

## Complexes of Ag<sup>I</sup>, Tl<sup>I</sup>, Zn<sup>II</sup>, Cd<sup>II</sup>, Hg<sup>II</sup>, Co<sup>II</sup>, Ni<sup>II</sup>, Ru<sup>II</sup>, Pd<sup>II</sup>, Ru<sup>III</sup>, Rh<sup>III</sup> and Pt<sup>IV</sup> with 4-(pyridine-2-carboxylideneamino)-5-mercapto-1,2,4-triazole

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**Abstract** : The synthesis and characterization of complexes of Ag<sup>I</sup>, Tl<sup>I</sup>, Zn<sup>II</sup>, Cd<sup>II</sup>, Hg<sup>II</sup>, Co<sup>II</sup>, Ni<sup>II</sup>, Pd<sup>II</sup>, Ru<sup>II</sup>, Ru<sup>III</sup>, Rh<sup>III</sup> and Pt<sup>IV</sup> with 4-(pyridine-2-carboxylideneamino)-5-mercapto-1,2,4-triazole (PMT) have been carried out on the basis of chemical and physical methods like elemental analysis, infrared, <sup>1</sup>H NMR and electronic spectral studies, magnetic susceptibility measurements, conductance and thermal studies. Octahedral structures have been proposed for the Co<sup>II</sup>, Ni<sup>II</sup>, Ru<sup>II</sup>, Ru<sup>III</sup>, Rh<sup>III</sup> and Pt<sup>IV</sup> complexes, square-planar for the Pd<sup>II</sup> complex, tetrahedral for the Zn<sup>II</sup>, Cd<sup>II</sup> and Hg<sup>II</sup> complexes and linear polymeric structures for the Ag<sup>I</sup> and Tl<sup>I</sup> complexes. The ligand coordinates to the metal ions through thiol sulfur after deprotonation and with nitrogen of the azomethine group. Pyridine nitrogen of PMT is also involved in coordination in Pd<sup>II</sup>, Ru<sup>III</sup>, Rh<sup>III</sup> and Pt<sup>IV</sup> complexes.

**Keywords** : Metal complexes, heterocyclic, chelates, PMT.

## Synthesis and characterization of mixed ligand complexes of zinc and cadmium ions with some nitrogen and sulphur donors

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**Abstract** : Mixed ligand complexes of zinc and cadmium ions with sulphur ligand, 1,1-dicyanoethylene-2,2-dithiolate [*i*-MNT<sup>2-</sup> = {S<sub>2</sub>C : C(CN)<sub>2</sub>}<sup>2-</sup>] as a primary ligand and nitrogen donor, *o*-phenylenediamine (OPD), as secondary ligand of the composition M(OPD)(*i*-MNT) [M = Zn<sup>II</sup> or Cd<sup>II</sup>] have been synthesized. Reactions of M(OPD)(*i*-MNT) with pyridine bases such as pyridine (py), *a*-picoline (*a*-pic), *b*-picoline (*b*-pic) or *g*-picoline (*g*-pic) have been carried out under different reaction conditions. Some of the reactions have yielded addition compounds whereas others have resulted the compounds in which OPD has been replaced by pyridine bases. The complexes have been characterized on the basis of analytical data, molar conductance, infrared and NMR spectral studies. The molar conductance data reveal that all of the complexes have non-electrolytic nature in DMF solution. Infrared spectral studies suggest bidentate chelating behaviour of *i*-MNT<sup>2-</sup> ion and OPD while other ligands show unidentate behaviour in its complexes.

**Keywords** : Mixed ligand complex, cadmium, zinc.

## Synthesis and properties of poly methyl methacrylate membrane in the presence of poly vinyl acetate by template polymerization

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**Abstract :** This communication presents the detailed study on the preparation and properties of poly methyl methacrylate membrane produced during the template polymerization in the presence of polyvinyl acetate as a template. The behaviour of poly methyl methacrylate membrane towards absorption in various solvents has been investigated which shows that the absorption of water in the membrane is highest and ethylene glycol is least. The solubility behavior and chemical resistance of the membrane has also been studied and the membrane is found to be resistant to water, acid and bases.

**Keywords :** Template polymerization, membrane, absorption, chemical resistance, solubility, viscosity.

## Correlation analysis of reactivity in the oxidation of substituted benzyl alcohols by 2,2'-bipyridinium chlorochromate

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**Abstract :** Oxidation of benzyl alcohol and some *ortho*-, *meta*- and *para*-monosubstituted ones by 2,2'-bipyridinium chlorochromate (BPCC) in DMSO leads to the formation of corresponding benzaldehydes. The reaction is first order in both BPCC and the alcohol. The reaction is promoted by hydrogen ions; the hydrogen-ion dependence has the form :  $k_{\text{obs}} = a + b [\text{H}^+]$ . Oxidation of *o*,*o*-dideuteriobenzyl alcohol ( $\text{PhCD}_2\text{OH}$ ) has exhibited a substantial primary kinetic isotope effect ( $k_{\text{H}}/k_{\text{D}} = 5.60$  at 298 K). The reaction has been studied in nineteen organic solvents and the effect of solvent analysed using Taft's and Swain's multi-parametric equations. The rates of oxidation of *para*- and *meta*-substituted benzyl alcohols have been correlated in terms of Charton's triparametric LDR equation whereas the oxidation of *ortho*-substituted benzyl alcohols with tetraparametric LDRS equation. The oxidation of *para*-substituted benzyl alcohols is more susceptible to the delocalization effect than that of *ortho*- and *meta*-substituted compounds, which display a greater dependence on the field effect. The positive value of  $h$  suggests the presence of an electron-deficient reaction centre in the rate-determining step. The reaction is subjected to steric acceleration by the *ortho*-substituents. A suitable mechanism has been proposed.

**Keywords :** Correlation analysis, halochromates, kinetics, mechanism, oxidation.

## Influence of pH on hanging mercury drop electrode cyclic voltammetry with aspartic acid in acetate buffers

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**Abstract :** As the supporting electrolyte (acetate buffer) itself interacts with mercury, the Hg-acetate current is always superimposed on the Hg-amino acid interaction current. Hence whether amino acid is present or not there will be the current of Hg-acetate leading to intercept on the current axis of the  $I_p$  vs [aspartic acid] plot. There are three processes deduced from Hg-amino acid solution interaction. They are process A, B and C. Process A is due to mercuric mercury complex formation,  $Hg^0 + (asp) \ll Hg^{2+} (asp)$  and process B is due to mercurous mercury complex formation,  $Hg^0 + (asp) \ll Hg_2^{2+} (asp)$ . Process C is the result of mercury-acetate interaction.

The peak potentials are shifted to less positive values with increasing pH.

**Keywords :** Cyclic voltammetry, mercury, aspartic acid, acetate buffer, HMDE.

## Synthesis, characterization and antimicrobial activity of Mannich bases of 2-chloro-4-nitrobenzamide derived from sulphonamides

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**Abstract :** The Mannich derivatives of 2-chloro-4-nitrobenzamide with formaldehyde and various sulphonamides were synthesized for study of their biological effects. The structures of the synthesized compounds were assigned on the basis of elemental analyses, UV, IR and  $^1H$  NMR spectral studies. The biological screening of these synthesized compounds were done against *B. subtilis* and *S. aureus* (Gram-positive bacteria) with a view to explore their antimicrobial action by disk diffusion method at 40, 80 and 160 mg/ml respectively. The results reveal the potential and importance of mounting new Mannich bases against pathogens under investigation and found to be low toxic as ascertained by  $LD_{50}$  test.

**Keywords :** 2-Chloro-4-nitrobenzamide, sulphonamides, Mannich reaction, Mannich bases, antimicrobial activity, statistical analysis.

## Synthesis and biological activity of thiazolo[3,2-c:2,3]-as-triazino[5,6-b]indoles and isomeric thiazolo[2,3-c:3,4]-as-triazino[5,6-b]indoles

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**Abstract** : 9/7-Bromo-2,3-dihydro-8-methoxy-5*H*-as-triazino[5,6-*b*]indole-3-thiones 3a,b on condensation with 4-chlorophenacyl bromide give 9/7-bromo-3-[4-chlorophenylthio]-8-methoxy-5*H*-as-triazino[5,6-*b*]indole hydrobromides 4a,b which on PPA catalysed cyclization furnish 6/8-bromo-3-[4-chlorophenyl-7-methoxythiazolo[3,2-*c*:2,3]-as-triazino[5,6-*b*]indoles 9a,b and not angular isomeric 6/8-bromo-1-[4-chlorophenyl]-7-methoxythiazolo[2,3-*c*:3,4]-as-triazino[5,6-*b*]indoles 6a,b. The unequivocal synthesis of the latter have also been accomplished. The antimicrobial potential of the compounds 6 and 9 have also been evaluated.

**Keywords** : Indoles, cyclization, antimicrobial activity, unequivocal synthesis.

## Modeling of mutagenicity of aromatic and heteroaromatic amines in *Salmonella typhimurium* TA98 : Role of hydrophobicity and topological indices

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**Abstract** : Topological modeling of mutagenicity of 88 aromatic and heteroaromatic amines acting on *Salmonella typhimurium* is reported using distance-based and connectivity indices including Balaban and Balaban type indices. The dependence of mutagenic activity is investigated under three different headings : (i) using topological indices alone; (ii) using log P in combination with the topological indices and (iii) using Balaban and Balaban type indices alone. The results have shown that though more or less similar results are obtained in all the three categories, the involvement of log P term gave slightly better results. Furthermore the results show that the mutagenic activity is a function of size of the aromatic ring system. The results are discussed critically using a variety of statistical parameters.

**Keywords** : Mutagenicity, QSAR, topological index, Balaban type indices, heteroaromatic amine, hydrophobicity, aromatic amine.

## **Extraction and separation studies of rhodium(III) with 4-(4-methoxybenzylideneamino)-5-methyl-4H-1,2,4-triazole-3-thiol in hydrochloric acid medium**

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**Abstract** : A novel method is proposed for the extraction of microgram level concentration of rhodium(III) from hydrochloric acid medium with 4-(4-methoxybenzylideneamino)-5-methyl-4H-1,2,4-triazole-3-thiol (MBIMTT) dissolved in chloroform as an extractant. It was stripped from organic phase with 1 M hydrochloric acid and estimated spectrophotometrically with stannous chloride. The effect of acid concentration and various foreign ions has been investigated. The method is applicable to the analysis of synthetic mixtures. The method is highly selective, simple and reproducible.

**Keywords** : Rhodium, MBIMTT, solvent extraction.

## **Investigations on polycyclic aromatic hydrocarbons (PAHs) in waste oil at Mathura-Agra, National Highway No. 2**

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**Abstract** : Polycyclic Aromatic Hydrocarbons (PAHs) are released into the environment from anthropogenic sources, such as combustion of refused burning, industrial process, electrical equipment. The concentration of PAHs in roadside oil-sludge was measured at outside of Mathura-Refinery, Delhi-Agra, National Highway No. 2. The samples were extracted with *n*-hexane by ultrasonic agitation and aromatic fraction analysis by GC. Total mean concentration of PAHs was found to be 11.34 mg g<sup>-1</sup> and ranged from 4.43–22.53 mg g<sup>-1</sup>. Fluoranthene, chrysene, benzo (b) fluoranthene were found to be the most abundant PAHs at this location.

**Keywords** : Polycyclic Aromatic Hydrocarbons (PAHs), fluoranthene, chrysene.

## Kinetics of oxidation of L-cystine by pyridinium bromochromate

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**Abstract :** The kinetics of oxidation of cystine by pyridinium bromochromate (PBC) was studied spectrophotometrically under pseudo-first order conditions in perchloric acid medium at 370 nm. It was found that the reaction is first order in [PBC], fractional order in [cystine] and the reaction rate is increased with  $[H^+]$  showing an order of more than unity. Product analysis confirmed cysteic acid as the final product of oxidation.

**Keywords :** Oxidation of cystine, pyridinium bromochromate.

## 5-Hydroxy-3,7,4'-trimethoxyflavone from *Cheilanthes farinosa* Kaulf. (Cheilanthaceae)<sup>†</sup>

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**Abstract** : *Cheilanthes farinosa* Kaulf. (Cheilanthaceae) has been established as new source of the natural flavonoid, 5-hydroxy-3,7,4'-trimethoxyflavone, characterized on the basis of spectral studies.

**Keywords :** *Cheilanthes farinosa*, Cheilanthaceae, 5-hydroxy-3,7,4'-trimethoxyflavone, spectral studies.

## Isolation and purification of phenanthrene from phenanthrene waste I

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**Abstract :** Isolation and purification of phenanthrene from phenanthrene waste has been studied by fractionation, recrystallization and precipitation. GC apparatus was used to investigate the purity of phenanthrene. Experimental results showed that the purity of phenanthrene was increased from 50.29% to 90.32%. And commercial grade phenanthrene was obtained by purification, the melting point of the product was 96-98 °C, and the yield of phenanthrene 54.3%.

**Keywords :** Phenanthrene waste, phenanthrene, purification.

## Synthesis of benzoylformic acid

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**Abstract :** A new route for preparing benzoylformic acid (phenylglyoxylic acid) was studied by benzene as the starting material after Friedel-Crafts reaction with acetic anhydride, oximation by isopropyl nitrite, then hydrolysis by hydrochloric acid and sodium nitrite. Calculated on the basis of acetophenone, the final yield is 57.5%. The suitable experimental conditions were also discussed.

**Keywords :** Benzoylformic acid, benzene, oximation, hydrolysis.

## Constituents of *Zizyphus jujuba*

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**Abstract :** Three flavonoids, kaempferol-7-methylether, kaempferol and myrecetin together with a cyclopeptide alkaloid, nummularine-K have been isolated from the barks of *Zizyphus jujuba* and their structures established by spectral evidences. This is the first report of occurrence of these compounds in *Z. jujuba*.

**Keywords :** Medicinal plants, flavonoids, cyclopeptide alkaloid.

## Synthesis and biological activities of 4-oxo thiazolidine derivatives

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**Abstract :** A series of 4-oxo-2-phenyl-thiazolidin-3-yl derivatives 5a-1 have been obtained by cyclisation of various Schiff's base 4 with thioglycolic acid. The Schiff's base 4 are obtained by the reaction of appropriate carbonyl compound with (4-oxo-3-*p*-tolyl-3,4-dihydro-quinazolin-2-yl-sulfanyl)-acetic acid hydrazide 3. The product is characterized by spectral and analytical data. Most of the tested compounds show promising antibacterial and antifungal activity.

**Keywords :** 4-Thiazolidinone, antibacterial, antifungal, quinazolidinone.

## Synthesis of novel bis-1,3,4-thiadiazoles, bis-1,2,4-triazoles and their antimicrobial activity

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**Abstract** : Condensation of sebacic acid dihydrazide (1) with aryl/alkyl isothiocyanates (2a-g) gives bis-(*N*-aryl/alkyl-thiocarbamido)-sebacic acid diamides (3a-g), which on reaction with *o*-phosphoric acid yields 1,8-bis-(2-aryl/alkylamino-1,3,4-thiadiazol-5-yl)-octanes (4a-g). 1,8-Bis-(3-mercapto-4-aryl/alkyl-1,2,4-triazol-5-yl)-octanes (5a-g) were obtained by a similar condensation of compounds (3a-g) with aqueous KOH, which on reaction with ethyl iodide in the form of dihydriodides have been isolated (6a-g). These on basification with aq. ammonia solution afforded free bases (7a-g). Compounds (4a-g) on benzylation with benzoyl chloride and NaOH affords benzoyl derivatives (8a-g). The structures of all these compounds were confirmed on the basis of elemental analysis and spectral data and evaluated for their antimicrobial activity against gram positive and gram negative bacteria.

**Keywords** : Synthesis, bis-1,3,4-thiadiazole, bis-1,2,4-triazole, antimicrobial activity.

## Gallium triiodide as a highly efficient and mild catalyst for the diethyl acetalization of carbonyl compounds

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**Abstract** : Diethyl acetals were obtained from carbonyl compounds in good to excellent yields under mild reaction conditions in the presence of triethyl orthoformate and a catalytic amount of gallium triiodide in anhydrous ethanol.

**Keywords** : Diethyl acetals, carbonyl compound, gallium triiodide.

## Synthesis of 3,5-disubstituted [1,2,4]-oxadiazoles

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**Abstract** : Substituted amidoximes have been synthesized, and converted to corresponding oxadiazoles as a novel heterocyclic compounds under mild conditions in good to excellent yield.

**Keywords** : *O*-Acylation, oxadiazole, heterocycles, cyclodehydration.

## Microwave induced synthesis of 3-substituted 1,2-benzisoxazole derivatives

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**Abstract** : A rapid, cost-effective and eco-friendly synthesis of 3-substituted 1,2-benzisoxazoles from *o*-hydroxy ketoximes in solvent free conditions using solid support under microwave irradiation has been achieved.

**Keywords** : 1,2-Benzisoxazoles, microwave, silica gel, sodium carbonate oxime.

## **Formation of *N,N*-bis[1-(2-hydroxyphenyl)ethylidene]ethylenediamine in the reaction of 1-(2-hydroxyphenyl)-3-(*N,N*-dimethylamino)propenone with ethylenediamine**

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**Abstract** : Ethylenediamine reacts with 1-(2-hydroxyphenyl)-3-(*N,N*-dimethylamino)propenone **3** to form *N,N*-bis[1-(2-hydroxyphenyl)ethylidene]ethylenediamine **2** instead of the expected bisaminoketone **1**.  
**Keywords** : Ethylenediamine, chromone, bisenamine.