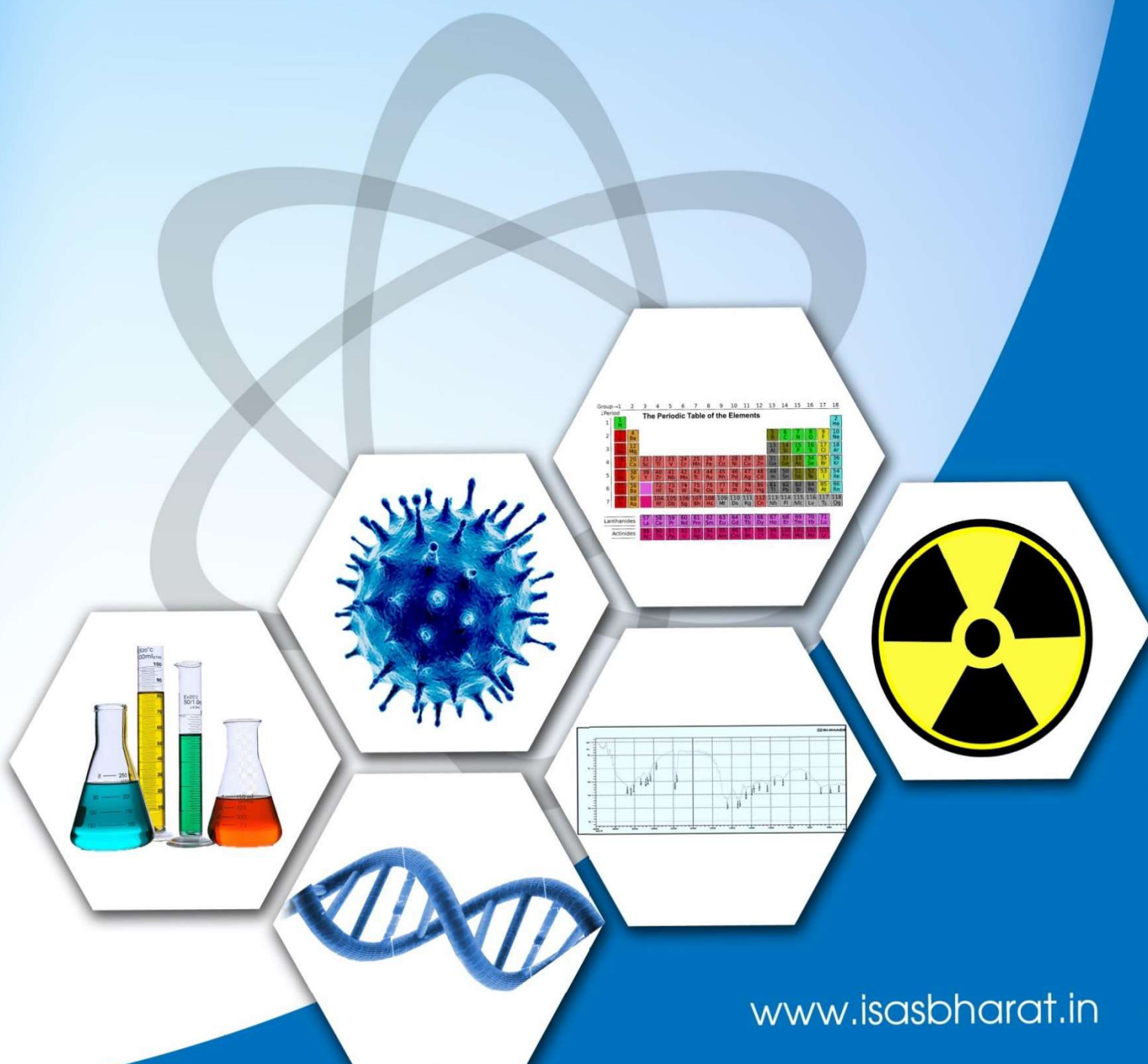




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Volume 2 Issue 1
July, 2023

Journal of ISAS

An open access peer reviewed quarterly e-journal by
Indian Society of Analytical Scientists



The Periodic Table of the Elements

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	H																	He	
2	Li	Be											B	C	N	O	F	Ne	
3			Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	
4																			Xe
5																			Rn
6																			
7																			
Lanthanides																			
Actinides																			



Journal of ISAS

An open access peer reviewed quarterly e-journal published by Indian Society of Analytical Scientists

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J. ISAS

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 - **Experimental**
 - **Results and Discussion**
 - **Conclusions**
 - **Acknowledgement**
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No. RCUB/VCO/2023-24/21

Date: 13-06-2023

MESSAGE

I am happy to note that 'Indian Society of Analytical Scientists' (ISAS, <https://isasbharat.in/>), a prime scientific national body has started its own open access quarterly e-journal (<https://isasjournal.isasbharat.in/>), **J. ISAS** since July 2022 and the upcoming special 'Anniversary Issue', to be published in July 2023 online over scientific deliberations from eminent personalities. I am confident that due to diligent and sincere efforts of the entire team associated with publication process; this journal has a bright future in the coming years by providing an ideal forum for exchange of information from different branches of analytical sciences.

J. ISAS has got ISSN No and each article is assigned with DoI. It is important to note that there is no publication/ processing charge in this open access journal, unlike many other journals by the well-known publishes.

Indeed, it is necessary to encourage the indigenous journals especially by the Professional bodies like ISAS because of the continuously increasing research publications in India (next only to China and USA).

I had the opportunity to inaugurate (as president) the ISAS Belagavi Chapter on 14-05-2021 (which is functioning from Dept. of Chemistry, Rani Channamma University, RCU), and pleased to know that it has received Best Chapter Award 2022 as well as Chairman of ISAS Belagavi Chapter (Prof. J. Manjanna,) has been conferred with ISAS Award of Excellence and ISAS Honorary Fellowship. Further, ISAS Belagavi Chapter has organized National Conference during Dec 15-16, 2022 in RCU campus. I am happy to learn that Prof. J. Manjanna has been elected as Vice-President of ISAS HQ for 3 years from April 2023.

With this background, I sincerely wish a great success to **J.ISAS** for making special impression in the minds of scientific community.

Vice Chancellor

Rani Channamma University

Belagavi

13/6/23



बी. सरवणन
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B. Saravanan
Outstanding Scientist &
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Government of India
Department of Atomic Energy
Atomic Minerals Directorate for
Exploration and Research

June 01, 2023

MESSAGE

I am very happy to note that Indian Society of Analytical Scientists (ISAS) will complete one year of publishing its quarterly, peer reviewed, electronic, open access e-journal, i.e. Journal of ISAS and release the fifth issue of the e-journal during the annual meet on 31.07.2023.

Since its formative days at Bhabha Atomic Research Center (BARC) Mumbai in 1983, ISAS has grown steadily with present strength of 3000 members representing multidisciplinary Indian experts in analytical sciences. It is heartening to note the pan-India presence of ISAS, which is now operating through 10 Chapters across India. Introduction of the e-journal last year is a right step towards popularizing scientific techniques and their role in resolving various societal issues.

In the last four issues of ISAS e-journals, analytical techniques with a wide coverage, starting from in-vogue techniques like ICP-AES, XRD, less common techniques like Electrochemical Impedance Spectroscopy (EIS), and more sophisticated techniques like John-Sivanandan Achari Isotherm were postulated for compositional and structural characterization of various materials. Besides, a large number of research papers are devoted to specific research domains which have tremendous societal impact; these include: (i) Nano technology (ii) Variety of adsorbant molecules (iii) Isolation and characterization of phytochemical constituents (iv) Characterization of traditional Indian medicines and (v) Techniques related to environment and its pollution. It is obvious that all the above mentioned articles have readers from a wider domain including science students, academicians, professionals and science reporters.

I am sure that the fifth issue of the Journal of ISAS will equally be informative and thought provoking and provide a platform for discussions on wide ranging topics, especially in the field of analytical sciences. On this occasion, I fondly congratulate all the members of the ISAS for an eventful annual meet on 31.07.2023 and a grand success for the release of next issue of the e-journal.


(B. Saravanan)

डॉ. कोमल कपूर
Dr. Komal Kapoor

उत्कृष्ट वैज्ञानिक एवं मुख्य कार्यपालक
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Nuclear Fuel Complex



MESSAGE

It gives me great pleasure to learn that the Journal of Indian Society of Analytical Scientists (ISAS) is completing one year of publication of its e-version with release of its fifth issue.

Analytical Sciences play a pivotal role in several areas such as environment, forensics, health care, pharmaceutical, linked largely to the traditional drugs, biotechnology, etc., including nuclear science and technology.

Novel researches and their publication form the bone of development making the publication of the journal highly essential. The Journal of ISAS caters to the need efficiently due to its e-version, peer reviewed, open access, free publication charge, and quarterly issues.

I wish the Journal a very bright future.


(Komal Kapoor)

Place: Hyderabad
Date: 25-05-2023



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डॉ. सं.वि. घुमटकर
संचालक

MESSAGE

I am very happy to note that Journal of ISAS is bringing out its anniversary issue after successful launching of four issues with ISSN and doi.

Forensic science refers to the examination of crime scenes, the recovery of evidence, laboratory analysis, interpretation of findings, and presentation of conclusions. As technology continues to advance and become globally accessible, crime is evolving and adapting at an unprecedented rate. New crime trends are emerging, with individuals committing offenses in cyberspace, trafficking occurring in new psychoactive substances and drugs, and so on. Therefore, it is crucial to incorporate new techniques to meet the ever-increasing challenges involved in solving crimes.

In the field of analytical sciences, research based work is progressing day by day and need of accrediting and publishing original work of authors can be addressed in the form high quality standard journals. Indian Society of Analytical Scientists (ISAS) has tried to lay a foundation stone and provided a platform to serve and help analytical scientists to portray their research following international guidelines in publishing field. As evidenced from published issues of the journal, it addresses significant and latest developments in the cross sectional fields of analytical sciences. I am sure untiring efforts of team of dedicated scientists working with J. ISAS will help in scoring the journal high in performance measures and moving up in journal ranking list.

Congratulations to ISAS and my best wishes for bright future of the journal.

Dr. Sangeeta V. Ghumatkar
Director-Directorate Of Forensic Science Lab



Indian Society of Analytical Scientists.



Message from President ISAS

It gives me immense pleasure that Indian Society of Analytical Scientists (ISAS) is releasing anniversary issue of its e -Journal, Journal of ISAS (J. ISAS).

The Journal covers a wide spectrum of research activities in Analytical and Allied Sciences with all efforts to retain quality of the Journal.

The issue speaks of tireless hard work of the publication group of ISAS (group of Editors, Advisers and supporting hands). The group deserves due appreciation.

I am sure visibility of the Journal increased with ISSN and DOI would take further leap with the grant of the UGC care in process.

Dr. Raghaw Saran
President ISAS and
Advisor J.I SAS



Indian Society of Analytical Scientists.



Editorial

Welcome to the anniversary issue of the J. ISAS. Today marks a momentous occasion as we proudly celebrate the first anniversary of the Journal of Indian Society of Analytical Scientists (J.ISAS). With immense joy and gratitude, we reflect on the incredible journey that has led us to this pivotal milestone. Over the past year, J. ISAS has emerged as a beacon of knowledge and innovation, uniting analytical scientists from across the nation in their pursuit of excellence.

The inception of J.ISAS was driven by a collective vision - to establish a platform that would foster collaboration, disseminate cutting-edge research, and accelerate the advancement of analytical science in India. Today, we stand triumphant, having achieved this and much more. As the editor-in-chief, I take immense pride in the quality of work that has graced the pages of our journal.

Over the course of this first year, J.ISAS has provided an avenue for researchers, scientists, and academicians to share their insights, discoveries, and breakthroughs. It has been awe-inspiring to witness the diverse array of research articles, reviews, and perspectives that have poured in from every corner of the country. Our contributors have consistently demonstrated their commitment to pushing the boundaries of analytical sciences, enhancing our collective understanding and contributing to the betterment of society. The present issue showcases interdisciplinary areas covering research papers, reviews and case study in the area of waste water treatment, copolymer resins, ayurveda, lubricants and forensic case study.

In celebrating this anniversary, we must acknowledge the unwavering support and encouragement we have received from ISAS and its members. Without your dedication and engagement, this journal would not have flourished the way it has. I express my heartfelt gratitude to all the authors, reviewers, editorial board advisory board members for their relentless efforts in maintaining the highest standards of academic excellence. My special thanks are due to Dr. Raghav Saran, President - ISAS and Chairman - advisory board, J.ISAS and Editorial board members - Dr. Vijayalaxmi Adya and Dr. Vinay Bhandari for their all time support and co-operation. I would like to acknowledge Vaibhav Parse, Maharshi Pandya and Shivani Kantak for technical assistance. I express my sincere gratitude towards esteemed scientists for their insightful encouraging messages and thank all the sponsors being a part of this issue.

As we embark on the second year of this exciting journey, we have set our sights on new horizons. J.ISAS aims to expand its scope further, exploring emerging frontier interdisciplinary areas in analytical sciences. We shall continue to embrace advancements in technology and uphold our responsibility to remain at the forefront of analytical research.

The first anniversary of the Journal of Indian Society of Analytical Scientists is not just a celebration of our achievements, but also a reaffirmation of our commitment to the pursuit of knowledge and the spirit of scientific inquiry.

Thank you for being a part of this remarkable endeavour, and we look forward to your continued support as we usher in another year of scientific excellence.



Dr. Nilima Rajurkar
Editor in Chief, Journal of ISAS

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Journal of ISAS

Anniversary Issue

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2(1), Pages 1 to 83, (2023)

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Contents

S.No.	Title and Authors	Page no.
1	Research Paper: Modification of Activated Carbon by Gamma Radiation- Removal of Acetic Acid S. T. Pandit, V. M. Bhandari*, N. S. Rajurkar Email: ymbhandari303@gmail.com DOI: 10.59143/isas.jisas.2.1.ILNL2965	1-14
2	Mini Review: Novel Applications of Some Organic Copolymers Derived From Phenolic and Nitrogen-Containing Compounds- A Review Kamlakar. A. Nandekar Email: kamlakar.nandekar@raisoni.net DOI: 10.59143/isas.jisas.2.1.KDQI5413	15-27
3	Case Study: Cypermethrin insecticide in viscera of suspected snake bite case: A Forensic case study S.O. Chetti* G. L. Kadam and S. V. Ghumatkar Email*: sandeepchetti@gmail.com DOI: 10.59143/isas.jisas.2.1.EPYI9445	28-32
4	Research Paper: Removal of Ni (II) ions from aqueous solution using chitosan and activated carbon: isotherms and kinetics K. Dimya* and M. N. Potangale Email*: kdimya21@gmail.com DOI: 10.59143/isas.jisas.2.1.XGQP4076	33-51
5	Review: Metallic <i>Bhasmas</i> : A Review on Chemical Characterization, Particle Size and Toxicity A. N. Garg* and A. Kumar Email*: amarnath943@yahoo.com DOI: 10.59143/isas.jisas.2.1.TXBY3589	52-68
6	Review: Role of Lubricants in Industry: A Review Narendra A. Gokarn* and K. N. Kiran Email*: ngokarn@yahoo.com DOI: 10.59143/isas.jisas.2.1.WFJR9779	69-83

Cy-Tb™

The new gold standard for latent tb detection

Latent TB is a condition that occurs after an individual is infected by TB bacteria, *M. tuberculosis*, but does not show symptoms of TB. Unlike patients with active TB, individuals with latent TB do not transmit the disease. In simple terms, people in this situation are infected with TB, but the infection is essentially dormant. Although most of the infected persons do not manifest the disease, they are at high risk of developing active infection and hence represent a reservoir of TB bacteria. In India, the prevalence rate of latent tuberculosis is very high, around 40% of the population. The reservoir of latent TB infection (LTBI) is a major barrier to the control and elimination of tuberculosis. Various studies indicate that a higher prevalence of LTBI would contribute to higher incidence and mortality of TB. In order to achieve the TB elimination target, testing and treatment of LTBI is essential.



Detection of Latent TB

Many individuals with high immunity affected by LTBI can typically resist the bacteria and prevent them from multiplying. However, if latent TB bacteria become active in the body, usually due to weak immunity, the person will develop an active infection. Those who have LTBI run a considerably higher risk of developing active TB or having it reactivated than healthy individuals. Thus, people with latent TB infection should be effectively diagnosed and treated to prevent them from developing TB disease.

Until recently, for detecting the latent TB cases, the two most widely used tools are the tuberculin skin test (TST) and interferon-gamma release assays (IGRA). However, TST has poor specificity and low sensitivity as it also shows positive for those who have received the BCG vaccine for TB, while IGRA results are influenced by an individual's immunity status. Additionally, IGRA is expensive, needs specialized instruments, trained personnel and labs. Aside from sensitivity issues, neither the IGRA nor the TST can reliably differentiate between active TB disease and LTBI, nor can they predict LTBI reactivation.



Conclusion

TB continues to be a significant public health issue in our country. Therefore, the TB programme should lay emphasis on detection and treatment of LTBI to decrease the likelihood of active TB and to achieve the targets of TB elimination.



CY-TB is the third-generation test for latent TB detection

The Cy-Tb test is one of the most recent advancements in LTBI diagnosis and is a novel form of the TB skin test. It strikes the right balance. Developed by the Serum Institute of India, this test combines the cost-effectiveness and the ease of the TST with the specificity of the IGRA in the diagnosis of LTBI, and remain unaffected by the BCG vaccination.

The test kit is designed to detect two major secretory proteins, namely, culture filtrate protein-10 kDa (CFP-10) and early secreted antigenic target-6 kDa (ESAT-6), thus solving the problem of false positive results. The test kit comprises Mylab Cy-Tb SmartPatch which has a SmartCut-Flap, to ensure easy access to the skin for injection. It also has QR code which certifies its authenticity and links observation with UHID. The Guidemark on the SmartPatch enables image processing by AI algorithm and injecting CTB, while the Colour Calibrator allows precise image correction.

Since most people in India have received the BCG vaccine, the 5mm cut-off for the wheal (skin bump) used by the world does not work in India. We have to keep the cut-off at 10 mm and this might be leading to us missing several cases. It also does not work very well with those who have HIV. With the Cy-Tb test using a specific infection-causing part of the TB, the 5 mm cut-off for a test to be positive can be followed for all including HIV patients.

The test can be used to detect latent tuberculosis in contacts of a patient with active TB and among those with conditions such as HIV and cancers who are at a higher risk of developing active TB.

Not only does the Cy-Tb test produce more accurate results, it also does not need extracts from the actual bacteria, making the manufacturing easier.



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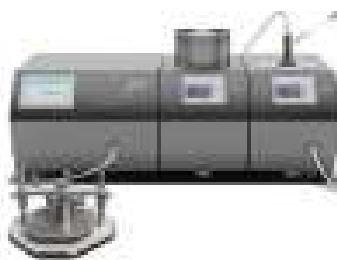
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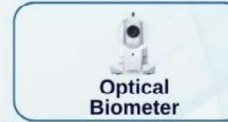
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