB index was used. According to the descriptive observations the flowering and leafing occurs in the end of March. In colour changing diagrams the intersection of green channel with red in late October exhibits a revolution in leaves colour. In the fruit colour diagrams, the whole of transmuting stages from flower to fruit was detected and the emergence time of these stages was gained. Also, the correlation between temperature and 2G-RB index for both leaf and fruit is significant and can be used as a means for monitoring phenology of the tree due to climate changes in future studies.

### Keywords

digital imaging, phenology, *Quercus infectoria*, RGB, 2G-RB index

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## The role of organic matter in phytoremediation efficiency of *Populus alba* L. seedlings in chromium (VI) polluted soil

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### Abstract

Due to its wide industrial use, chromium is considered as a serious environmental pollutant. Phytoremediation is an effective, economical and biocompatible method for remediation of contaminated soils. The present study is an attempt to assess the capability of *Populus alba* L., for the phytoextraction of Cr from a polluted loamy soil added with either cocopeat, litter and peatmoss as organic matter. Three amended substrates (soil and cocopeat, soil and litter, soil and peatmoss) using mentioned organic matter and one soil substrate (as control) were prepared. Four concentrations of Cr (VI) including 0, 50, 100 and 150 mg kg<sup>-1</sup> (were spiked as potassium dichromate) were added to substrates. At the end of growing season, the samples were digested and the contents of Cr in plant tissues (root, shoot and leaf) were measured. Maximum and minimum total uptake (54.64 µg plant<sup>-1</sup> and 2.81 µg plant<sup>-1</sup>) were observed in presence of cocopeat at 100 mg kg<sup>-1</sup> and soil at 0 mg kg<sup>-1</sup> respectively. Amended substrates were able to enhance the total uptake of Cr by plants nearly two times more than that occurred in control substrate. Using chemical chelators in order to increase metal solubility and enhance phytoremediation efficiency led to increase environmental impacts. The result of the present study as an environmental friendly approach may have a potential use to assist phytoremediation process.

### Key words

cocopeat, litter, peatmoss, pollutant, potassium dichromate.

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## **Applying information resources and communication channels in adoption process of rural waste comprehensive management**

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### **Abstract**

The rural waste management is as an innovation and its aim is to discontinue or adverse rural waste effects on rural inhabitants' health. The effect of communication channels and information resources are inevitable issues for adoption of waste management. This may change and improve knowledge, attitude and skill toward rural inhabitants and also implementation of rural waste management. Consequently, the purpose of this study is to investigate the importance rate of each step of adopting comprehensive rural waste management and applying information resources and communication channels according to each step. To collect data, questionnaire and data analysis have been used by grouping decision with analytical hierarchy process (AHP). The results illustrated that in the adoption process, knowledge criterion by weighing 0.655, and 0.08. Compatibility rate had higher priority than encouraging, decision making and the implementation criteria. Accordingly, holding training classes on rural waste recycling for rural women as the best information resource and communication channel were identified in the adoption process of rural waste comprehensive management.

### **Key Words**

adoption process, communication channels, information resources, rural waste management.

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