

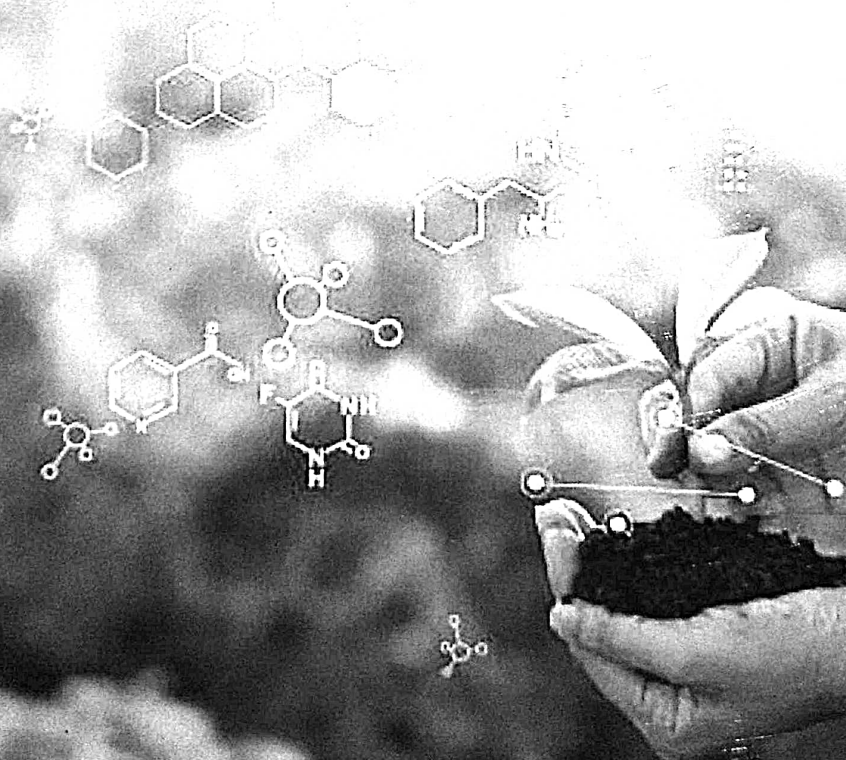
# Recent Trends in Chemical Sciences : An Interdisciplinary Research Area in Physical, Biological and Environmental Science

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15. Evaluation of Air Quality Variations in Three Major Cities of India during the COVID- 19 Lockdown Period  
**Dr. Neena Rai, Pranjal Rai** 118
16. Mini Review On Synthesis of Carbon Quantum Dots and it's Biological Application  
**Anjali Padey, Dr. Namita Bhardwaj** 131
17. Density, refractive index and other thermodynamic properties of hydroxamic acids in DMSO at  $T = (298.15 \text{ to } 318.15)\text{K}$   
**Dr. Sandhya Patre, Dr. Rakesh Kumar Kurre** 141
18. Assessment of Trace Metals Concentration in Pond Water of Ratanpur Bilaspur District, Chhattisgrah, India  
**Suresh Kumar Bharty, Dr. Smt. Ambuj Pandey** 148
19. Nutritional, Physico-chemical & Fatty Acids Profile of *Averrhoa carambola* (Linn.) Seed  
**Shraddha Pandey, Prof. Dr. Kiran Vajpai, Purnima Patel** 154
20. Serum Phosphate in Hypertensive Patients  
**Dr. Seema Mishra, Dr. Archana Dixit** 161
21. Recent Advances in Microextraction Techniques for determination of Pesticides in Water sample  
**Anupama Pradhan, Dr. Ambuj Pandey** 170
22. Understanding the Sustainability Impact of Li-ion UPS Batteries  
**Dr. Smt. Manju Banerjee** 184
23. Synthesis of Nanoparticles from various Waste Batteries: A Review  
**Varsha Burman, Dr. Jayati Chatterjee Mitra** 189
24. Study of Medicinal uses of weeds in rice fields of Champa, district Janjgir-Champa, Chhattisgarh  
**Smt. Pooja Pandey, Dr. (Mrs.) Veenapani Dubey** 196
25. Studies of Physiochemical parameters of different Soil Samples of Bhatapara (C.G.)  
**Dr. Preeti Soni** 204
26. Graphene as a Rising Electrochemical Sensor for Detection of Environmental Samples : A Review  
**Dr. Archana Patley, Dr. Pushpa Bhandari** 207

# Density, refractive index and other thermodynamic properties of hydroxamic acids in DMSO at $T = (298.15 \text{ to } 318.15)\text{K}$

\*Dr. Sandhya Patre

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## ABSTRACT

Hydroxamic acids are a group of weak organic acids having the general formula  $\text{RC(=O)N(R')OH}$ , show a wide spectrum of activities in analytical, agricultural, biological and medicinal fields. Physical properties, such as density, ( $\rho$ ) and refractive index, ( $n$ ) of three hydroxamic acids were measured in dimethyl sulfoxide (DMSO) as a function of concentrations at  $T = (298.15, 303.15, 308.15, 313.15 \text{ and } 318.15) \text{ K}$ . The apparent molar volumes ( $V_f$ ), limiting apparent molar volumes ( $V_f^0$ ) at infinite dilution, slope ( $S_V^*$ ) and Hepler's constant are  $(\partial^2 V_m^0 / \partial T^2)$  calculated from the experimental values of densities ( $\rho$ ) by applying the Masson's equation. The apparent molar expansibilities at infinite dilution ( $\phi^0_E$ ), molar volumes ( $V$ ), thermal expansion coefficient ( $\alpha_2$ ) and the excess molar volumes ( $V^E$ ) are also computed. The precise refractive indices ( $n$ ) data have been used to evaluate the steric parameters viz. molar refractions ( $R_M$ ), polarizability ( $\alpha$ ) and excess molar refraction ( $R_M^E$ ) of these molecules. The behavior of this parameter suggests strong solute-solvent interactions. The results have been discussed in terms of solute-solvent interaction, and it was found that a hydroxamic acid acts as a structure maker in the present system.

**Keywords:** Density, Refractive index, Excess Properties, hydroxamic acids.

**1. Introduction-** The volumetric and molar refraction behavior of solutes has been proved to be very useful in elucidating the various interactions occurring in pure solvent. Studies on the effect of concentration and temperature on the apparent molar volumes of solutes have been extensively used to obtain information on solute-solute, solute-solvent, and solvent-solvent interactions [1]. The use of densities



National Seminar On  
“Recent Trends in Chemical Sciences : An Interdisciplinary Research  
Area in Physical, Biological and Environmental Sciences”  
(NSRTCS-23)

March 01-02, 2023


Organised By  
Department of Chemistry & IQAC  
Government Bilasa Girls P. G. Autonomous College Bilaspur (C. G.)

Sponsored By  
Chhattisgarh Council of Science & Technology

**CERTIFICATE**

This is to certify that Prof. or Mr./Ms. Sandhya Patre, Assistant Professor of Sant Shriromani Gusu Ravidas college, Sargaon, District-Mungeli has participated in the National Seminar on “Recent Trends in Chemical Sciences : An Interdisciplinary Research Area in Physical, Biological and Environmental Sciences”. He/She delivered Key Note/Invited Talk/Chaired Session/Presented Oral/Poster entitled Physico chemical property of hydroxamic Acid.

  
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Convener

  
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## Physico-chemical Characteristics, and Nutritional Value of *Urena lobata* Seeds and Seed Oil of Eastern Chhattisgarh.

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*Urena lobata* commonly known as 'Caesarweed' or 'Congo jute' in English is a subshrub which belongs to the family Malvaceae. *Urena lobata* traditionally has been used for treatment of various ailment since generations. These seeds have been found to be rich in oil content and high calorific value. Proximate analysis of full fat seed reveals Moisture – 6.09%, Ash – 9.63%, Volatile Matter – 72.27%, Fixed carbon – 12.01% and Ultimate analysis reveals N – 4.39%, C – 51.67%, H – 7.508%, S – 0.32%. Flame photometer and AAS analysis of *Urena lobata* full fat seed powder indicated the presence of cations composition in seeds. Quantitatively, the main fatty acids by GC-FID were nervoinic acid – 30.70%, lignoceric acid – 8.56%, elaidic acid – 5.26, palmitic acid – erucic acid – 1.54%. The amino acid profile by HPLC result shows glutamate was the most abundant in the *Urena lobata* had the highest contents of all the non-essential amino acids such as aspartate, glycine, alanine, serine, tyrosine, proline, cystine (NEAA-68.87%) and essential amino acids such as threonine, methionine, valine, isoleucine, leucine, lysine – 4.15%, (EAA- 24.52%).

**Key Words:** Physico-chemical, Proximate-Ultimate Analysis, AAS, Fatty Acid Composition, GC-FID, Amino Acid, HPLC, *Urena lobata* seeds.

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## Density, refractive index and other thermodynamic properties of hydroxamic acids in DMSO at $T = (298.15 \text{ to } 308.15)\text{K}$

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Hydroxamic acids are a group of weak organic acids having the general formula  $\text{RC(=O)N(R')OH}$ , show a wide spectrum of activities in analytical, agricultural, biological and medicinal fields.