

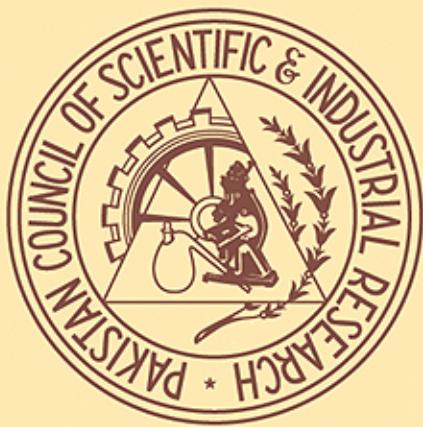
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Antioxidant Activity of Date Palm Fruit (*Phoenix dactylifera* L.) Extract for Oxidative Stabilisation of Butter Oil at Ambient Temperature

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(received August 18, 2014; revised April 30, 2015; accepted May 5, 2015)

Abstract. In this study, long term preservation of butter oil was achieved through ethanolic extract of date palm fruit (*Phoenix dactylifera* L.). Butter oil was supplemented with date palm fruit extract (DPFE) at three different concentrations i.e. 250, 500 and 750 ppm (T_1 , T_2 and T_3) and compared with a control. Total phenolic content, DPPH free radical scavenging activity and inhibition of linoleic acid peroxidation of the DPFE was 5.19 GAE, 74.2 and 81%, respectively. IC_{50} value of date extract for the inhibition of DPPH and linoleic acid peroxidation was 2.45 and 0.82 mg/mL, respectively. The loss of oleic acid and linoleic acid in control after six months of storage was 16 and 52% as compared to T_3 which was 4% and 14%. T_3 yielded the lowest concentration of primary and secondary oxidation products with no effect on sensory attributes. DPFE can be used to enhance the shelf life of butter oil at ambient temperature.

Keywords: date palm, oxidative stability, butter oil

Cadmium Tolerance and Bioremediation Potential of Bacteria Isolated from Soils Irrigated with Untreated Industrial Effluent

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(Received July 22, 2014; revised May 7, 2015; accepted May 13, 2015)

Abstract. The present study was aimed to investigate the Cd tolerance of bacteria isolated from municipal effluent irrigated soils. Thirty bacterial strains were isolated and screened for their Cd⁺ tolerance by growing on nutrient agar plates amended with varying amount of Cd⁺. Out of them four bacteria (GS₂, GS₅, GS₁₀ and GS₂₀) were found highly Cd tolerant (600 ppm Cd). The minimum inhibitory concentration of Cd⁺ was found 200 ppm. The isolates showed optimum growth at 30 °C and pH 7.5-8.5. Growth curve study against different concentrations of Cd (0-600 ppm) revealed that GS₂ was more tolerant among selected strains showing only 33% reduction in growth compared to 64% by GS₅ and 77% by both GS₁₀ and GS₂₀ at 600 ppm Cd. Inoculation of maize seeds with Cd tolerant bacteria for root elongation demonstrated up to 1.7 fold increase in root elongation (in the absence of Cd) and up to 1.5 fold (in the presence of 50 ppm Cd) compared to the un-inoculated plants. The results of the study revealed that the bacterial isolates exhibiting great Cd tolerance and growth promoting activity can be potential candidates for bioremediation of metal contaminated soils and wastewaters.

Keywords: soil contamination, Cd tolerance, tolerance index, bioremediation

Antibacterial Activities of Aqueous Extracts of *Terminalia catappa*, *Momordica charantia* and *Acalypha wilkesiana* on *Escherichia coli* Isolated from Pediatrics

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(received March 27, 2014; revised August 08, 2014; accepted August 20, 2014)

Abstract: Antibacterial activity of aqueous extract of *Terminalia catappa*, *Momordica charantia* and *Acalypha wilkesiana* was investigated against *Escherichia coli* isolated from pediatrics with the minimum inhibitory concentration (MIC) of 0.5mg/mL by agar dilution technique. The antibacterial potency of the extracts as evaluated by broth dilution technique, showed diameter of inhibition zone of 22.80 mm, 14.20 mm and 21.00 mm at a concentration of 0.5 mg/mL for *T. catappa*, *M. charantia* and *A. wilkesiana*, respectively. The antibacterial effect of *T. catappa* was found to be more pronounced with its plausible use for the treatment of infections caused by *E. coli*.

Keywords: *Acalypha wilkesiana*, *Escherichia coli*, *Momordica charantia*, *Terminalia catappa*, pediatrics.

Nutrients Dynamics of Co-composting Poultry Litter with Fast Food Wastes

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(received July 7, 2014; revised December 26, 2014; accepted December 29, 2014)

Abstract. Co-composting of poultry litter (PL) and fast food waste (FFW) in different combinations was carried out to explore the nutrient dynamics. The PL and FFW were co-composted in pits of dimensions 2 m×2 m×1.5 m (L×W×D) in ratios of 100:0, 75:25, 50:50, 25:75 and 0:100, respectively, for a period of 105 days. Co-composts of PL and FFW in a 50:50 ratio yielded highest total nitrogen (3.63%), total phosphorus (0.81%), and total potassium (3.40%) levels in the mature compost after 105 days of composting period. Carbon to nitrogen ratio for this combination was 18.33, which is suitable for safe land application. Present study identified PL and FFW co-composting in equal proportions yields maximum N, P and K levels with suitable C:N ratio which may be applied to soils to meet crop nutrient demands and enhanced agricultural productivity.

Keywords: co-composting, poultry litter, fast food waste, total nitrogen, total phosphorus, C:N ratio

Application of Extrusion Technology to Prepare Bread Crumb, A Comparison with Oven Method

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Shabbir and Shabbir Ahmed**

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(received December 30, 2014; revised June 5, 2015; accepted June 16, 2015)

Abstract. The current research project was designed to conclude the upshot of extrusion cooking temperature on the properties and acceptability of bread crumb. Bread crumbs were obtained by drying the bread, maintaining moisture up to 3-8% and then broken down using hammer mill or crusher which breaks the bread into bread crumbs. Significantly highest moisture contents 7.26% was observed in oven baked bread crumb as compared to 6.25% in bread crumb prepared by extrusion cooking method. The highest bulk density (28.13 g/100 L) was observed in extruded bread crumb whereas, the oven baked bread crumbs showed lower bulk density (7.03 g/100 L). The fat uptake of extruded and oven baked bread crumbs were found 0.516 mg/g and 0.493 mg/g, respectively. The extruded bread crumb showed higher water binding capacity as 34.76 g H₂O/kg as compared to oven baked bread crumb which showed 27.92 g H₂O/kg. Sensory evaluation of extruded and oven baked bread crumbs depicted that bread crumbs prepared from extrusion cooking methods got significantly higher scores for taste, flavour and over all acceptability as compared to those prepared by oven baked method. As far as crispiness is concerned oven baked bread crumbs got comparatively higher scores. Moreover, it was concluded that the treatment T₂ of extruded bread crumbs got more sensory scores than oven baked bread crumbs.

Keywords: bread crumb, extrusion technology, oven method, sensory evaluation

Accumulation of Heavy Metals in Edible Organs of Different Meat Products Available in the Markets of Lahore, Pakistan

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(received October 2, 2014; revised March 14, 2015; accepted April 1, 2015)

Abstract. The present study assessed the accumulation of selected heavy metals (Cd, Cr, Pb and Cu) in different organs including brain, heart, lungs, liver, stomach, kidney and flesh (muscles) of several animals commercially available in the market of Lahore, Pakistan. The concentrations found in different organs of chicken, goat and cow ranged between 0.132-2.165 µg/g for Cd, 0.768-2.335 µg/g for Cr, 0.260-1.411 µg/g for Pb and 0.092-1.195 µg/g for Cu. In the absence of national safety standards in respect to the content of heavy metals in foodstuffs, the results obtained were compared with international guidelines and found concentrations considerably higher than the prescribed safe limits. Therefore, immediate attention must be paid to prevent public health risks associated with the presence of toxic heavy metals in the commercially available meat products.

Keywords: meat products, toxicity, heavy metals, bioaccumulation

Distribution and Abundance of Marine Debris Along the Coast of Karachi (Arabian Sea), Pakistan

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(received August 20, 2014; revised May 26, 2015; accepted June 4, 2015)

Abstract. This study reports the first assessment of distribution and abundance of marine debris along the coast of Karachi (Arabian Sea), Pakistan. The quadrat method was used for estimating the debris material. Total 40 quadrates were made for collecting the debris on 4 beaches: Sandspit, Buleji, Paradise Point and Korangi Creek in the year of 2012. Nine different types of debris comprising of plastics, glasses, thermopore, clothing, rubber, paper, pot pieces and cigarette filters were collected. The study revealed that, plastic was found in high quantity at all four beaches of Karachi. Other most common items were as follow: plastic at Paradise Point and Sandspit; pot pieces at Korangi Creek and rubber at Buleji. A total weight of 12277.45 g debris was recorded during the whole study period. It was also noted that Paradise Point is the dirtiest beach (5612.6 g) when compared with other studied beaches.

Keyword: marine pollution, beaches, debris, plastic, Pakistan

Concentration of Heavy Metals in Available Fish Species (Bain, *Mastacembelus armatus*; Taki, *Channa punctatus* and Bele, *Glossogobius giuris*) in the Turag River, Bangladesh

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(received March 27, 2015; revised June 16, 2015; accepted June 19, 2015)

Abstract. This study was conducted to assess the concentration level of heavy metals in three available fish species (Bain, *Mastacembelus armatus*; Taki, *Channa punctatus* and Bele, *Glossogobius giuris*) of the Turag river, Bangladesh during the months from January to March, 2014. In case of bio-concentration of heavy metals in fish, the levels of Pb, Cd, Cr, Cu and Fe ranged from 0.01-0.13 mg/kg, 0.001-0.02 mg/kg, 0.17-0.48 mg/kg, 0.30-0.74 mg/kg and 4.05-46.86 mg/kg, respectively while Hg was below detection level. These values indicate that the heavy metals were concentrated in fish flesh at a higher level than water. The highest values of Pb, Cd and Cr were found in Bain fish, Fe was found in Taki fish and Cu was found in Bele fish. Most of the heavy metals have crossed the permissible limits in fish, especially for the values of Cr, Cu and Fe. From the results of the present investigation, it can be concluded that the available fish species are harmful for their consumers.

Keywords: heavy metals, river fish, bio concentration, ecosystem

Short Communication

High Heritability in a Resistant Barley Genetic Source to Spot Blotch (*Cochliobolus sativus*)

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(received June 3, 2014; revised December 23, 2014; accepted January 14, 2015)

Abstract. The objective of the present research was to assess and understand the heritability of the resistant barley genetic source cv. Banteng to spot blotch SB disease caused by *Cochliobolus sativus*. A cross was made between this resistant cultivar and the universally susceptible cv. WI 2291. Analysis of variance for the studied trait indicated highly significant differences among cultivars. High broad sense heritability was found ($H \approx 88\%$). However, in all cases, the results obtained for the F_2 plants demonstrated that the observed segregation pattern fitted 1:15 ratios.

Keywords: *Hordeum vulgare*, *Cochliobolus sativus*, fungus resistance, inheritance

Short Communication

Enhancing Shelf Life of Vegetable Oils Blend by Using *Moringa oleifera* Leaf Extract as Antioxidant

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(received August 12, 2014; revised February 13, 2015; accepted March 19, 2015)

Abstract. The antioxidant activity of ethanolic *Moringa oleifera* leaf extract for oxidative stabilisation of canola, sunflower and soybean oils was investigated at ambient temperature. The blend was prepared by mixing canola, sunflower and soybean oils in equal proportions. Ethanolic *M. oleifera* leaf extract was incorporated into vegetable oils blend at three different concentrations; 300, 600 and 900 ppm (T₁, T₂ and T₃), compared with a control and the sample added with 100 ppm tertiary butylated hydroxyl quinine (TBHQ) was used as a positive control. Filled in one litre transparent PET bottles, kept at room temperature (35-40 °C) for 3 months and sampled at 0 and 90 days for the assessment of oxidative stability. Peroxide value of three months stored blank, T₃ and TBHQ supplemented samples were 2.25, 0.84 and 0.78 (meqO₂/kg). Induction period of blank, T₃ and TBHQ supplemented vegetable oils blend was 3.46, 7.95 and 8.57 h. Peroxide value of blank, T₃ and TBHQ supplemented vegetable oils blend, after 5 days at 63 °C, was 7.55, 2.81 and 2.59 (meqO₂/kg).

Keywords: *Moringa oleifera*, leaf extract, vegetable oils blend, oxidative stability