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Short Communications

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Electronic Structure Calculation and Crystal Structure of Trimethylpyridine Cobalt Chloride Complex

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Northwest Minzu University, Lanzhou 730030, P. R. China

(received February 8, 2017; revised August 24, 2017; accepted September 11, 2017)

Abstract The new complex of 2, 4, 6-trimethylpyridine (TMPy) cobalt chloride consists of $CoCl_4$ anions and trimethylpyridine cations by ionic electrostatic force. This complex belongs in space group of $P2_1/c$, having crystalline parameters of a = 8.915, b = 17.339, c = 13.945 Å, β = 102.54°, Z = 4 and Dm = 1.37 Mg·m. Electronic structure calculation results indicated stronger covalence of $(CoCl_4)^{2-}$ and demonstrated that the coordination compound of $CoCl_4 \cdot (HTMPy)_2$ is very stable. There are positive charges on C_2, C_4 and C_6 positions, and negative charges on C_3 and C_5 positions in pyridine ring. Mulliken bond grade and atom net charge were derived.

Keywords: cobalt complex, trimethylpyridine, crystal structure, electronic structure calculation, Mulliken bond grade

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3) 122-127

Schiff Bases Derived from 1-Aminoanthraquinone: A New Class of Analgesic Compounds

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(received June 2, 2017; revised June 20, 2017; accepted June 21, 2017)

Abstract. A series of Schiff bases **1-17** were synthesised by way of a facile condensation between 1-amino-anthraquinone with a variety of carbonyl compounds in the presence of a catalytic amount of dodeca-tungstosilicic acid/P_2O_5 under solvent free conditions at room temperature. These were charachterised by ^{1}H- and ^{13}C-NMR, LCMS, FTIR and elemental analyses. All the compounds were screened for their analgesic activity using hot plate thermal stimuli method at dose of 10 and 30 mg/kg. Diclofenac sodium was used as a reference drug. All the compounds at dose of 10 and 30 mg/kg body weight showed the significant ($p<0.05$) increase in latency time as compared to control (normal saline). Compound **5** showed excellent activity after 120 min of drug administration (10 mg/kg) of body weight. Compound **10** was found to be potent (10.48±1.19s, 11.27±1.2s and 10.24±1.9s) at dose of 30 mg/kg at 30, 60 and 120 min, respectively when compared to the standard drug. Compound **6** (10.13±0.4s) was also found to be an excellent analgesic compound at a dose of 30 mg/kg at 120 min. However, the studies on analgesic activity revealed that some of the target compounds may be strong candidates as an analgesic drug.

Keywords: schiff bases, 1-aminoanthraquinone, analgesic compound

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3) 128-133

Efficiency for Sorption Behaviour of Polymeric Resins of (2-hydroxybenzaldehyde) with Aliphatic and Aromatic Diamines Towards Different Metal Ions

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(received April 29, 2017; revised August 23, 2017; accepted August 28, 2017)

Abstract. Aliphatic and aromatic polymeric resins of (2-hydroxybenzaldehyde) with 1,2-propylenediamine and 1,4-phenylenediamine were synthesised and characterised employing elemental and thermal analysis, FT-IR and UV-visible spectroscopy. The metal uptake behaviour of synthesised polymers (PMBHBPn, PMBHBPh) towards different metal ions were investigated and optimised by variety of conditions. The sorption data of these metal ions were followed Langmuir, Freundlich, and Dubinin-Radushkevich (D-R) isotherms. The Freundlich parameters were computed at $1/n = 0.26 \pm 0.02$, 0.309 ± 0.02, 0.35 ± 0.05, 0.368 ± 0.04 and 0.23 ± 0.01, $A = 3.9 \pm 0.03$, 4.31 ± 0.02, 4.683 ± 0.01, 5.43 ± 0.03, and 2.81 ± 0.05 mmol/g for Cu(II), Co(II), Ni(II), Fe(III) and Cd(II) ions, respectively. The variation of sorption with temperature gives thermodynamic quantity (ΔH) in the range of (AH = 36.33 - 52.14 KJ/mol) for (PMBHBPn) and (39.21-56.29 KJ/mol) for (PMBHBPh). The sorption procedure could preconcentrate metal ions, and it can be determined by atomic absorption spectrophotometer.

Keywords: polymeric resin, sorption, isotherms, kinetics, thermodynamics

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3)134-140

Variability in Kernel Oil and Kernel Crude Protein Contents in Sudanese Fruit Accessions of *Balanites aegyptiaca* (L.) Del.

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(received October 10, 2016; revised May 1, 2017; accepted June 14, 2017)

Abstract: Balanites fruits (*Balanites aegyptiaca*) as a potential source of steroidal sapogenins, chemicals in demand by the pharmaceutical industry was studied. This report focuses on two potential fruit products other than sapogenins, namely, balanites kernel oil (BKO) and kernel total protein. The oil content of balanites kernels obtained from thirteen mature-fruit accessions collected from different parts of Sudan was high, reaching a value above 40% of kernel dry weight in several accessions. Kernel total protein averaged 31.2%. Some physicochemical characteristics of the oil and of its component lecithin fraction were determined. Linoleic acid was the predominant fatty acid in BKO, reaching 56.0% of total fatty acids.

Keywords: *Balanites aegyptiaca,* balanites kernel oil, fatty acids, kernel total protein

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3)141-146

Catalytic Reduction of Wood Kikar (*Acacia albida*) by Acetosolv and Organosolv Pulping with Organic acids

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(received October 6, 2016; revised August 9, 2017; accepted August 16, 2017)

Abstract. Kikar wood *(Acacia albida)* of particle size 0.315-1.00 mm was subjected to acetosolv and organosolv pulping catalyzed by strong acid like HCl. The selective condition for pulping is 95%, 0.25% catalyst (HCl) solid/liquor ratio (S/L) 1:12.5 for 180 mins, for acetic acid, 80%, 0.2% catalyst (HCl), S/L 1:12.5 for 120 min, for formic acid, 85%, 0.2% catalyst (HCl), S/L 1:12.5 for 180 min for propionic acid, giving residues impurities but the α-cellulose and klason lignin 58.5% and 24.1% in Kikar wood. The optimum delignification was achieved by the acetic acid as compared to other organic acids.

Keyword: wood, organosolv, acetosolv, pulping, kikar

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3) 147-153

The Effect of Different Curing Conditions on Compressive Strength of Concrete

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(received May 05, 2016; revised June 23, 2017; accepted July 07, 2017)

Abstract. The focus of this research work was to analyse the effect of different types of curing on compressive strength of concrete structures. For this purpose, 54 test specimens of cylindrical shape were prepared. These specimens were cured with different methods and were tested on different age days to analyse the effect of curing on compressive strength. Test specimens cured with conventional water curing method gives the highest results as compared to the other adopted methods.

Keywords: conerete, compressive strength, hydration, curing

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3) 154-161

Application of Eco-friendly Antimicrobial Finish *Butea monosperma* Leaves on Fabric Properties of Polyester and Cotton/Polyester

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(received February 23, 2016; revised September 28, 2017; accepted September 30, 2017)

Abstract. The study was aimed to check the effect of eco-friendly antimicrobial finish on 100% polyester and 50/50 cotton/polyester woven fabrics. The leaves' extract of *Butea monosperma* was used as an eco-friendly antimicrobial finish. The fabric was first desized, scoured, bleached and washed then antimicrobial finish was applied by using pad dry cure method. The aesthetic, comfort and mechanical fabrics properties were checked before and after applying antimicrobial finish. Under aesthetic property stiffness and smoothness appearance was checked, under comfort related property absorbency and air permeability was checked and under mechanical property tear and tensile strength was checked. The antimicrobial finish was checked by using ASTEM E2149 Shake Flask method. The AATCC and ISO standard testing methods were used for checking fabric properties. One way ANOVA statistical test was applied for analysis of results. Antimicrobial finish has increased aesthetic (stiffness, smoothness appearance), comfort (absorbency, air permeability) and mechanical (tensile and tear strengths) properties of polyester and cotton/polyester fabrics. The antimicrobial finish was effective on both 100% polyester and 50/50 cotton/polyester fabrics up to 25 washes. This study is beneficial to medical industry, paramedical staff, sports wears, home furnishing as well as common people.

Keywords: antimicrobial finish, *Butea monosperma*, polyester, cotton, polyester

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3)162-168

The Role of Yarn Counts and Polyester/Cotton Blends in Comfort of Knitted Fabric

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(received August 25, 2016; revised August 8, 2017; accepted August 30, 2017)

Abstract. There have been three major concerns regarding the clothing comfort, psychological, sensorial and thermo-physiological comfort. However, there is lack of work on thermo-physiological comfort of knitted fabric. Hence the present study is conducted to fulfill this gap by analyzing physiological comfort in sense of air permeability, absorbency, vertical wicking and drying time of plain knitted fabric. Clothing comfort is mainly affected by type of fibres, yarn properties, structure of fabric, finishing treatments, and clothing conditions. In this study the effect of various yarn counts and polyester/cotton blend ratios on the comfort of knitted fabric has been analyzed using Statistical Package for the Social Sciences (SPSS). It is depicted from the results that the selected variables put direct influences on the thermo-physiological comfort of the knitted fabric. The increasing share of polyester in the blend and the fine count for yarn put negative impact on the comfort of the knitted fabric.

Keywords: yarn count, polyester/cotton blends, air permeability, drying time, absorbency

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3) 169-171

Short Communication

Cleaning of Dulmial-Punjab Coal by Froth Flotation

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(received July 22, 2016; revised August 25, 2017; accepted September 11, 2017)

Abstract. This study was undertaken to assess the cleaning potential of Dulmial-Punjab coal by froth flotation. Release analysis was performed to determine the optimum flotation response of the coal. Number of batch flotation tests were performed to investigate the effects of various parameters such as particle size, impeller speed, collector dosage, frother dosage and conditioning time on clean coal yield and ash content. It was found that maximum yield of 51.25% with 39.5% ash content was achieved at impeller speed, collector dosage, frother dosage and conditioning time of 1600 RPM, 1200 g/t, 200 g/t and 10 min, respectively.

Keywords: froth flotation, release analysis, Dulmial-Punjab coal

Pak. j. sci. ind. res. Ser. A: phys. sci. 2017 **60**(3) 172-174

Short Communication

Heavy Metal Content of Refined and Bakery Salts Consumed in Pakistan

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(received November 12, 2016; revised February 21, 2017; accepted March 3, 2017)

Abstract. This study involved the investigation of heavy metal contents of 100 refined and an equal number of bakery refined table salt samples collected from the local markets of Lahore, Faisalabad and Gujranwala, Pakistan. Levels of lead, copper, cadmium and iron were estimated using an atomic absorption spectrophotometer. The results indicated a mean ± SD in µg/g levels in the refined table salt samples for lead (0.85±0.22), copper (1.37±0.25), cadmium (0.41±32) and iron (7.72±2.1). For bakery refined table salts values for same metals ranged 1.61±0.51, 2.07±1.2, 0.71±0.21 and 12.6±5.1, respectively. Obtained results were compared with the maximum limits recommendations for human consumption set by Codex Alimentarius Commission.

Keywords: heavy metals, refined salts, bakery salts

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