

## Sites of *O*-alkylation and *O*-glycosylation in naturally occurring phenolics using Kalidhar shifts

Meera

Department of Chemistry, KM Government College, Narwana, Jind-126 102, Haryana, India

*Manuscript received 14 November 2007, revised 17 October 2008, accepted 31 March 2009*

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**Abstract :** Kalidhar shifts which involve comparison of  $^1\text{H}$  NMRs of peracetates have been shown to be useful in locating the sites of *O*-alkylation and *O*-glycosylation in naturally occurring phenolics.  
**Keywords :** *O*-Alkylation, Kalidhar shift, *O*-glycosylation, phenolics.

J. Indian Chem. Soc.,  
Vol. 86, July 2009, pp. 670-678

## Spectral and biocidal studies of manganese(II), dioxomolybdenum(VI) and oxovanadium(V) complexes with monobasic bidentate Schiff base ligands

Rekha Garg, Nighat Fahmi and R. V. Singh\*

Department of Chemistry, University of Rajasthan, Jaipur-302 004, Rajasthan, India

*E-mail :* rvsjpr@hotmail.com

*Manuscript received 19 December 2007, revised 12 March 2009, accepted 12 March 2009*

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**Abstract :** Schiff base complexes of manganese(II), dioxomolybdenum(VI) and oxovanadium(V) derived from 1*H*-indol-2,3-dione and 5nitro-1*H*-indol-2,3-dione and 2-aminobenzenethiol have been characterized on the basis of elemental analysis, molecular weight determinations and spectral studies including IR,  $^1\text{H}$  NMR, UV, ESR and X-ray studies. The spectroscopic results show the involvement of sulphur and azomethine nitrogen in coordination to the central metal ion. The magnetic moment values of the manganese(II) complexes are in the range of 5.80–6.15 B.M. suggesting a high spin state of manganese in these complexes. Based on the spectral studies, tetrahedral geometry for the manganese(II) complexes and octahedral geometry for the dioxomolybdenum(VI) complexes have been proposed. In the case of the oxovanadium(V) complexes, vanadium is in penta- or hexa-coordinated environments. Antimicrobial effects of some re-presentative ligands and their complexes on different species of pathogenic fungi and bacteria have also been recorded. Further, the complexes were tested for their antifertility activity.  
**Keywords :** Manganese(II), Schiff base ligand, dioxomolybdenum(VI), oxovanadium(V).

J. Indian Chem. Soc.,  
Vol. 86, July 2009, pp. 679-689

## A compilation and critical evaluation of the literature data on thermal dehydration of hydrated salts

S. B. Kanungo\*

Institute of Minerals and Materials Technology (Formerly R.R.L.), Bhubaneswar-751 013, Orissa, India

*E-mail :* sbk\_your@yahoo.co.in

*Manuscript received 7 January 2008, revised 16 March 2009, accepted 17 March 2009*

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**Abstract :** The article provides a detailed compilation of literature data on the thermal dehydration of simple (formed from single cation and anion) hydrated salts consisting of a wide variety of cations and anions or ligands. An attempt has been made to correlate the temperature and apparent activation energy of dehydration with either charge density ( $z/r$ ) of cation or stability constant ( $\log K$ ) of metal-ligand complex. It is observed that the correlations are complex as they are dependent on the nature of both cation and anion. It is suggested that precise and well-documented data of the dehydration of crystalline hydrated salts are necessary to arrive at meaningful correlation with adequate theoretical basis.

Keywords : Hydrated salts, thermal dehydration, literature data, charge density of cations, stability constants of metal- ligand complexes.

J. Indian Chem. Soc.,  
Vol. 86, July 2009, pp. 690-696

## Synthesis and spectroscopic characterization of homo binuclear Cr<sup>III</sup>, Mn<sup>II</sup>, Co<sup>II</sup> and Ni<sup>II</sup> complexes of 1,4-diformylpiperazine derivative

Sulekh Chandra\* and Amit Kumar Sharma

Department of Chemistry, Zakir Husain College (University of Delhi), J. L. Nehru Marg, New Delhi-110 002, India

E-mail : schandra\_00@yahoo.com; sharmaamitk@yahoo.co.in

Manuscript received 15 December 2008, revised 12 March 2009, accepted 24 March 2009

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**Abstract :** The homo binuclear complexes of Cr<sup>III</sup>, Mn<sup>II</sup>, Co<sup>II</sup> and Ni<sup>II</sup> metal ions with a binucleating tetradentate Schiff's base ligand 1,4-diformylpiperazinebis(carbohydrazone) have been synthesized and characterized on the basis of elemental analysis, molar conductance measurements, magnetic susceptibility measurements, IR, UV, EPR spectral studies and thermal studies. The general stoichiometries of the complexes are found to be [Cr<sub>2</sub>(H<sub>2</sub>L)X<sub>4</sub>], [Ni<sub>2</sub>(H<sub>2</sub>L)X<sub>2</sub>] and [M<sub>2</sub>(H<sub>2</sub>L)X<sub>2</sub>(H<sub>2</sub>O)<sub>4</sub>], where M = Mn<sup>II</sup> and Co<sup>II</sup>, H<sub>2</sub>L = dideprotonated ligand, and X = NO<sub>3</sub><sup>-</sup> and OAc<sup>-</sup>. The studies reveal that the complexes possess the binuclear monomeric compositions and octahedral geometry for Cr<sup>III</sup> and Mn<sup>II</sup> complexes, whereas the Co<sup>II</sup> and Ni<sup>II</sup> complexes have tetragonal and square planar geometries, respectively.

Keywords : Tetradentate Schiff's base ligand, bimetallic complexes, spectral studies, TGA.

J. Indian Chem. Soc.,  
Vol. 86, July 2009, pp. 697-702

## Synthesis and characterization of nickel(II), cobalt(II), manganese(II), copper(II), iron(III) and chromium(III) complexes of unsymmetrical salen-type ligand and their application as catalysts for the oxidation of styrene

Atish K. Maldhure and Anand S. Aswar\*

Department of Chemistry, Sant Gadge Baba Amravati University, Amravati-444 602, Maharashtra, India

E-mail : aswar2341@rediffmail.com

Manuscript received 29 December 2008, revised 23 March 2009, accepted 24 March 2009

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**Abstract :** Salen type ligand has been synthesized in high yield, from which the nickel(II), cobalt(II), manganese(II), copper(II), iron(III) and chromium(III) complexes have been synthesized. The resulting complexes have been characterized by elemental analyses, IR and electronic spectral data, magnetic susceptibility measurements and thermogravimetric analysis. The complexes have been tested for their ability to activate molecular oxygen in the catalytic oxidation of styrene. Manganese(II), nickel(II) and chromium(III) complexes show slight high catalytic activity towards oxidation of styrene as compared to others. Scanning electron micrograph and powder X-ray diffractogram have also been reported.

Keywords : Imines, tetradentate Schiff base ligand, thermogravimetry, catalytic oxidation of styrene.

J. Indian Chem. Soc.,  
Vol. 86, July 2009, pp. 703-710

## Comparative study on the geographical, physical and engineering properties of soils of West Bengal. Part-II : Field test (experimental methods) working equations and engineering properties of soils of North Bengal

Surajit Ghoshal<sup>a,b</sup>, S. S. Dedalal<sup>b</sup> and S. C. Lahiri<sup>a,c\*</sup>

<sup>a</sup>Department of Chemistry, Kalyani University, Kalyani-741 235, West Bengal, India

<sup>b</sup>Soil Mechanics Section, River Research Institute, West Bengal, P.O. HRRI, Nadia, West Bengal, India

<sup>c</sup>Emeritus Fellow, AICTE, Kalyani Government Engineering College, Kalyani-741 235, West Bengal, India

*E-mail* : sujitlahiri@yahoo.com

*Manuscript received 10 December 2007, revised 27 February 2009, accepted 19 March 2009*

**Abstract** : The experimental methods for the determination of mechanical properties of soils based on field tests, the basic equations for the determination of the design values of the bearing capacity according to the load of the superstructure and the properties of the sub soils have been described.

The mechanical (engineering) properties of soil samples of North Bengal have also been described.

**Keywords** : Bearing capacity, consolidation test, dynamic cone penetration test, foundation, North Bengal, soils, static cone penetration test.

J. Indian Chem. Soc.,

Vol. 86, July 2009, pp. 711-716

## Electrode kinetics and thermodynamics of Mn<sup>II</sup> complexes with some amino acids and vitamin-B<sub>7</sub>

Afroza Khanam and Farid Khan\*

Department of Chemistry, Dr. H. S. Gour University, Sagar-470 003, Madhya Pradesh, India

*E-mail* : faridkhan58@yahoo.com; farid.fk@rediffmail.com

*Manuscript received 22 August 2008, revised 23 March 2009, accepted 24 March 2009*

**Abstract** : The paper presents simple and highly sensitive direct voltammetric method developed for the determination of stability of the ternary complexes of Mn<sup>II</sup> complexes with L-lysine, L-ornithine, L-threonine, L-serine, L-glutamic acid and L-aspartic acid as primary ligands and vitamin-B<sub>7</sub> (biotin) as secondary ligand at pH 7.30 ± 0.01 and m = 1.0 M NaClO<sub>4</sub> at 25 °C and 35 °C. The nature of current voltage curves was quasireversible and diffusion controlled. Mn<sup>II</sup> formed 1 : 1 : 1, 1 : 1 : 2 and 1 : 2 : 1 complexes with these drugs as confirmed by Schaap and McMaster method. The sequence of stability constant of complexes was L-lysine < L-ornithine < L-threonine < L-serine < L-glutamic acid < L-aspartic acid can be explained on the basis of size, basicity and steric hindrance of ligands. The study has been carried out at 35 °C also to determine the thermodynamic parameters such as enthalpy change (ΔH), free energy change (ΔG) and entropy change (ΔS) respectively. The kinetic parameters viz. transfer coefficient (α), degree of irreversibility (λ), diffusion coefficient (D<sup>1/2</sup>) and standard rate constant (k<sup>0</sup>) were calculated. The values of 'α' confirmed that the 'activated complex' is formed in an exact intermediate between dropping mercury electrode and mercury solution interface. The study confirmed that L-amino acids or vitamin-B<sub>7</sub> or the combination of both could be used as antidote against Mn<sup>II</sup> toxicity.

**Keywords** : Electrode kinetics, thermodynamics, [Mn-L-amino acidate-vitamin-B<sub>7</sub>] system.

J. Indian Chem. Soc.,

Vol. 86, July 2009, pp. 717-727

## Molar volume, viscosity and conductance studies of ascorbic acid in water, 0.01 M aqueous sodium chloride and dextrose + 0.01 M aqueous sodium chloride

Shashi Kant\* and Anuradha Kapil

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

*Manuscript received 24 December 2008, accepted 24 March 2009*

**Abstract** : Molar volume, viscosity and conductance of ascorbic acid in water, 0.01 m aqueous sodium chloride and 2, 4 and 6 wt. % of dextrose in 0.01 m aqueous sodium chloride 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 ascorbic acid in water, 0.01 m aqueous sodium chloride and 2, 4 and 6 wt. % of dextrose in 0.01 m aqueous sodium chloride have been inferred from  $f_v^0$ ,  $B$ -coefficient of Jones-Dole equation and  $L_m^0$  values. The structure making/breaking behaviour of ascorbic acid is inferred from the sign of  $[\frac{d^2 f_v^0}{dT^2}]_p$ ,  $dB/dT$ , transition state theory i.e. free energy contribution per mole of solute ( $\Delta m_2$ ) and free energy contribution per mole of solvent ( $\Delta m_1$ ) values and temperature coefficient of Walden product i.e.  $d(L_m^0 h_0)/dT$ . It has been found from viscosity and conductance studies that ascorbic acid behaves as structure-breaker in water, 0.01 m aqueous sodium chloride and 2, 4 and 6 wt. % of dextrose in 0.01 m aqueous sodium chloride solutions. The energy of activation for ascorbic acid in different systems has also been calculated from conductance and viscosity data.

**Keywords :** Molar volume, viscosity, conductance, ascorbic acid-water-sodium chloridedextrose system.

J. Indian Chem. Soc.,

Vol. 86, July 2009, pp. 728-733

## Synthesis of novel 5-phenylselenenyl pyrimidine analogs

N. Jeelan Basha, CH Upendar Reddy and N. M. Goudgaon\*

Department of Studies and Research in Chemistry, Gulbarga University, Gulbarga-585 106, Karnataka, India

*E-mail :* naganna\_g@yahoo.com

*Manuscript received 25 January 2008, revised 9 January 2009, accepted 26 February 2009*

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**Abstract :** 5-Phenylselenenyl-4-substituted-2-benzylthiopyrimidine analogs were prepared efficiently in four steps. Reaction of 2-thiouracil with benzyl chloride in presence of base furnishes 2-benzylthio uracil, which on reaction with phenylselenenyl chloride in pyridine under anhydrous conditions yielded 5-phenylselenenyl-2-benzylthio uracil. Chlorination of 5-phenylselenenyl-2-benzylthio uracil with excess  $\text{POCl}_3$  under reflux furnishes 5-phenylselenenyl-4-chloro-2-benzylthiopyrimidine. Aromatic nucleophilic substitution reaction of 5-phenylselenenyl-4-chloro-2-benzylthiopyrimidine with oxygen nucleophiles like sodium ethoxide, sodium benzoate and nitrogen nucleophiles like aliphatic primary amines, substituted aromatic primary amines furnished the target compounds in 48–80% yield. 5-Phenylselenenyl-4-(substitutedbenzylidenehydrazino)-2-benzylthiopyrimidines were prepared in 60–75% yield, by the reaction of 5-phenylselenenyl-4-(hydrazino)-2-benzylthiopyrimidine with various aromatic aldehydes.

**Keywords :** 5-Phenylselenenyl pyrimidine, uracil, synthesis.

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J. Indian Chem. Soc.,

Vol. 86, July 2009, pp. 734-738

## A novel electroorganic synthesis of some 2-amino-5-substituted-1,3,4-oxadiazoles at the platinum electrode

Sushma Singh, Sanjeev Kumar, Laxmi Kant Sharma and R. K. P. Singh\*

Electrochemical Laboratory of Green Synthesis, Department of Chemistry, University of Allahabad, Allahabad-211 002, Uttar Pradesh, India

*E-mail :* rkp.singh@rediffmail.com

*Manuscript received 24 September 2008, revised 25 February 2009, accepted 17 March 2009*

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**Abstract :** The electroorganic synthesis of 2-amino-5-substituted-1,3,4-oxadiazoles from semicarbazone has been carried out at platinum electrode. This is an environmentally benign electroorganic reaction done under controlled potential electrolysis in an undivided cell. The non-aqueous solvent and a supporting electrolyte has been used for the electrolysis in the electrooxidation.

**Keywords :** Electrooxidation, controlled potential electrolysis, supporting electrolyte, oxadiazole, acylhydrazine, platinum electrode, green chemistry.

## Application of coal fly ash, cow dung and grass cuttings mix in cultivation of few vegetables of *Solanaceae* family

Krishna Rani and Kalpana S.\*

P.G. Department of Chemistry, Govt. College, Kota-324 001, Rajasthan, India

E-mail : kr10360@gmail.com

Manuscript received 15 December 2008, revised 17 March 2009, accepted 17 March 2009

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**Abstract :** Addition of coal fly ash (CFA), a by-product of Thermal Power Plants, with soil alters its physical and chemical properties. Few pot and field experiments were conducted to study the impact of bio modified CFA in cultivation of selected varieties of tomato and brinjal/egg plant fruit and physicochemical studies have been carried out for different composts obtained by successive replacement of CFA for soil/earth in constituents of original or reference compost. Cow dung and grass cuttings were used as organic manure. CFA obtained from Kota Super Thermal Power Plant was used. Increase in rate of growth and improvement in quality of product was observed with the increase in percentage of CFA.

**Keywords :** Coal fly ash, compost, Kota Super Thermal Power Plant, bio modified.

## Role of ultrasonication in fast and effective biohydrolysis of vegetable oil

M. Ghosh<sup>a\*</sup>, S. Ghosh<sup>a</sup> and K. Khara<sup>b</sup>

<sup>a</sup>Oil Technology Section, Department of Chemical Technology, University of Calcutta, 92, Acharya Prafulla Chandra Road, Kolkata-700 009, India

E-mail : mahuag@gmail.com Fax : 91-33-23519755

<sup>b</sup>Department of Biotechnology, Seedling Academy of Design, Technology & Management, University of Rajasthan, Jaipur-302 004, Rajasthan, India

Manuscript received 1 October 2008, accepted 17 March 2009

**Abstract :** The agitation plays an important role in the rate of hydrolysis of oil. Agitation causes the effective change in interfacial area between the oil phase and the aqueous phase and thereby influences the rate of hydrolysis. In this study, to compare the hydrolysis rates of oil, ultrasonication and mechanical agitations were used for interfacial area generation. By ultrasonication, larger interfacial area with much narrower distribution of oil droplet could be produced as compared to mechanical agitation. Experiments carried out to assess the hydrolysis rate of lipids, showed that ultrasonication significantly increases the interfacial area between oil and water saturated with enzyme and the specificity of enzymes was also not disturbed.

**Keywords :** Vegetable oil, lipase, biohydrolysis, fatty acids, ultrasonication.

## Effect of some complex nutrients on improvement of bioaccumulation of lead by *Rhizopus arrhizus*

Sauryya Bhattacharyya<sup>a</sup>, Tapan Kumar Pal<sup>b</sup> and Arunabha Basumajumdar<sup>a\*</sup>

<sup>a</sup>Department of Chemical Technology, University of Calcutta, 92, Acharya Prafulla Chandra Road, Kolkata-700 009, India

E-mail : sauryya@hotmail.com; a\_basumajumdar@vsnl.net Telefax : 91-33-23519755

<sup>b</sup>Department of Biotechnology, Bengal Institute of Technology, On Basanti Highway, Hadia, Kolkata-700 150, India

E-mail : tapankpal@gmail.com

Manuscript received 19 September 2008, accepted 19 March 2009

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**Abstract :** The present study indicated that a few complex nutrients enhanced bioaccumulation of lead by *Rhizopus arrhizus* M1 from chemically defined medium containing 1 mg/L of the metal. Amongst them, yeast extract showed most prominent effect. Highly significant increment ( $p < 0.001$ ) of lead accumulation of about 67% [from 147.8 mg/g (control) to 247.78 mg/g cell dry weight] was observed when the culture medium was supplemented with yeast extract at a concentration of 10 mg/ml. Specific composition of a complex nutrient was found to influence lead accumulation, when a commercial peptone preparation enriched with tryptophan showed improved bioaccumulation of lead, in comparison to other peptone. A few amino acids and water-soluble vitamins were also found to stimulate lead uptake in similar cultural conditions, although not to the extent of the complex nutrients. The present study indicated that lead removal from aqueous systems with the use of commercially available complex nutrients as composite sources of amino acids, vitamins and other useful macromolecules for *Rhizopus arrhizus* M1, would definitely provide cost-effectiveness when applied in large-scale industrial processes.

**Keywords :** Bioaccumulation, *Rhizopus arrhizus*, lead, amino acids, vitamins.

J. Indian Chem. Soc.,  
Vol. 86, July 2009, pp. 753-755

## Accelerating effect of arsonium ylide for the copolymerization of acrylonitrile and $\alpha$ -methyl styrene

Rita Awasthi

Department of Chemistry, Brahmanand P.G. College, Kanpur, Uttar Pradesh, India

E-mail : rita\_awasthi2000@yahoo.co.in

Manuscript received 17 February 2009, accepted 24 March 2009

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**Abstract :** *p*-Acetyl benzylidene triphenyl arsonium ylide (*p*-ABTAY) accelerates  $\alpha$ , $\alpha$ -azobisisobutyronitrile (AIBN) initiated copolymerization of acrylonitrile (AN) and  $\alpha$ -methyl styrene ( $\alpha$ -MS) in DMF at  $65 \pm 0.1$  °C by reducing the rate of termination. The value of energy of activation in the presence and absence of *p*-ABTAY is 11.0 and 9.8 kJ/mol, respectively.

**Keywords :** Copolymerization, *p*-ABTAY, rate of polymerization intrinsic viscosity.

J. Indian Chem. Soc.,  
Vol. 86, July 2009, pp. 756-757

## Alkaloids of *Argemone mexicana*

Sarita Singh, Tryambak Deo Singh, Virendra P. Singh and Vidya B. Pandey\*

Department of Medicinal Chemistry, Institute of Medical Sciences, Banaras Hindu University, Varanasi-221 005, Uttar Pradesh, India

E-mail : pandeyvb@gmail.com Fax : 91-542-2367568

Manuscript received 15 October 2008, revised 25 February 2009, accepted 17 March 2009

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**Abstract :** Four isoquinoline alkaloids *dl*-tetrahydrocoptisine, dihydrocoptisine, 8-methoxydihydrosanguinarine and 13-oxoprotopine have been isolated from the whole plant of *Argemone mexicana* and their structures have been established by spectral evidences. This is the first report of these alkaloids from *Argemone mexicana*.

**Keywords :** *Argemone mexicana*, isoquinoline alkaloids, *dl*-tetrahydrocoptisine, dihydrocoptisine, 8-methoxydihydrosanguinarine, 13-oxoprotopine.

## Alkaloids of *Alstonia scholaris*

Luna Jain<sup>a</sup>, Sarita Singh<sup>a</sup>, M. B. Pandey<sup>b</sup> and V. B. Pandey<sup>a\*</sup>

<sup>a</sup>Department of Medicinal Chemistry, Institute of Medical Sciences, Banaras Hindu University,  
Varanasi-221 005, Uttar Pradesh, India

E-mail : pandeyvb@gmail.com

<sup>b</sup>Department of Chemistry, S.G.R. P.G. College, Dobhi (Purvanchal University), Jaunpur,  
Uttar Pradesh, India

Manuscript received 23 October 2008, revised 25 February 2009, accepted 17 March 2009

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**Abstract :** Picrinine, strictamine and nareline has been isolated from the fruit pods of *Alstonia scholaris* and their structure established by various spectral data. This is the first report of these alkaloids in *A. scholaris* fruit pods.

**Keywords :** *Alstonia scholaris*, Apocynaceae, indole alkaloids, picrinine, strictamine, nareline.

## Aluminium chloride assisted zinc-induced reduction of some a,b-unsaturated ketones

Sankar P. Dey

Department of Chemistry, Srikrishna College, Bagula-741 502, Nadia, West Bengal, India

E-mail : deysp2002@yahoo.co.in

Manuscript received 15 December 2008, accepted 17 March 2009

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**Abstract :** Some a,b-unsaturated ketones are reduced to give cyclodimerization products and/or b,b-coupling products in presence of Zn-AlCl<sub>3</sub>.6H<sub>2</sub>O-moist THF and aluminium chloride acts as Lewis acid to increase the yield of the products.

**Keywords :** a,b-Unsaturated ketones, reduction, aluminium chloride, zinc.

## UV spectrophotometric method for simultaneous estimation of tizanidine and valdecoxib in tablet dosage forms

Shyam Bihari Sharma, Lopamudra Banerjee<sup>a</sup>, Suman Jain and Radha Sharma\*

Pranav Institute of Pharmaceutical Sciences, Sitholi, Gwalior-474 011, Madhya Pradesh, India

E-mail : sharma.radha@rediffmail.com

<sup>a</sup>Department of Pharmaceutical Sciences, Dr. H. S. Gour Vishwavidhyalaya, Sagar-470 003, Madhya Pradesh, India

Manuscript received 3 December 2007, revised 6 February 2009, accepted 31 March 2009

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**Abstract :** The simple, selective, rapid and precise UV spectrophotometric method has been developed for the simultaneous estimation of valdecoxib and tizanidine in pharmaceutical dosage form. The proposed method is based on the Vierordt's simultaneous equations. Tizanidine has absorption maxima at 318.1 nm and valdecoxib absorption maxima at 239.0 nm in methanol. The linearity was observed in the concentration range of 2-18 mg/ml for tizanidine and valdecoxib. Both the drugs obey Beer's law. The method is validated statistically. The recovery studies confirmed the accuracy of the proposed method.

**Keywords :** Simultaneous equations, tizanidine, valdecoxib, absorptivity coefficient.