

Synthesis, spectral, characterization, catalytic and biological studies of new Ru^{II} N₂O Schiff base complexes

K. P. Balasubramanian^{a*}, S. Manivannan^b and V. Chinnusamy^b

^aDepartment of Chemistry, Gobi Arts & Science College, Gobichettipalayam-638 456, Tamilnadu, India

^bDepartment of Chemistry, Sri Ramakrishna Mission Vidyalaya College of Arts & Science, Coimbatore-641 020, Tamilnadu, India

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Abstract : Complexes of the type [RuCl(CO)(B)(L)] (B = PPh₃, AsPh₃, py or pip; L = monobasic tridentate Schiff base) have been synthesized by the reaction of equimolar amounts of [RuHCl(CO)(EPPh₃)₂(B)] and Schiff bases in benzene. The resulting complexes have been characterized by analytical and spectral (IR, electronic, NMR) data. An octahedral structure has been assigned to all these complexes. The new complexes have been exhibit catalytic activity for the oxidation of benzyl alcohol and cyclohexanol in the presence of *N*-methylmorpholine-*N*-oxide as co-oxidant.

Keywords : Synthesis, Schiff base complex, Ru^{II}.

Synthesis, spectral characterization, electrochemical behaviour and antibacterial activity of mixed ligand copper(II) and zinc(II) complexes of 3,4-substituted b-diketones with 2,2'-bipyridine

N. Raman

Department of Chemistry, VHNSN College, Virudhunagar-626 001, Tamilnadu, India

E-mail : drn_raman@yahoo.co.in

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Abstract : Six new mixed-ligand copper(II) and zinc(II) complexes of the composition [ML(bpy)₂]Cl₂, where M = Cu^{II}/Zn^{II} ; L = 3,4-substituted b-diketone derived from salicylaldehyde and acetylacetone/methylacetoacetate/acetoacetanilide and bpy = 2,2'-bipyridine, were synthesized. They were characterized by usual analytical and spectral techniques. The data show that the complexes exhibit octahedral geometry. The powder XRD study confirms the structural similarity of the copper and zinc complexes. The salient features of their electrochemical behaviour have been discussed. The antibacterial activities of the free ligands and their complexes have been screened against various microorganisms (both Gram-positive and Gram-negative bacteria). The data indicate that the complexes are highly active than the free ligands.

Keywords : Mixed-ligand complexes, bipyridine complexes, b-diketone complexes, electrochemical behaviour, antibacterial activity.

Density and viscosity studies of glucose solutions in water and in aqueous NaCl, NaBr, KCl and KBr solutions at 298.15, 303.15, 308.15 and 313.15 K

Pandharinath S. Nikam, Mehdi Hasan*, Kailas H. Kapadnis^a and Thansing B. Pawar

P.G. Department of Physical Chemistry, M.S.G. College, Malegaon Camp-423 105, Dist. Nashik, Maharashtra, India

E-mail : mihasan@rediffmail.com

^aL.V.H. College, Nashik, Maharashtra, India

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Abstract : The densities and viscosities of glucose solutions in water and in 0.05, 0.1, 0.5, 1.00 M NaCl, NaBr, KCl and KBr have been measured at 298.15, 303.15, 308.15 and 313.15 K. From densities (ρ), the limiting partial molar volumes (f_{v}°) have been evaluated. The viscosity data have been analyzed with the help of the modified Jones-Dole equation and the corresponding viscosity B -coefficients have been calculated.

Keywords : Viscosity, glucose solution, density, Jones -Dole equation.

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Molar volume, viscosity and conductance studies of nickel sulphate in water and aqueous mannitol

Shashi Kant* and Kushal Kumar

Department of Chemistry, Himachal Pradesh University, Summer Hill, Shimla-171 005, Himachal Pradesh, India

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Abstract : Molar volume, viscosity and conductance of nickel sulphate in water and 2, 4 and 6 wt. % of aqueous mannitol solutions have been evaluated from density, viscosity and conductance data respectively at temperatures 303.15, 308.15, 313.15 and 318.15 K. The solute-solvent interactions for nickel sulphate in water and various compositions of aqueous mannitol have been inferred from f_{v}° , B -coefficient of Jones-Dole equation and L_{m}° values. The structure making/breaking behaviour of nickel sulphate is inferred from the sign of $[^2 f_{v}^{\circ}/T^2]_p$, dB/dT and temperature coefficient of Walden product i.e. $d(L_{m}^{\circ} h_o)/dT$ values. It has been found that nickel sulphate behaves as structure-breaker in water and structure-maker in 2, 4 and 6 wt. % of aqueous mannitol solutions from molar volume, viscosity and conductance studies. The energy of activation for nickel sulphate in different composition of aqueous mannitol have also been calculated from conductance and viscosity data.

Keywords : Molar volume, viscosity, conductance, nickel sulphate-water-mannitol system.

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Micellization of linear alkyl benzene sulphonate and sodium lauryl sulphate in mixed aqueous solution

Narain Datt Kandpal, H. K. Sanwal, S. K. Joshi* and S. Joshi

Physical Chemistry Laboratory, Chemistry Department, Kumaun University, S.S.J. Campus, Almora-263 601, Uttarakhand, India

E-mail : narain_datt@rediffmail.com, dr.s.k.joshi.alm@gmail.com

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Abstract : The micellization behaviour of linear alkyl benzene sulphonate has been studied conductometrically in presence of sodium lauryl sulphate in aqueous solution. The conductance data are used to obtained values of critical micelle concentration, cmc, of mixed surfactant systems of different compositions. The results are interpreted in the light of various possibilities of micelle formation with equilibriums between possible surfactant species formed by both the surfactant in mixed system. It has been proved by measuring solubilization of anthracene in mixed surfactant systems and effect of temperature on cmc that is the detergency performance of LABS can be enhanced in presence of $\frac{1}{2}$ cmc of sodium lauryl sulphate in aqueous solution.

Keywords : Surfactant, micellization, micelles, solubilization, linear alkyl benzene sulphonate, cmc, conductance.

Orbital character and vibrational spectra study on carbon monoxide and nitrosyl compound $\text{Mn}(\text{NO})_3\text{CO}$

Hai-tao Sun^a, Yan-min Li^b, Zhi-zhong Wang^a, Ke Tang^a and Zheng-yu Zhou^{a*}

^aDepartment of Chemistry, Qufu Normal University, Shandong, Qufu, Shandong 273165, P. R. China and

State Key Laboratory of Crystal Materials, Shandong University, Shandong, Jinan 250100, P. R. China

E-mail : zhengyu@mail.qfnu.edu.cn

^bDepartment of Culture Foundational Education, Shandong Business Institute, Shandong, Yantai 264025

P. R. China

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Abstract : The geometry, electronic structure, energy and vibrational spectra of $\text{Mn}(\text{NO})_3\text{CO}$ have been studied using B3P86, B3LYP and B3PW91 methods at 6-31G basis set level. Three states have been found and all states have been fully investigated employing the molecular orbital theory and vibrational analysis. From the calculation, we have found that the singlet state is the most stable one.

Keywords : Molecular orbital, vibrational frequencies, nitrosyl.

Effect of dielectric constant of medium on conductance for acetylcholine halides and perchlorate in normal and branched alcohols

N. H. El-Hammamy^{a*}, M. M. El-Kholy^b and M. F. Amira^a

^aFaculty of Science, ^bFaculty of Education,

Chemistry Department, Alexandria University, Ibrahimia, P.O. Box 426, Alexandria 21321, Egypt

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Abstract : The conductance parameters, L_o (equivalent conductance at infinite dilution) and K_A (association constant) for acetylcholine chloride, bromide, iodide and perchlorate in methanol, ethanol, *n*-propanol, 2-propanol and *n*-butanol have been evaluated at 25 °C from the conductance measurements.

The values of L_o for different salts decrease with decreasing dielectric constant of medium (*D*) with some variations and are in the order of MeOH > EtOH > 2-PrOH > *n*-PrOH > *n*-BuOH. The association constants of the same salts in different alcohols increase with decreasing dielectric constant of medium and are in the order of *n*-BuOH > 2-PrOH > *n*-PrOH > EtOH > MeOH.

Keywords : Conductance measurement, acetylcholine halides, perchlorate.

Rigidanthrin, a new dimeric phenanthrene derivative of the orchid *Bulbophyllum rigidum*

P. L. Majumder*, Saswati Bandyopadhyay (née Guha) and Suparna Pal (née Ray)

Department of Chemistry, University College of Science, 92, Acharya Prafulla Chandra Road, Kolkata a-700 009, India

Abstract : Rigidanthrin, a new dimeric phenanthrene derivative, was isolated from the orchid *Bulbophyllum rigidum* which also afforded the known monomeric phenanthrenes nudol and gymnopusin and the simple aromatic compound ethyl 4-hydroxy-3-methoxycinnamate. The structure of rigidanthrin was established as 2,2',7,7'-tetrahydroxy-3,3',4,4'-tetramethoxy-1,1'-biphenanthryl from various spectral and chemical evidence. The structure of rigidanthrin was finally confirmed by regio- as well as regio- and enantio-selective biomimetic synthesis from its monomeric congener nudol (2,7-dihydroxy-3,4-dimethoxyphenanthrene) by oxidative phenol-coupling reaction with phosphomolybdic acid (PMA) on silica gel surface and CuCl(OH).(-)-(S)-proline methyl ester, respectively, in very good yields. The optical purity of (-)-rigidanthrin obtained in the latter case was found to be 95.79%. The co-occurrence of rigidanthrin with its monomer nudol in the same orchid *Bulbophyllum rigidum* provides a strong circumstantial evidence in support of the proposed biogenesis of the naturally occurring biphenanthryl derivatives which are assumed to have been formed from their corresponding monomers by enzymatic oxidative phenol-coupling reaction.

Keywords : *Bulbophyllum rigidum*, orchidaceae, rigidanthrin, dimeric phenanthrene derivative, regioselective biomimetic synthesis, PMA on silica gel surface, enantioselective synthesis, CuCl(OH).(-)-(S)-proline methyl ester.

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Synthesis of novel 3-substitued coumarin carboxamides with biological interest and their spectral studies

Asish R. Das*, Arunima Medda, Raghunath Singha**, Anuva Samanta and Nikhil Guchhait

Department of Chemistry, University Colleges of Science, Calcutta University,
92, Acharya Prafulla Chandra Road, Kolkata-700 009, India

E-mail : ardas66@rediffmail.com

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Abstract : The 3-substitued coumarin carboxamides are prepared by a highly efficient one-pot procedure. The coupling reaction of coumarin carboxylic acids and its acid chlorides with different amines afforded amide derivatives of coumarin in moderate to high yields by using either HOBT/EDCI or NaHCO₃. In addition, we have studied photophysical properties by steady state absorption and emission spectroscopy.

Keywords : synthesis, characterization, electronic spectroscopy.

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Evaluation of the efficiency of fly ash from thermal power plant in controlling aquatic pollution

Mitali Sarkar*, Sucharita Manna and Partha Pratim Pramanick

Department of Chemistry, University of Kalyani, Kalyani -741 235, West Bengal, India

E-mail : mitali_ku@yahoo.com

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Abstract : Contamination of ground water due to geoenvironmental causes is a worldwide problem including India. The problem further aggravates due to anthropogenic activities particularly through indiscriminate use of ground water. The geogenic route is mainly the dissolution and leaching of minerals deposits like of arsenopyrite, apatite and fluorite. This results in elevated concentration of arsenic and fluoride in drinking water and subsequent health hazards. The present report describes the use of fly ash for removal of both arsenic and fluoride in water. The operational parameters and the extent of removal are determined. The suitable condition for adsorption is evaluated from the

nature of the isotherm curves and thermodynamic constants. A comparison is made with activated carbon in terms of the efficiency as well as cost of operation.
Keywords : Ground water, arsenic, fluoride, adsorption, fly ash.

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Natural colors through modified synthetic membranes : Separation performances of floral pigments from the extract of rose petals

Yogesh, S. Gupta, S. Javiya, P. Paul, S. Basu^a, K. Singh and A. Bhattacharya*

Reverse Osmosis Division, Central Salt and Marine Chemicals Research Institute, Bhavnagar-364 002, Gujarat, India

E-mail : bhattacharyaamit1@rediffmail.com Fax : 91-278-2567562

^aSaha Institute of Nuclear Physics, 1/AF Bidhannagar, Kolkata-700 064, India

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Abstract : UV-assisted photochemical technique was used to produce modified polysulfone (PS) membranes and their separation ability of natural pigments from rose petal extract was tested. Grafting by hydrophilic monomer (acrylic acid) increased wettability of polysulfone membrane surface and shifted the membrane to lower molecular weight cut off, which increased retention in anthocyanins from rose petal extract. Membrane modified with acrylic acid with different grafting showed gradual increase in performance behavior towards the anthocyanins separation. The pH dependence performance study showed different significant behavior in anthocyanins separation, as the chemistry of modified membranes and anthocyanins is sensitive.

Keywords : Rose, membrane, acrylic acid, anthocyanins, separation, pH.

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Effect of viral infected plant materials and filterable agents on biomethanation[†]

N. Chakraborty^a, G. M. Sarkar^b and S. C. Lahiri^{c*}

^aICMR Virus Unit, ID and B. C. Roy Hospital, Kolkata-700 010, India

^bDepartment of Botany, Ranaghat College, Ranaghat-741 202, West Bengal, India

^cRetd. Professor, Department of Chemistry, Kalyani University, Kalyani -741 235, West Bengal, India and Research Advisor, Central Forensic Science Laboratory, Kolkata-700 014, India

E-mail : sujitlahiri@yahoo.com

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Abstract : Biomethanation of common plant materials, both healthy and viral infected, was studied under anoxic conditions using inocula from different sources as well with filterable agents from viral infected plants. Biomethanation had always been found to be less with viral infected plants but the effect was not much. But with filterable agents, differential alterations or interferences in biomethanation were observed. The level of interaction may be organismic alloinhibition.

Keywords : Biomethanation, viral infection, organismic alloinhibition, filterable agent.

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Influence of solvent on preparation of silica nanosphere

N. Venkatathri

Department of Chemistry, Anna University, Chennai-600 025, India

Abstract : Normally silica nanospheres were synthesized using ethanol as solvent. The draw back in this method is the result of non-uniform particle size. Octadecyltrimethoxy silane was used to normalize it. As it is costly, there is need for alternative method. Here in this communication we changed the solvent to acetone, isopropanol, *n*-octanol, etc. We succeed in getting a monotype nano silica particle when we used these three solvents. Even though the experiment is simple, the impact is more. It is found that the density of the solvent plays an important role in particle growth. There is an optimum value of density, above or below which precipitate was not produced.

Keywords : Silica, nanosphere, solvent, density.

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A comparative study on viscosities of some hydrated and anhydrous salts of transition metal sulphates and magnesium sulphate in water at different temperatures

M. L. Parmar* and Praveen Sharma

Department of Chemistry, Himachal Pradesh University, Summer Hill, Shimla-171 005,
Himachal Pradesh, India

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Abstract : Relative viscosities for the aqueous solutions of some hydrated and anhydrous salts of transition metal sulphates viz. cobalt sulphate, nickel sulphate, copper sulphate and zinc sulphate, and magnesium sulphate have been determined (in the concentration range $0.005-0.100 \pm 0.001$ mol kg^{-1}) at five equidistant [298.15, 303.15, 308.15, 313.15 and 318.15 K] temperatures. The data have been evaluated using Jones-Dole equation and the obtained parameters have been interpreted in terms of ion-ion and ion-solvent interactions. The hydrated salts of transition metal sulphates and magnesium sulphate act as structure-makers/promoters while the anhydrous salts act as structure-breakers in water i.e. just the removal of water of crystallization changes the behaviour of salts all together.

Keywords : Viscosity, hydrated and anhydrous salts, water.

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Some phenolic compounds in Himalayan Knotweed

Nadda Vrchotová^{a*}, Boena erá^a and Eva Dadáková^b

^aInstitute of Systems Biology and Ecology AS CR, Branišovská 31, CZ 370 05 eské
Budějovice, Czech Republic

E-mail : nada@usbe.cas.cz

^bUniversity of South Bohemia, Faculty of Agriculture, Studentská 13, CZ 370 05 eské
Budějovice, Czech Republic

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Abstract : The extracts from leaves, roots and flowers of Himalayan Knotweed (*Persicaria polystachya* (Meissner) H. Gross) were analysed by HPLC and CE (capillary electrophoresis). Catechin, quercetin, quercetin-3-rhamnoside (quercitrin), quercetin-3-D-galactoside (hyperoside) were detected.

Keywords : Catechin, quercetin, biologically active compounds, *Persicaria polystachya*, *Polygonaceae*, Knotweed, CE, HPLC.

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Reaction of active methylene compounds with 4-dimethylaminobenzalaniline and nematicidal activity of the products

Amardeep Kaur^a, V. K. Kaul^b and M. R. Manrao^{a*}

^aDepartment of Chemistry, ^bDepartment of Plant Pathology,
Punjab Agricultural University, Ludhiana-141 004, Punjab, India

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Abstract : Condensation of active methylene compounds (1-7) with 4-dimethylaminobenzalaniline resulted in the formation of addition-elimination products 1a-7a respectively. The products were characterized on the basis of elemental analysis, m.m.p. determination and spectral studies and were evaluated for their nematicidal activity against *Ditylenchus myceliophagus* and *Caenorhabditis elegans* by aqueous *in vitro* screening technique.

Keywords : Active methylene compounds, 4-dimethylaminobenzalaniline, nematicidal activity.

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Synthesis, characterization and antimicrobial study of substituted bis-[1,3,4]-oxadiazole, bis-[1,3,4]-thiadiazole and bis-[1,2,4]-triazole derivatives

Pradip P. Deohate^{a*} and B. N. Berad^b

^aDepartment of Chemistry, Shri Radhakisan Laxminarayan Toshniwal College of Science,
Akola-444 001, Maharashtra, India

E-mail : pradip222091@yahoo.co.in

^bPostgraduate Department of Chemistry, Shri Shivaji Science College, Amravati-444 603,
Maharashtra, India

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Abstract : Series of compounds 1,4-bis-(2-aryl/alkyl-amino-[1,3,4]-oxadiazol-5-yl)-benzenes, 1,4-bis-(2-aryl/alkyl-amino-[1,3,4]-thiadiazol-5-yl)-benzenes and 1,4-bis-(3-mercapto-4-aryl/alkyl-[1,2,4]-triazol-5-yl)-benzenes have been synthesized by the oxidative cyclization of di-(*N*-aryl/alkyl thiocarbamido) terephthalamides using alkaline ethanolic solution of iodine containing potassium iodide, *ortho*-phosphoric acid and aqueous potassium hydroxide solution respectively. These compounds on acetylation afforded bis-acetyl derivatives, on benzylation afforded bis-benzoyl derivatives and on reaction with ethyl iodide afforded bis-ethylmercapto derivatives respectively. These compounds have been assayed for their antimicrobial activity against gram-positive as well as gram-negative microorganisms.

Keywords : Bis-oxadiazole, bis-thiadiazole, bis-triazole, synthesis, antimicrobial activity.

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A bianthraquinone and anthraquinone from *Cassia javanica* heart wood

Supriya Singh* and Janhavi Singh

Department of Chemistry, Udai Pratap Autonomous College, Varanasi-221 002, Uttar Pradesh,
India

E-mail : jnh_singh@yahoo.co.in, supriya_singh@rediffmail.com

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Abstract : Phytochemical study of *Cassia javanica* stem bark has resulted in the isolation of one new bianthraquinone, 4,4c-bis(1,5-dihydroxy-7-hydroxymethyl-2-methyl-3-methoxy) anthraquinone, along with known compounds anthraquinone, 1,3,5,8-tetrahydroxy-6-methoxy-2-methyl anthraquinone and 1,2-dihydro-1,3-dihydroxy-6,8-dimethoxy-2-methyl anthraquinone.

Keywords : *Cassia javanica* (Caesalpiniaceae), medicinal plant, bianthraquinone, anthraquinone.

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Halogenated 4-aryloxymethylcoumarins as potent antimicrobial agents

K. Shivashankar^a, Lokesh A. Shastri^a, Manohar V. Kulkarni^{a*}, Vijaykumar P. Rasal^b and Deepak M. Saindane^b

^aDepartment of Chemistry, Karnatak University, Dharwad -580 003, Karnataka, India

E-mail : profmrvk@rediffmail.com Fax : 91-836-2747884

^bDepartment of Pharmacology and Toxicology, Karnataka Liberal Education Society's College of Pharmacy, Belgaum-590 010, Karnataka, India

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Abstract : Halogenated phenols reacted with various 4-bromomethylcoumarins to furnish the corresponding 4-aryloxymethylcoumarins. Introduction of chloro and methoxy groups in the coumarin ring elicited considerable antimicrobial activity against *B. subtilis*, *E. coli*, *A. niger* and *C. albicans*. In the aryloxy moiety, the chloro group as a substituent were found to be more active than the corresponding bromo compounds. The growth inhibition was observed even at concentrations of less than 10 mg ml⁻¹ in some cases.

Keywords : 4-Chloro/bromo phenoxy methylcoumarins, synthesis, antimicrobial.

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Synthesis and antimicrobial activities of some *N*-{4-[5-aryl-1-(isonicotinoyl)pyrazol-3-yl]-phenyl}-benzenesulfonamide and 3-(4-benzenesulfonylamino phenyl)-5-aryl-pyrazole-1-carboxylic acid amide

V. S. Jamode^a, H. S. Chandak* and P. R. Bhagat^b

*Department of Chemistry, G. S. Science, Arts & Commerce College, Khamgaon-444 312, Maharashtra, India

E-mail : chemants29@rediffmail.com

^aEx-Vice Chancellor, S. G. B. Amravati University, Amravati-444 602, Maharashtra, India

^bDepartment of Chemistry, Jawaharlal Darda Institute of Engineering & Technology, Lohara, Yavatmal, Maharashtra, India

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Abstract : A series of *N*-{4-[5-aryl-1-(isonicotinoyl)pyrazol-3-yl]-phenyl}-benzenesulfonamide (3a-e) and 3-(4-benzenesulfonylamino phenyl)-5-aryl-pyrazole-1-carboxylic acid amide (4a-e) have been synthesized by refluxing *N*-[4-(2,3-dibromo-3-aryl-propanoyl)-phenyl]-benzenesulfonamide (2a-e) with isonicotinoic acid hydrazide and semicarbazide hydrochloride respectively in pyridine medium. The synthesized compounds were assayed for antibacterial activities against *Staphylococcus aureus* (gram +ve), *Escherichia coli*, *Proteus mirabilis* and *Pseudomonas aeruginosa* (gram -ve) and antifungal activities against *Aspergillus niger*.

Keywords : Pyrazole, benzenesulfonamide, antimicrobial activities.