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Effect of Exposure to Moisture and Petrochemicals on Medium Voltage Cable Jackets

Nazer Hussain Malik, Mohammad Iqbal Qureshi* and Abdulrehman Ali Al-Arainy

College of Engineering, King Saud University, P.O. Box 800, Riyadh 11421, Saudi Arabia

(received January 6, 2010; revised July 14, 2010; accepted July 22, 2010)

Abstract. The 15 kV, cross-linked polyethylene (XLPE) insulated underground power cables, having polyethylene (PE) and polyvinyl chloride (PVC) jackets, were studied regarding the influence of moisture, chemicals and petroleum products. PE jackets were found to possess more suitable properties in harsh conditions and performed better than PVC jackets for use in electric power utilities, industry and other uses.

Keywords: petrochemicals, power cables, cable jackets

Beneficiation Studies of Bajaur Manganese Ore by Different Processing Techniques

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(received September 28, 2009; revised August 20, 2010; accepted August 25, 2010)

Abstract. The manganese ore of Bajaur Agency of Pakistan was subjected to flotation, heavy medium separation, gravity concentration and magnetic separation techniques for beneficiation. The original composition of the manganese ore was 45.56% Mn, 4% Fe₂O₃, 40% SiO₂. The Mn content was raised to a maximum ~ 48.76 % in the concentrate with the recovery of ~ 67.78 % through flotation technique. Other techniques rendered marginal increase in Mn concentration against the theoretical possibility of substantial enrichment by rejecting the ~ 20 % gangue minerals. The separation of manganese minerals from associated gangue was difficult, due to mineralogical complexity of the ore, extreme fineness of the particle size, texture and minerals intergrowth. High Mn/Fe ratio, phosphorus, and silica contents were within tolerable limits for utilisation of the ore in ferro-manganese production.

Keywords: manganese, Bajaur agency, magnetic separation, flotation, beneficiation

Mineralogical and Textural Characteristics of Kakul (Hazara) Phosphate Rock, NWFP, Pakistan

**Rashid Mehmood*, Muhammad Arif Bhatti, Kamran Raza Kazmi,
Ansar Mehmood, Shahid Tufail Sheikh and Syed Aleem Shah**

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(received January 19, 2010; revised July 29, 2010; accepted August 6, 2010)

Abstract. Various types of minerals, present in phosphate rock of Hazara area of Khyber Pukhtoonkhwa Province of Pakistan, were identified and their concentration was determined using a suitable method. The characteristics of the rock were defined by petrography, X-ray diffraction, and chemical analysis and the textural characteristics such as grain size, grain shape and their arrangement in the rock body were also investigated. The degree of liberation of phosphate-bearing mineral was studied by the particle-counting method. Mineralogical and textural observations indicated that fine-grained rock may be suitable for beneficiation by the froth flotation separation technique.

Keywords: phosphate rock, mineralogy, mineral beneficiation, Hazara, Pakistan

Electronic Properties of Au/MgF₂/Au Structures at Different Temperatures

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(received February 11, 2010; revised May 25, 2010; accepted June 10, 2010)

Abstract. Investigations of some electronic properties of vacuum evaporated thin film Au/MgF₂/Au structures such as circuiting I_c and emission I_e currents *versus* the applied voltage, electron attenuation lengths MgF₂ layers and the role of the latter layers showed that these devices undergo an electroforming process leading to decrease in resistivity of several orders of magnitude along with a negative resistance region in their I - V characteristics. High emission current densities are archived for low applied voltages with the cathodes at or near the room temperature. By decreasing the temperature, both I_c and I_e decreased and at low temperatures the negative resistance region disappears completely. High values of hot electron attenuation lengths in the insulator were obtained and the significance of these high values is described.

Keywords: thin films, cold cathodes, electroforming, Au/MgF₂/Al thin films

GC-MS Evaluation of Fatty Acid Profile and Lipid Bioactive of Partially Hydrogenated Cooking Oil Consumed in Pakistan

Aftab Ahmed Kandhro^{ab}, Syed Tufail Hussain Sherazi^{a*}, Sarfaraz Ahmed Mahesar^a,
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(received April 22, 2010; revised August 25, 2010; accepted August 26, 2010)

Abstract. Evaluation of fatty acid profile including *trans* fat and lipid bioactive (tocopherol and sterol contents) of most commonly used vanaspati ghee and cooking oil brands was made by gas chromatography coupled with mass spectrometer detector (GC-MSD). Among the saturated fatty acids (SFA), palmitic and stearic acid were dominant fatty acids; the mean value of SFA in ghee and oil was 44.98 and 30.83%, respectively. Mean values of monounsaturated, polyunsaturated and *trans* fatty acids in ghee were 47.51, 7.49 and 8.08%, and in oil 49.26, 19.90 and 0.91%, respectively. α -Tocopherol was the major tocopherol while campesterol, stigmasterol and sitosterol were main phytosterols in terms of their quantity.

Keywords: GC-MSD, fatty acid profile, tocopherols, phytosterols, edible fats and oils

Estimation of Heavy Metals in Dust Fall Samples from Three Different Industrial Areas of Karachi

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Karachi-75280, Pakistan

(received July 22, 2009; revised July 7, 2010; accepted July 21, 2010)

Abstract. The study of accumulation of heavy metals, Fe, Cu, Mn, Zn, Pb and Cd, in the dust fall samples, collected from three selected industrial areas of Karachi, showed the level of heavy metals to decrease gradually from sites of high activity to those of low activity such as from roundabouts to main roads to side roads. Concentration of heavy metal showed a variation of the order $\text{Fe} > \text{Zn} > \text{Pb} > \text{Mn} > \text{Cu} > \text{Cd}$. Iron had the highest concentration in all the sampling areas in the range of 1.947 ± 0.00 to 30.039 ± 0.01 mg/g. Lower values were observed for Cd with respective ranges of 0.001 ± 0.00 to 0.009 ± 0.01 mg/g. The results suggested that heavy metal pollution in the dust fall samples of industrial areas may be due to automobile and industrial exhaust from different industrial units.

Keywords: dust fall, heavy metals, industrial areas, automobile emission, industrial emission, air pollution

Nutritional Value and Antioxidant Activity of Various Extracts and Fractions of *Punica granatum* (Pomegranate) Peel

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(received September 19, 2009; revised August 5, 2010; accepted August 20, 2010)

Abstract. Evaluation of the nutritional value and antioxidant activity of *Punica granatum* peel extracts for their radical scavenging activity revealed that potent antioxidant activity, in the order of ethyl acetate fraction > chloroform fraction > petroleum ether fraction > water fraction. Ethyl acetate fraction had higher radical scavenging activity in comparison to a standard antioxidant like BHT.

Keywords: *Punica granatum*, nutritional profile, DPPH, reducing power activity, antioxidant activity

Biophysicochemical Variability Evaluation of *Jatropha curcas* L. Collections for Biodiesel Feedstock

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(received January 20, 2010; revised May 17, 2010; accepted May 25, 2010)

Abstract. The seed oils of six *Jatropha curcas* biotypes were evaluated for their oil quality parameters and showed: oil content (38-41 %), acid value (0.14-6.94 mg/g), free fatty acid (0.07-3.47 %), iodine value (115.48-163.37 mg/g) and viscosity (0.6320-0.7431). Significant differences among biotypes were observed in oil yield and biochemical parameters. The variability among the biotypes indicate a good scope of genetic gain through selection.

Keywords: *Jatropha curcas*, biodiesel, chemical composition, seed oil

Short Communication

Screening of Selected Medicinal Plants for the Antioxidant Potential

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(received March 30, 2010; revised August 11, 2010; accepted August 18, 2010)

Abstract. Screening of selected prominent medicinal plants of Pakistan, used by local herbal practitioners for treatment of various ailments, namely *Hyoscyamus niger*, *Carthamus lanatus*, *Foeniculum vulgare*, *Citrullus colocynthis*, *Cissampelos pareira*, *Hypericum dyeri*, *Hypericum perforatum*, *Equisetum arvense* L., *Cichorium intybus*, *Momordica charantia*, *Solanum xanthocarpum*, *Galium aparine*, *Xanthium strumarium*, *Ammi visnaga* and *Euphorbia helioscopia*, using 2,2-diphenyl picryl hydrazyl (DPPH) radical assay was undertaken. *C. pareira*, *E. arvense* L. and *C. intybus* were found to be devoid of antioxidant activity, while the rest displayed variable levels of antioxidant potential.

Keywords: antioxidant activity, medicinal plants, DPPH radical assay, Pakistan

The Effect of Drying and Salting on the Nutrient Composition and Organoleptic Properties of *Vernonia amygdalina* Leaves

Fred Omon Joseph Oboh* and Gift Ejehiokhin Madojemu

Department of Basic Sciences, Benson Idahosa University, PMB 1100, Benin City, Nigeria

(received February 17, 2010; revised June 22, 2010; accepted June 29, 2010)

Abstract. The preservation methods used for finding their effect on the nutrient content and organoleptic properties of *Vernonia amygdalina* leaves (bitter leaf), included oven drying at 40 °C without any pretreatment, blanching in steam prior to oven drying at 40 °C, light brining (25 g salt/L water), light dry salt treatment (25 g dry salt/kg leaves), light brine and vinegar treatment (50 g salt + 50 mL vinegar), and heavy salting (250 g/kg leaves), each for a duration of 14 days. Compared with drying alone, blanching before drying did not affect vitamin C, β -carotene, total carotene and ash content, but resulted in decrease of iron, sodium and calcium. Relative to the fresh vegetable, fermentation resulted in a decrease in the content of all the nutrients investigated except sodium and calcium which increased.

Keywords: *Vernonia amygdalina* leaves, steam blanching, drying, salting, nutrient composition

Short Communication

Development of Ultraviolet Spectrophotometric Methods for Analysis of Stavudine in Bulk and Pharmaceutical Dosage Forms

**Sahoo Sunit Kumar*, Sahoo Gyanasis, Sahoo Sukanta Kumar,
Das Dilip Kumar and Mishra Prachiprava**

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(received January 12, 2010; revised April 23, 2010; accepted April 24, 2010)

Abstract. A UV spectrophotometric method was developed and validated for the quantitative determination of stavudine, one of the first line regimens in antiretroviral therapy. The different analytical routine parameters such as linearity, precision, accuracy, limit of detection and limit of quantification were determined according to International Conference on Harmonization guidelines. Effect of various temperatures (25, 50 and 60 °C) on stavudine solution in phosphate buffer pH 6.8 was also studied. Absorbance maximum in phosphate buffer pH 6.8 was found to be 266 nm. Beer's law is obeyed over concentration range of 3-24 µg/mL with correlation coefficient (r^2) value 0.999. The results were validated statistically and by recovery study. Degradation of stavudine was more at high temperature. The proposed method is highly sensitive, precise, cheap, reliable and less time consuming for estimation of stavudine in bulk as well as in pharmaceutical dosage forms.

Keywords: stavudine, spectrophotometry, phosphate buffer, correlation coefficient

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