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Population Dose Distribution due to Soil Radioactivity in Designated and Undesignated Waste Dumpsites in the City of Lagos Nigeria

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Abstract. The radionuclide contents in soil from waste dumpsites in the city of Lagos were determined. The radioactivity concentration level due to ^{40}K , ^{226}Ra and ^{228}Th in the soil were determined using gamma-ray spectrometry system. The average radioactivity level obtained was 1134 Bq/kg (designated dumpsite) and 1045Bq/kg (undesignated) for ^{40}K , 43 Bq/kg (designated) and 85 Bq/kg (undesignated dumpsite) for ^{226}Ra , 34 Bq/kg (designated) and 38 Bq/kg (undesignated dumpsite) for ^{228}Th . No artificial radionuclide was detected in any of the samples. The average outdoor effective dose rate due to gamma exposure was calculated as 0.11 mSv/y at designated and 0.13 mSv/y at undesignated dumpsites. These values are much smaller than 1 mSv/y, the limit recommended for the member of the public by United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR).

Keywords: soil, dumpsites, spectrometry, radionuclide, Lagos, Nigeria

Paleocurrent Analysis of the Early Pliocene Nagri Formation, Southern Kohat Plateau, Sub Himalayas, Pakistan

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Modelling Water Age as Surrogate for Water Quality in a Distribution System

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Abstract. Extended period simulation study of the water quality was made through construction of a waterCAD model of the existing Ikpoba Hill water distribution system to simulate the age of water as surrogate for water quality throughout the network. The average age of water in the network fluctuated between 0.5 and 4 h during 24 h; applying literature values of 0.00007/min and 0.00003/min for chlorine decay coefficients to the most critical time (4 h), it was indicated that the chlorine residual could degrade in the network by 1-2% only. This suggests that areas presently served by the network are not likely to suffer water quality problems on account of travel time. However, considering the age of the network, adequate attention should be paid to the possible unaccounted reasons for water problems in a network for maintaining the water quality integrity of the network *viz.*, management of metering, billing and collection, and illegal connections and theft which create higher chances of drinking water contamination and outbreak of water-borne diseases.

Keywords: extended period simulation, water age, calibration, waterCAD

Characteristic Trend of Persistent Organochlorine Contamination in Imported Red Kidney Beans

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Abstract. Residual level of persistent organochlorines (OC) such as Σ HCH, dieldrin and endrin were measured in red kidney bean samples from consignments imported from Ethiopia during 2004-2006. OCs, mainly Σ DDT and Σ HCH along with breakdown products (>65%), were detected in 80% of the samples analyzed and the highest concentration was 37 ng/g. In 2004, 20% and in 2006, 40% samples were found contaminated with detectable levels of OCs. Beta-HCH, however, was not detected in any sample in 2004 and HCB, in 2005. In 2004, average residual concentration of OCs in individual sample was 0.03-0.180 mg/kg and in 2005, 0.004-0.09 mg/kg.

Keywords: red kidney bean, organochlorine pesticides, Ethiopia, GC/ECD analysis

Short Communication

Development and Evaluation of Combined Wavelet Based Palmprint Identification System

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(received July 31, 2009; revised May 3, 2010; accepted May 12, 2010)

Abstract. Palmprint based identification is fairly recent biometric modality gaining popularity due to its traits like user comfort, reliability and easy acquisition. A wavelet based palmprint identification system has been proposed. Euclidean distance based classification is performed using Biorthogonal, Symlet and Discrete Meyer wavelets on 500 palmprints obtained from 50 users for individual and combined features, employing locally developed acquisition platform. An equal error rate (EER) of 0.0217 and genuine acceptance rate (GAR) of 97.12% demonstrate the effectiveness of the combined system.

Keywords: biometrics, palmprint, wavelet transform, distance transform

Biological Sciences

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Biology of Parasitoid *Aganaspis daci* (Weld) (Hymenoptera: Eucoilidae)

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(received December 17, 2009; revised April 26, 2010; accepted May 04, 2010)

Abstract. In view of the importance of *Aganaspis daci* (*Trybliographa daci*) and *Diachaishmimorpha longicaudata* parasitoids in the use of fruit fly control, biology of *A. daci* was studied under controlled temperature and humidity conditions. *A. daci* was found to be more dominant and easy to use as a biological control agent than the *D. longicaudata*.

Keywords: biological control, fruit fly, *Aganaspis daci*, *Trybliographa daci*, *Bactrocera dorsalis*

N-Acetyltransferase 2 (NAT2) in Tunisian Population: Correlation Between Acetylation Phenotype and Genotype

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Abstract. One hundred tuberculous patients were studied during 2004-2005 to determine acetylation phenotype, frequent mutations of NAT2 gene and to compare acetylation phenotype with NAT2 genotype in Tunisian population. Acetylation phenotype was determined by determination of acetylation index. Five mutations of NAT2 gene were evaluated by PCR/RFLP. Results show bimodal distribution of acetylation SA and RA phenotype, 75% and 25% and genotype 56% and 44%, respectively. Ten NAT2 alleles were found, NAT2*4 being the major one. Thirty-two different genotypes were found (9 RA and 23 SA). The major one was NAT2*6 B/NAT2*4. The concordance value was 79%. A good sensibility (98, 2%) of acetylation test for SA detection was found. Thus, acetylation phenotype in SA is predicted with poor error risk.

Keywords: Tunisian population, phenotype, genotype, N-acetyltransferase 2, polymorphism

Bionomics of Rose Aphids and their Natural Enemies

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Abstract. Aphids and their natural enemies were enumerated on 11 rose cultivars at weekly basis during the year 2005, at PMAS-Arid Agriculture University, Rawalpindi, Pakistan. Rose plants were found to be colonized by rose aphid (*Macrosiphum pachysiphon*), potato aphid (*Macrosiphum euphorbiae*, *Rhodobium porosum*), 7-spotted lady bird beetle (*Coccinella septempunctata*), syrphid fly (*Episyrphus balteatus*) and *Aphidius rosae*. Significantly, greater aphid populations were observed on the cultivar Blumonia than on other varieties. Higher percentage of parasitism and predation were observed on the cultivars, Good News and Golden Master, respectively.

Keywords: bionomics, rose aphids, predators, parasitoids, rose cultivars

Effect of Storage Temperature and Time on the Vitamin C Contents of Selected Fruits and Vegetables

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Abstract. The vitamin C contents of 5 fruits and 7 vegetables, as a whole and in diced form, were determined by HPLC during cold storage. Results showed a decrease in vitamin C contents during 15 days refrigeration (7 °C) as well as freezing at -20 °C. It was found that fruits are more stable than vegetables since the rate of degradation of vitamin C was higher in vegetables as compared to fruits, either during freezing or refrigeration. During 15 days freezing, fruits showed a decrease of 41.05 - 51.44%, whereas, this loss augmented to 54.12 – 89.10% in vegetables. In addition to this, it was also observed that fruits and vegetables which have peels are less vulnerable to vitamin C degradation; the ratio of degradation of vitamin C in all the fruits studied and potato was not more than 51.44%. In fruits, apple was more susceptible and in vegetables, potato was more stable to vitamin C degradation.

Keywords: fruits,vegetables, vitamin C, refrigeration, freezing

Technology

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An Experimental Study on Regulated and Unregulated Pollutants from a Spark Ignition Car Fuelled on Liquefied Petroleum Gas and Gasoline

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Abstract. In the experimental study conducted on a spark ignition (SI) car running on a chassis dynamometer, fuelled on liquefied petroleum gas (LPG) and gasoline, carbon monoxide (CO) and total hydrocarbons (HC) decreased by 37.3% and 46.8%, respectively, while oxides of nitrogen (NO_x) increased by 59.7% due to higher compression ratio with LPG, compared with gasoline. In case of LPG fuel, formaldehyde, acetaldehyde, propionaldehyde, 2-butanone, butyraldehyde, benzaldehyde and valeraldehyde decreased, leading to an over all decrease of about 35% and 26% in carbonyls and their ozone forming potential (OFP), respectively, compared with gasoline. Furthermore, benzene, toluene, ethyl benzene, xylene and styrene decreased, resulting in an overall decrease of 38.8% in volatile organic compounds (VOCs) and 39.2% in BTEX (benzene, toluene, ethyl benzene and xylene) species due to more complete combustion with LPG, compared with gasoline. Further, the OFP of VOCs with LPG was 6% lower than that with gasoline fuel.

Keywords: liquefied petroleum gas, regulated emissions, unregulated emissions, carbonyls, gasoline car

A New Process for the Synthesis of Naphthalene Based Tanning Agent

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Abstract. A new process developed for the preparation of naphthalene catechu tanning agent consisted of sulphonation of naphthalene, condensation with formaldehyde, combining with naturally occurring catechol, followed by neutralization of the reaction mixture. The product was then dried, analyzed and tested for application on wet blue leather which showed excellent tanning properties.

Keywords: syntan, catechu, naphthalene, tanning agent
