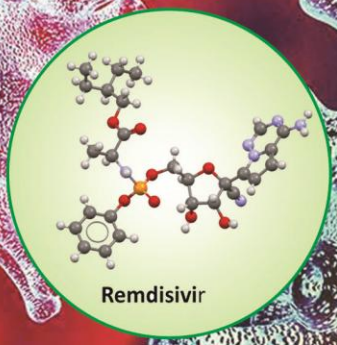
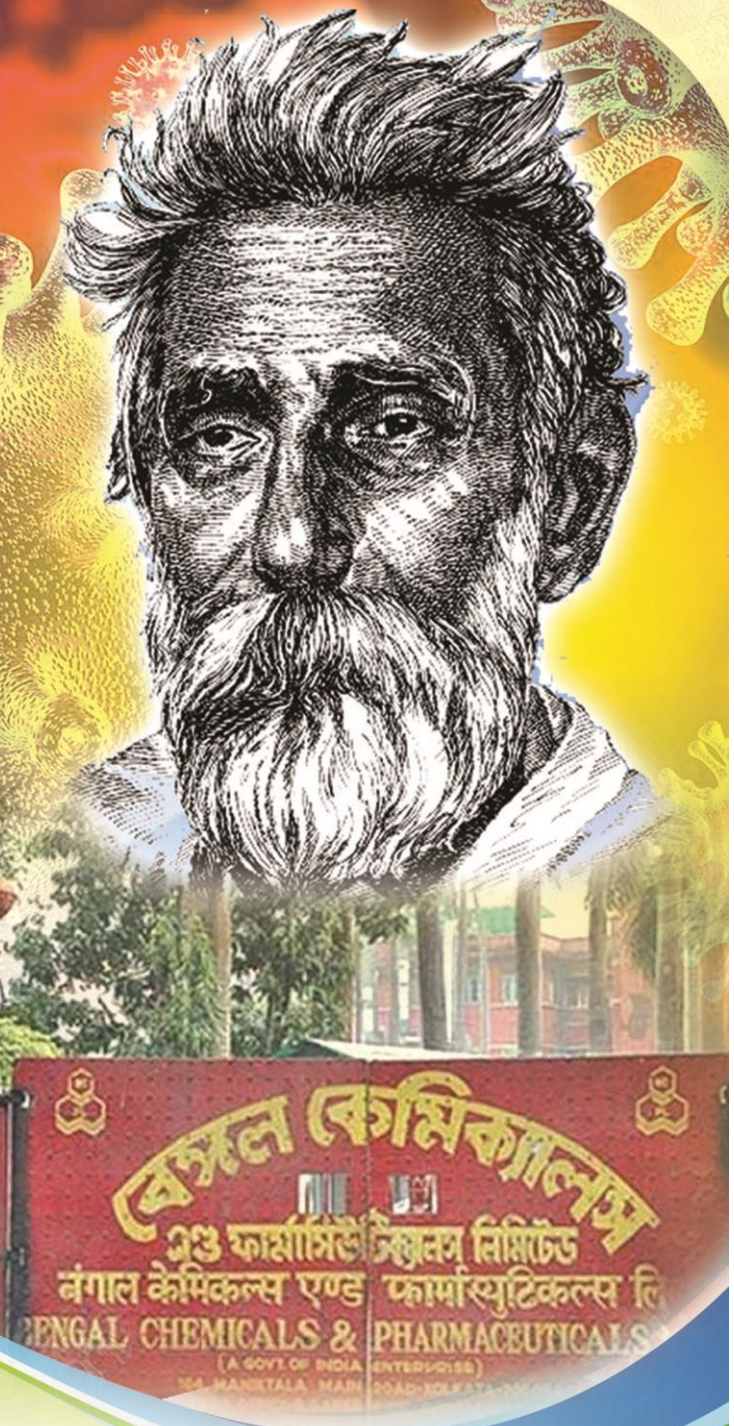
CHEMICAL Warta

Covaxin !!


Remdisivir

Dexamethasone


Hydroxychloroquine



The Second issue of this Newsletter is being published to celebrate the
159th Birth Anniversary of Acharya P. C. Ray

Published by

INDIAN CHEMICAL SOCIETY
92, Acharya Prafulla Chandra Road, Kolkata - 700 009, India

Chemical Warta, Vol. : 1, No. : 2, Year : 2020

2nd August 2020

CHEMICAL Warta

Editorial–

Any Scientific organization thrives on a communication mouthpiece that can disseminate knowledge to every stratum of Society. An online news bulletin is one such mode of communication that allows the readers to stay up to date in their relevant field. At this point, we take pride in announcing the launch of our very first news bulletin "Chemical Warta". We would also like to acknowledge Prof. G.D. Yadav's contribution for creating this report. Chemical Warta features news on upcoming national and international conferences in different fields, recent trends in Chemistry, modern techniques etc. Content of different issues of *J. Indian Chem. Soc.* (March-August, 2020) is summarized in this bulletin. Through this bulletin we hope to convey the different activities of Indian Chemical Society. It is no longer a new thought when we argue that Scholars from different fields must collaborate to come up with innovative solutions. Through our bulletin we try to provide a platform to the researchers in diverse areas to communicate and connect. We hope that every member will participate enthusiastically to serve the purpose of the bulletin. It is safe to predict that only a collective effort from our members will produce results that will change the way we live. In this context we want to appreciate the effort made by Mr. Rahul Mitra of ASHA LED, Haldia, West Bengal, India for designing the cover page of this issue.

Dr. Nibedita Chakrabarti
Editor

Dr. Gourisankar Roymahapatra
Editor

CHEMICAL Warta

COVID 19 and Challenges and Opportunities for Chemical and Allied Industry

Professor G.D. Yadav
President, Indian Chemical Society
Emeritus Professor of Eminence and J.C. Bose National Fellow (GOI)
Former Vice Chancellor and R.T. Mody Distinguished Professor and Tata Chemicals Darbari Seth Distinguished Professor of Leadership and Innovation
NSTITUTE OF CHEMICAL TECHNOLOGY MUMBAI

During this lockdown due to the COVD 19 pandemic and henceforth we will have to change our lifestyle and there will be a new normal. That new normal will be different for different ages and locations. Never in our widest dream a year ago, would we have imagined that will the World practically be closed for business. But it happened. Everybody is vulnerable now. In this connection, the entire world came to know social (physical} distancing, hand sanitization and "keeping the mouth shut". The personal protection equipment (PPE) is a common vocabulary. The Chemical and Allied Industries including pharmaceuticals and drugs found a new respect. The damned and banned plastics came to the rescue in all forms and sizes. The importance of polymer and plastic industry will be more evident since we want to be protected from all viruses, bacteria and unknown microscopic creatures and bugs which are going to be a huge problem for the society at large. We need plastics more now than ever before to remain safe; masks, medicines, sanitizers, food products, water, and what not. Plastic is a saviour of humankind. Plastics, for the public it may be polythene bags which are littered everywhere, but in the wider sense of the term have been part and parcel of our lives at least for the past 70-80 years. You cannot imagine a World without plastics. Plastic ban was such a policy decision which did not solve the problem totally. What is the substitute for plastic and at what cost, and its convenience to use? In the first place, plastic was introduced to the commoners as a substitute to paper which was responsible for denudation of paper. A ton of paper requires about 1.5 tons of chemicals and 30 tons of water. Glass processing is done at 1500-1600 ^{o}C, needing a lot of energy and release of NOx and SOx. Glass is ~ 22 heavier than plastic and susceptible to breakage. Glass is made from all-natural resources, such as sand, soda ash, limestone and recycled glass. However, it is important to note that we're running out of the sand that's used to make glass in the first place. Worldwide, we go through usage of 50 billion tons of sand every year. That is twice the amount produced by every river in the world. So glass is no good. Glass is much heavier than plastic and

so has a much larger carbon footprint. All of food packaging materials are 100 per cent recyclable, so whether you choose to buy a plastic bottle, can or glass, all of these can be recycled. Furthermore, the solution in terms of paper or glass as substitute to paper is to assume that you throw it after use, and it will not cause pollution. Nature will take care of it. Short sightedness! I think the ban on single use plastic (SUP) was a knee-jerk reaction without finding an alternate economically viable and easily adoptable material. Ban is never as a good idea. Because ban leads to all sorts of social problems, illegal businesses and corruption by the law enforcing authorities. It is absolutely true we have to reduce waste be that plastic, metal or debris a long-term solution is needed. Plastic which is already in the environment and use of plastic in future will require two different approaches. The history of technology teachers us that if one technology creates a problem, another solves it. Better technology is the only solution. Better methods of collection of waste at source and segregation, recycle, reuse, depolymerization, mixing with bitumen for road making etc. are well practiced but not fully implemented and the list is long. Govt of Maharashtra last year even banned non-woven polypropylene (PP) bags which are 100% recycle. PP is used for face masks, surgical masks N95 and hazmat dresses. Now they are importing from abroad; for instance, China. Ban on SUP should be lifted temporarily to deal with the grave health crisis India is facing and the protocol for such waste disposal must be in place. Those who collect and dispose such waste need to be protected. I had suggested to the Govt. that no plastic bad, wrapping or container be given free but should be sold with a refundable deposit of at least Rs 1-5 per item depending on the potential to pollute. Like the news paper delivery man comes to our doorsteps every morning, another person will come to collect plastic bags, bottles, can and the like and refund part of money charging some collection fee (5-10%) which could be digitally collected. It will promote Digital India mission and also create employment .The municipalities will save money on segregation at source and the plastic can be reprocessed or depolymerized or whatever form it could be converted into. Thus, SUP will be a game changer and not a polluter.

Our life has changed forever due to Corona. Everybody will use sanitizers, disinfectants, face masks apart from other gazettes and medicines; in other words, chemicals in one form or the other. Just imagine, over 7.3 billion people using alcohol-based sanitizers, different formulations, and several millions of tons of alcohol required since at least 70% alcohol is used in the formulation. In fact, this pandemic has brought to the fore the importance of all these related industries. Thus, there is a confluence of chemical sciences and engineering with biological sciences and engineering whether you want develop therapeutics or vaccines, use biocides, masks, and practice social distancing. The technologies related to producing advanced materials and polymers, clean energy generation and storage, medicines, high-end drugs, nutraceuticals, food products, fertilizers, agrochemicals, surface coating materials, dyes, colorants, pigments, adhesives, textiles, fibres, oleochemicals,

surfactants, lubricants, water treatment and purification, air pollution abatement, bio-processing, downstream processing and a myriad of related issues involve high degree of science and engineering related to chemicals and materials. There is not a single man-made item which does not use chemical. Even if you try, we will not succeed. I believe the Govt. of India should declare these industries as essential, not just pharma and healthcare. They should never be part of any future lockdown since there is a huge supply chain wherein product one industry is consumed in the next which may end up in a polymer, pesticide, biocide, mask or disinfectant or a drug. About 70% of industrial chemicals are used to make some other chemicals and materials and are never sold off the shelf in general market. The public does not know it. Because of ban on Chinese imports the Chemical and Allied Industries, whether intermediates, API, drugs, agrochemicals, and the like, will have great future. Of course, the processes and products must be manufactured by using green chemistry and engineering; plants must be safer and smarter. After the reopening of industries after the lockdown, about a dozen accidents took place in the chemical and pharmaceutical industries. Therefore chemical safety and risk management, worker training and loss prevention must be strictly followed. The Chemical Industry will be a major contributor to the India's dream of a 5 trillion dollar economy by 2024. I am sure Indian Industry will rise to the occasion.

We will have to live with COVID 19 for some time to come; the challenges and opportunities it has provided to scientists and engineers, economists, strategists, media, academia, governments and all sorts of industries are too many to enumerate. Since humans are so ingenious, I hope that in another couple of years we would have forgotten these difficult days. A new lifestyle will be a routine. Be prepared. New life will pervade in all sectors whether you like it or not. Social distancing has come and also virtual closeness. Hugging is gone but not love and respect. Handshake is gone but not NAMASTE !!

Namaste.

CHEMICAL Warta

The story behind Hydroxychloroquine

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It's probably safe to assume that the polysyllabic word hydroxychloroquine is more familiar to people than most other drugs these days, thanks to its recent connection with COVID-19. India produces this drug in more quantities compared to other countries, about 70% of the world requirement. Private players like Ipca Laboratories, Zydus Cadila, Wallace Pharmaceuticals and Cipla are top pharma companies manufacturing hydroxychloroquine in India, having a production capacity of nearly 500 T per annum. In social media, I have seen people connect it with Acharya Prafulla Chandra Ray, the father of modern chemistry in India. We know Acharya PC Ray founded the Bengal Chemicals and Pharmaceuticals Limited that was producing and marketing chloroquine phosphate and not hydroxychloroquine till recent times, as a drug to cure the mosquito-borne disease, malaria.

Malaria is a disease of very ancient origin, perhaps from the time human beings are co-habitating with mosquitoes, following developing human settlements in good concentrations after mastering agriculture. The symptoms of the disease are very high fever with vigourous shivering, cold hands and feet before the fever, and repeating the cycle at precise regular intervals, generally multiples of 24 hours. There have been several occasions when malaria accounted for hundreds of thousands of deaths, killing men and women in several entire villages making those resemble ghost burial grounds.

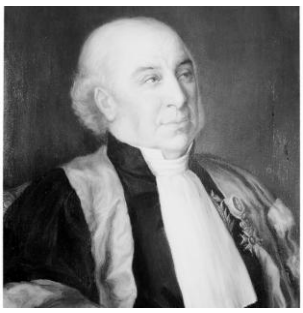
Fever Tree (*Cinchona officinalis*)

The word malaria has its origin in medieval Italian as *mala aria* meaning 'bad air'. Not just the Indian subcontinent and Africa that have been its primary area of infection but also the whole of Europe used to suffer from this dreadful disease earlier. In medieval time, the favourite treatment in Europe was bloodletting, i.e., cutting a principle artery to let blood go out. Physicians believe that worsening of blood quality was the cause of every disease and so letting a part of it go could cure the disease. No wonder that most of the patients didn't survive if they had a vector-borne disease like malaria.

After Columbus found America in his search for a naval route to India, the Europeans colonized it quickly. In order to bless the locals with Christianism, Spanish Jesuit missionaries discovered a peculiar habit of some Peruvian tribes: whenever they shiver in cold, they grind dried bark of a particular plant, mix it with a sweetened beverage and drink the liquor. It tasted horribly bitter, but the priests still brought home some of its seedlings to plant in Spain and other places. For a long time the plants thus grown had no application as they grew up unused.

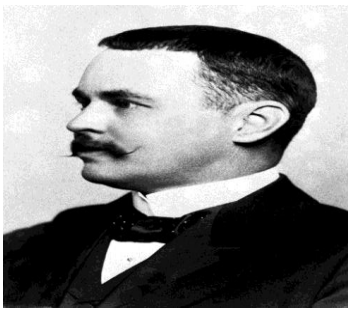
In 17th century Rome, after some priests got infected with malaria and started shivering, they were suddenly reminded of the findings of their predecessors' accounts in the New World. They tried the dried Jesuit barks of the grown-up plants and thankfully recovered from malaria. Slowly the barks became accepted as a medical remedy for treating malaria. Following the local name of the plant in Peru, it was christened cinchona, meaning 'the divine bark'. Another couple of centuries later, in 1820, two French chemists, Pierre Joseph Pelletier and Joseph Bienaimé Caventou extracted the active principle, quinine, from the barks of this *Cinchona officinalis*.

P. J. Pelletier



J. B. Caventou

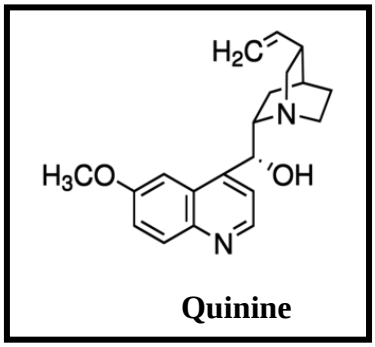
Towards the end of that century, in 1880, Charles Louis Alphonse Laveran, a French army doctor working in a military hospital in Algeria, first observed parasites inside the red blood cells of infected people and proposed the parasite to be responsible for the disease. Later in 1897, British army surgeon Ronals Ross researched heavily – bulk of it in Presidency General Hospital (presently known as IPGMER and SSKM Hospital) in colonial Calcutta – on the mosquitoes that were likely to have spread the disease by biting prospective victims. Under the microscope he discovered those single-celled parasites, *Plasmodium falciperum*, in the salivary gland of female anopheles mosquitoes and presented the complete life cycle of those parasites. It was a huge finding at that time and both Ross and Lavern were rewarded with Nobel Prizes in medicine and physiology in 1902 and 1907 respectively. Ross continued with his public health programs to control malaria in many countries in Africa and Middle East.



Ronald Ross

British Empire used to spend more than 50 million pounds every year to combat malaria sickness each year. For them, it was very important to secure the supply of the bark of cinchona. In 1860, a British expedition to South America led by Clements Markham smuggled back cinchona seeds and plants, which were introduced in several

areas of British India and Sri Lanka. In India it was planted in Ooty in the Nilgiris and later extended into the hilly terrain of Darjeeling in Bengal. Cinchona factories were established at Naduvattam in the Nilgiris and at Mungpoo in Darjeeling.



Quinine

Quinine being the only medicine available to cure the dreadful malaria, there was a mad rush in its chemical synthesis in all chemical laboratories across the world. It was not simple, though, and most of the initial attempts were met with failures. On an Easter break, the German professor August Wilhelm von Hoffmann of the Royal College of Chemistry, London visited his own country after giving a written instruction to his British research student, William Henry Parkin on a possible chemical route to synthesize quinine. He expected that Parkin would try it and from the preliminary findings they would advance the attempts further after he was back from his vacation.

Parkin did try the synthetic route, but instead of quinine, his first reaction yielded a beautiful purple-colured compound that he named mauveine. He was very inquisitive and wanted to explore whether cotton clothes could be dyed with this compound. He sent a sample to a textile mill who gave a very positive feedback. On his elder brother's advice, Parkin dropped the idea of furthering his research career with Professor Hoffmann, applied for a patent of his invention, borrowed money from his father and together with his brother set up a small factory to produce mauveine, the first synthetic dye ever discovered. Before mauveine, clothes could be coloured with only a select few dyes extracted from natural sources, like indigo for blue and madder for red. You may recall the infamous indigo revolution triggered by British tyranny on Indian farmers forcing the latter to grow indigo.

It took almost another century to synthetically produce quinine in a laboratory, achieved eventually successfully in 1944 by the American organic chemist 27-year old Bob Woodword and his 26-year old post-doc Bill Doering. It was a long multistep process perfected by Bill but the concept was certainly Bob's. Bill used to joke that Bob was good enough perhaps to boil water but it would be a tough task for him to make boiled eggs. Woodwords, however, later established himself as one of the all time great synthetic organic chemists through his contribution behind chemical syntheses of many natural products including vitamin B12 and got the Nobel Prize in Chemistry in 1965.

While colonizing the tropical countries in Africa, the Indian subcontinent and the south-east Asia, European soldiers used to get infected with malaria and die in thousands. They needed cinchona in large quantities, the demand of which was met by cutting the cinchona trees of Peru in bulk and exporting its seeds and seedlings out of Peru. It led to mass deforestation in Peru forcing its government to ban its export. However, smuggling remained a problem for long. In 1852, a Dutch smuggler got hold of a few sackful of the magic seedling by bribing a local official and was knighted by

Holland for his action. The seedlings were planted in their south-east Asian colony of Java, but it yielded very poor quinine. It was a different species of cinchona but they thought the plant won't produce enough cinchona outside South America.

In 1861, another Australian smuggled another few sackfuls of cinchona seedlings out of Bolivia by bribing their government official, Manuel Incra. Manuel was caught and was awarded capital punishment, that too with severe cruelty, in order to prevent smuggling. The Australian smuggler, however, was finding it difficult to sell his stocks. Most European traders refused to buy, thinking it won't work. His last hope was with the Dutch but they had already burnt fingers with the smuggled seedlings. With a lot of persuasion, he managed to sell those sackful of seedlings at a mere twenty dollars.

It turned out to be one of the most remarkable profit-making investments in the world. Those seedlings planted again in Java were genuine and in the year 1930, the Dutch sold cinchona bark worth 22 million pound sterling, accounting for nearly 97% of the world demand of quinine. Soon in the forthcoming WWII, the soldiers of the allied forced faced a huge problem of malaria when Germans defeated the Dutch and Japan occupied bulk of the south-asian archipelago. Faced with acute shortage of supply they tried planting some seedlings in Phillipins and Costa Rica but were unsuccessful. At this crucial juncture the laboratory synthesis of quinine made Woodword-Doering national heroes.

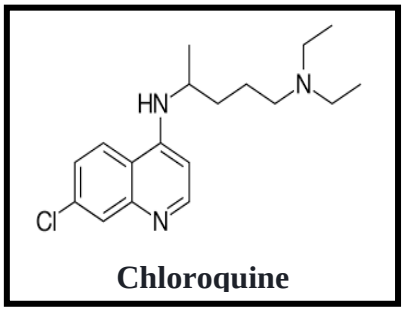
India used to suffer from malaria from time immemorial. In the fourth Anglo-Mysore war of 1799, Tipu Sultan of Mysore was beaten by the British army and his country was annexed by the British. Their soldiers were celebrating in their camps in Srirangapattanam which was marshy and therefore natural breeding grounds of mosquitoes. Feeling unsafe, they shifted their army base away from Srirangapattanam to Bangalore, then a sleepy town with not many inhabitants. Although the climate of Bangalore was fantastic, it also had its share of several lakes where mosquitoes could breed happily.

Quinine became a familiar medicine by then. East India Company used to bring it from Europe and distributed among its army camps for regular use. The soldiers were instructed to mandatorily take those pills so that they could develop enough immunity to fight malaria. The bitter taste of quinine was, however, a big spoiler. The British food didn't include anything bitter and thus their palate could not tolerate the high bitterness of quinine. They used to throw up a lot while taking quinine and thus there was a natural tendency to avoid consuming the pills somehow, by throwing them away when others were not watching. Seniors noticed it and realized something needed to be done in order to make this abhorrent drug palatable. Their dieticians experimented by mixing quinine with several other foods and eventually noticed that the best diluent of the taste was the liquor made by fermenting Juniper berry. Alcohol made from fermented Juniper berry was called Gin and the drink produced by mixing quinine with it was named 'Gin and Tonic'. It became a regular drink for British

soldiers to consume. Quinine thus became connected with the word tonic. If you visit a restaurant in the west and ask for drinking water, the waiter would ask whether he would serve still water, sparkling water or tonic water. Still water is normal drinking water as we Indians consume it, sparkling water is soda, i.e., mixed with pressurized carbon dioxide and tonic water is the one mixed with a little quinine.

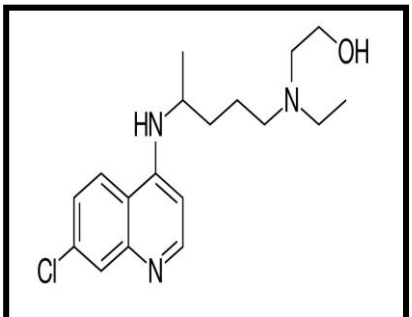
British soldiers were brave and they could risk their lives in the battlefield, but however much you try, you can't feed them with quinine without mixing with Gin. Thus, the monthly ration that they received must include some bottles of Gin and tonic water, so that they could mix themselves to prepare the drink. This required for them to plan either to import a huge supply of Gin – and other alcoholic drinks as required by the army – or, better, to produce it locally. In a short period of time a large number of breweries and distilleries sprang up in and around Bangalore. Other British army camps started getting their supplies from Bangalore which became the pub capital of India. Five of the small units viz., Castle Brewery, Nilgiris Breweries, Bangalore Brewing Co., British Brewing Corp. and BBB Brewery were merged to found United Breweries, which, after India's independence was bought and headed by Vittal Mallya, the father of Vijay Mallya.

In 1934, the German company Bayer AG produced chloroquine, discovered by its scientist by Hans Andersag, and named it Resochin. It was lying unused for nearly a decade, fearing it would be toxic to human beings. People started using another derivative, 3-methy chloroquine instead, produced by another German concern Dak who named it Sontochin. During WWII, the allied force got handle of this Sontochin and Resochin and sent to the USA for human clinicals. When the safety and efficacy of chloroquine was proven in 1947, doctors across the world started prescribing it for malaria. The other derivative, hydroxychloroquine was synthesised by Sterling-Winthorp Research Institute in 1950 by Alexander R Surrey and Henry F Hammer and got the medical clearance in 1955.



Chloroquine

Quinine (Q), chloroquine (CQ) and hydroxychloroquine (HCQ) are all quinoline derivatives, all of them having a long side-chain in the 4-position (para to the N). In addition, Q has a methoxy group at 6-position while the other two have a chloro at 7-position. The side chains in Q and the other two are not the same. In HCQ, the side chain has an extra primary alcoholic hydroxy compared to that of CQ. Besides malaria, these, especially HCQ has been reported to be useful in treating lupus, in patients with an autoimmune coagulopathy, in patients with rheumatoid arthritis as well as those with a low-level inflammatory arthropathy. The mechanism of action is at the most speculative. It's known to find its way through to the lysozymes, get



Hydroxychloroquine

concentrated, stabilize its membrane and increase its pH leading to modulation of action of certain pH-sensitive enzymes. Overdose of all three of these could be seriously toxic.

Hydroxychloroquine came in recent news because of a request from the USA President to the Indian Prime Minister to help procure the medicine in a sizeable quantity from India to control COVID-19. It was hypothesized that together with zinc ion, prophylactic hydroxychloroquine which is also a zinc ionophore could help combat the novel coronavirus through an 'open and shoot' mechanism (HCQ to open the gate of the lipid membrane of infected cells and zinc to shoot down the virus). This hypothesis was neither proved nor disproved and human trials were supposedly ongoing at many places. Meanwhile two articles were published in two of the best medical journals – Lancet and New England Journal of Medicine – claiming hydroxychloroquine as totally ineffective, after analyzing data allegedly received from 1200 hospitals across the globe. Based on this finding, WHO stopped trials on HCQ. Both the articles were later retracted and newspaper columns were flooded alleging both the articles to be completely fake and the authors to have vested interests. Thus HCQ has not yet lost its relevance with COVID-19.

Acharya P. C. Ray devoted his entire life to encourage fellow Indians to engage in business enterprises and to fight with imported goods to become self-sufficient. In 1892, he founded the Bengal Chemicals and Pharmaceuticals Limited (BCPL), the first pharmaceutical company of India. Many of its products were his own personal formula – *aqua ptychotis*, naphthalene balls, phenyle disinfectants, bleaching powders, aguru fragrant fresheners etc. However he was not connected with hydroxychloroquine *per se*, having expired in 1944, about 6 years before its first synthesis and 11 years before it was cleared for medical prescription. Till April, 2020 BCPL was manufacturing only chloroquine phosphate among the three Qs, as a malarial drug. With rising awareness about the possible role of HCQ in combating COVID-19, it applied for and received necessary clearances for manufacturing hydroxychloroquine and is prepared to supply the drug, should the need arise.

(This article is written as a popular science article. All pictures are taken from Google image)

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Meet Our Honorary Editor of –

Journal of Indian Chemical Society

Physical & Industrial Chemistry Section

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Scientific Officer
Head, Molecular Photochemistry Section
Radiation & Photochemistry Division
Bhabha Atomic Research Centre, Mumbai, India &
Professor, Homi Bhabha National Institute (HBNI), Mumbai-94

Email: bhasikuttan@gmail.com

Dr. Achikanath C. Bhasikuttan obtained his Ph.D. from the University of Mumbai in 1998 he joined as a JSPS postdoctoral fellow at Osaka University, Japan, 1999-2001. His research interests include the excited state molecular dynamics and to probe the intricacies of non-covalent interactions in supra-biomolecular systems, femtosecond absorption & emission spectroscopy, electron transfer & proton transfer reactions, single molecule spectroscopy and radiation chemistry. He is a recipient of Scientific & Technical Excellence Award -2009 from Department of Atomic Energy (DAE), Govt of India, Bronze medal from Chemical Research Society of India-2014 and the prestigious Homi Bhabha Science & Technology Award-2014 from DAE, Govt of India. Recently he has been bestowed with the Prof. S. C. Ameta Award-2016 from the Indian Chemical Society for his contribution in photochemical sciences. Recognizing his contribution internationally, he has been awarded the Japanese Photochemistry Association Lectureship Award for Asian and Oceanian Photochemist 2017 by the Japanese Photochemistry Association. He is a 'Fellow of the Maharashtra Academy of Sciences' (FMASc,), the 'Fellow of the National Academy of Sciences, (FNASc), India, 'Fellow of The Indian Chemical Society, (FICS) in 2018. He has taken the charge of Honorary Editor of **Journal of the Indian Chemical Society (Physical & Industrial Chemistry Section)** for the period of 2020-2022.

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Meet Our Honorary Editor of –

Journal of Indian Chemical Society

Inorganic & Analytical Chemistry Section

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- **Prof. Sundargopal Ghosh** obtained his B.Sc. and M.Sc. from University of Calcutta. He then received his PhD from Indian Institute of Technology Bombay in 1998. Following a postdoctoral fellowship with Professor Thomas P. Fehlner at the University of Notre Dame, USA, where he developed a new synthetic route to hypoelectronic metallaborane clusters. He joined the Department of Chemistry at Indian Institute of Technology Madras in 2005 where he is currently a Professor. His research interests lie in the area of transition metal-boron compounds and their application in catalysis and small molecule activation. Professor Ghosh has achieved several awards and honors. He is the recipient of 'Alexander von Humboldt Fellowship 2007', 'CRSI Bronze Medal 2013', 'Institute Research & Development Awards 2013. He was selected as 'Authors of High-Quality Research in ACS Journals 2013', and awarded Professor Priyadaranjan Ray Memorial Award, 2019 by Indian Chemical Society. He was elected as the 'Fellow of Indian Academy of Sciences (FASc) 2017', 'Fellow of National Academy of Sciences (FNASc) 2017', 'Fellow of The Indian Chemical Society (FICS) 2019'. He is working as the Editorial board member of Organometallics (ACS) from 2018 onwards and Associate Editor of Inorganica Chimica Acta from 2020. He has taken the charge as the **Honorary Editor of Journal of the Indian Chemical Society (Inorganic & Analytical Chemistry Section)** for the period of 2020-2022.

CHEMICAL Warta

Meet Our Honorary Editor of –

Journal of Indian Chemical Society

Organic and Biochemistry Section

Prof. Chhanda Mukhopadhyay
Professor and Head
Department of Chemistry
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Email: cmukhop@yahoo.co.in

After graduating in 1982 and masters in 1984 from University of Calcutta, **Prof. Chhanda Mukhopadhyay** did her research work on 'Bridged Ring and Condensed Cyclic Systems' at IACS Kolkata, and awarded PhD from Jadavpur University, Kolkata in 1991. She then did her post doctoral research at Bose Institute, Kolkata (1992-94) and then moved to M.D. Anderson Cancer Centre, University of Texas, USA (1998-2000) to do further research on 'Polycyclic aromatic compounds as anticancer agents'. In her professional carrier, she first worked as a faculty of chemistry at St. Paul's C. M. College, Kolkata (1994-2005). She joined Calcutta University as Reader in October 2005. Now she is serving the department as the professor and HOD. Her wide spread research area includes – 'organic synthesis with special emphasis on nitrogen containing heterocycles', 'green chemistry', 'heterogeneous catalysis', 'host-guest chemistry focusing on the formation of pseudorotaxanes', 'application of nano-catalysts towards organic transformations', 'multicomponent reactions', 'calixarene chemistry', 'fluorescence sensors etc. She is the recipient of 'Professor R. S. Varma Memorial Award, by the Indian Chemical Society (2015)', Bronze Medal Award, Chemical Research Society of India (CRSI) (2015)', 'Gold medal by the University of Calcutta for standing first in the first class at the M.Sc. Examination in Chemistry, (1984)', 'Awarded by the University of Calcutta for standing first in the first class at the B.Sc. Examination in Chemistry, (1982)', 'Cunningham Memorial Prize, and 'Acharya P.C. Ray Memorial Prize' by Presidency College, Kolkata (1982) for securing the highest marks in Chemistry. He was elected as the 'Fellow of The Indian Chemical Society' (FICS) in 2001. She has taken the charge of **Honorary Editor of Journal of the Indian Chemical Society (Organic and Biochemistry Section)** for the period of 2020-2022.

CHEMICAL Warta

Meet Our International Editor of – Journal of Indian Chemical Society

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Prof. Takashiro AKITSU, Ph.D. is a full Professor for the Department of Chemistry, Faculty of Science Division II at Tokyo University of Science. He completed his undergraduate school training (chemistry) from Osaka University, Japan in 1995, and completed graduated with PhD in physical & inorganic chemistry, especially coordination, crystal, and bioinorganic chemistry from Osaka University in 2000. After his PhD he joined Institute for Protein Research, Osaka University, Postdoctoral Researcher (2000-02), and then he joined the Keio University as Research Associate (2002-07). From 2007-08 he worked as a Visiting Scholar at Stanford University, and also served Keio University as an Assistant professor of Chemistry in this same period (2007-08). In 2008 Dr. AKITSU joined the Faculty of Science, Tokyo University of Science as Junior Associate Professor and from 2016 he is working there as a full professor. His research interest is on 'Absorption of light by chiral metal complexes and their hybrid materials', Schiff base complexes and bio-fuel. He got 'Publons Peer Review Awards 2018', 'PROFESSOR OF THE YEAR' under the Biomedical Sciences and Engineering Discipline (Specialisation: Biomaterials) 2018', Dr. Radhakanta Kajal Sen Award 2017'. He is now working with Indian Chemical Society as the **International Editor** of **'Journal of the Indian Chemical Society'.**

CHEMICAL Warta

Meet Our International Editor of – Journal of Indian Chemical Society

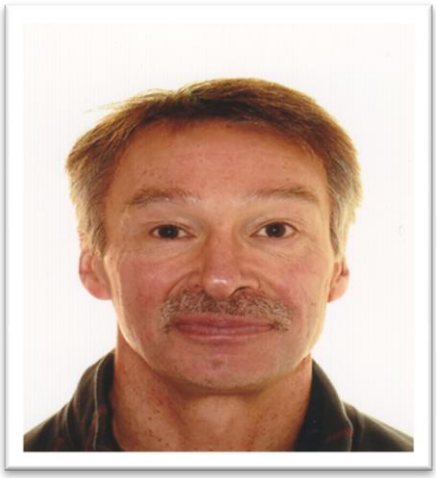
Prof. Bimal K. Banik
Professor and Senior Researcher
Dept. of Mathematics and Natural Sciences
College of Sciences and Human Studies
Deanship of Research Development
Prince Mohammad Bin Fahd University
Al Khobar 31952, Kingdom of Saudi Arabia
Email: bimalbanik10@gmail.com

After completing M.Sc (Chemistry) from The University of Burdwan, **Prof. B. K. Banik** obtained his Ph. D. in Chemistry from Jadavpur University (1987) based upon his research performed at Indian Association for the Cultivation of Science on Total synthesis of terpenoids and alkaloids. He conducted postdoctoral research at Case Western Reserve University and Stevens Institute of Technology (1987-1989). Within a year, he accepted an offer for a teaching and research postdoctoral position at Stevens Institute of Technology (SIT), Hoboken, New Jersey in 1990 and promoted to Research Assistant Professor in 1994 at SIT. Professor Banik joined at the University of Texas, M. D. Anderson Cancer Center, Houston, Texas in 1995 and joined the University of Texas-Pan American (UTPA) in 2004 where he became Tenured Full Professor of Chemistry and the university's first President's Endowed Professor in 2007. He was also the Vice President of Research & Education Development of the Community Health Systems of South Texas. At present, he is a Full Professor of Prince Mohammad Bin Fahd University, Kingdom of Saudi Arabia. He chaired a session at the NOBEL PRIZE RESEARCH CELEBRATION MEETING in Nurenberg, Germany, 2008. He is a FRSC and CChem of the Royal Society of Chemistry, UK. He is also a Fellow of the Indian Chemical Society (FICS). He got the **Life time achievement award -2018**, from Indian Chemical society in its 55th Annual Convention. He is now working with Indian Chemical Society as the **International Editor** of **'Journal of the Indian Chemical Society'.**

CHEMICAL Warta

Meet Our International Editor of – Journal of Indian Chemical Society

Prof. Ebbe Nordlander
Professor of Inorganic Chemistry
Division of Chemical Physics
Lund University, Sweden
Email: ebbe.nordlander@chemphys.lu.se



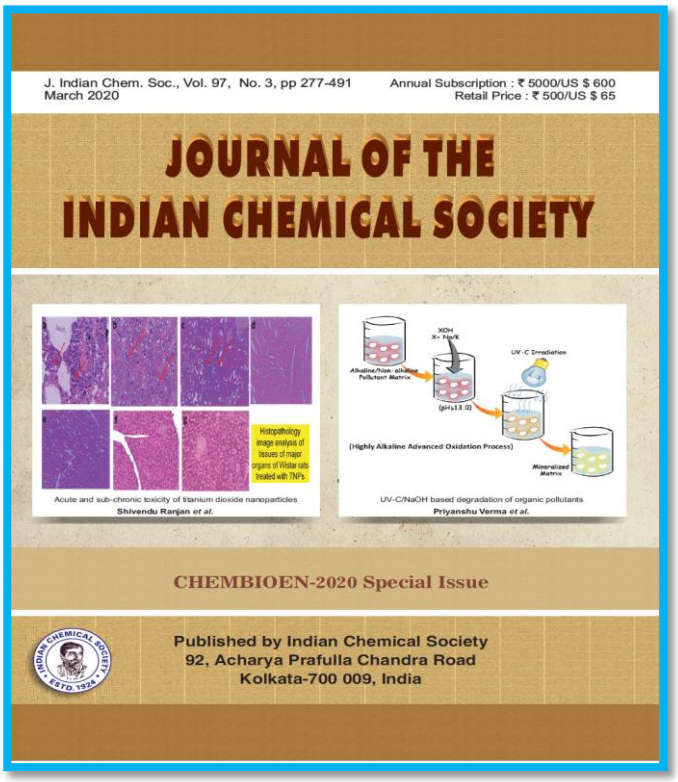
Prof. Ebbe Nordlander was born in Uppsala, Sweden, received his BSc in Chemistry from Beloit College, Wisconsin, USA, in 1986 and carried out his postgraduate studies at Cambridge University under the supervision of Brian F. G. Johnson and Jack Lewis. After obtaining his PhD degree in 1990, he carried out postdoctoral research for two years with Richard H. Holm at Harvard University. In 1992, he took up a position at Lund University, Sweden, where he is now a Professor in Inorganic Chemistry. His research interests concern both bioinorganic (bio-coordination) chemistry and organometallic chemistry, with a focus on catalysis. In 2008, Professor Nordlander was awarded a Swedish South Asian Studies Network (SASNET) planning grant, and has been involved in research collaboration with SASNET (India and Bangladesh) since many years. Prof. Nordlander is the 'Member of the Royal Physiographical Society' (Kungl.Fysiografiska Sällskapet, www.fysiografen.se); Secretary of the Chemical Society of Lund (Kemiska Föreningen i Lund), 1995-96; Treasurer, 1997-99; member of the governing board, 1999-2000. He is the Member of the establishing board of the Society of Biological Inorganic Chemistry (SBIC); Secretary of SBIC and member of the Society's Governing Council, 1997-99. Prof. Nordlander is the Member of the Editoral Advisory Boards for 'Dalton Transactions', 'Bioinorganic Chemistry and Applications', 'International Journal of Molecular Science', 'The Open Inorganic Chemistry Journal'. He was the Guest Editor of 'European Journal of Inorganic Chemistry', and 'Chemical Communications'. He is now working with Indian Chemical Society as the **International Editor** of **'Journal of the Indian Chemical Society'**.

CHEMICAL Warta

About J. Indian Chem. Soc. Vol. 97, Issue: March – August, 2020

Special Issue on CHEMBIOEN 2020, March 2020
J. Indian Chem. Soc, Vol. 97, Issue 3

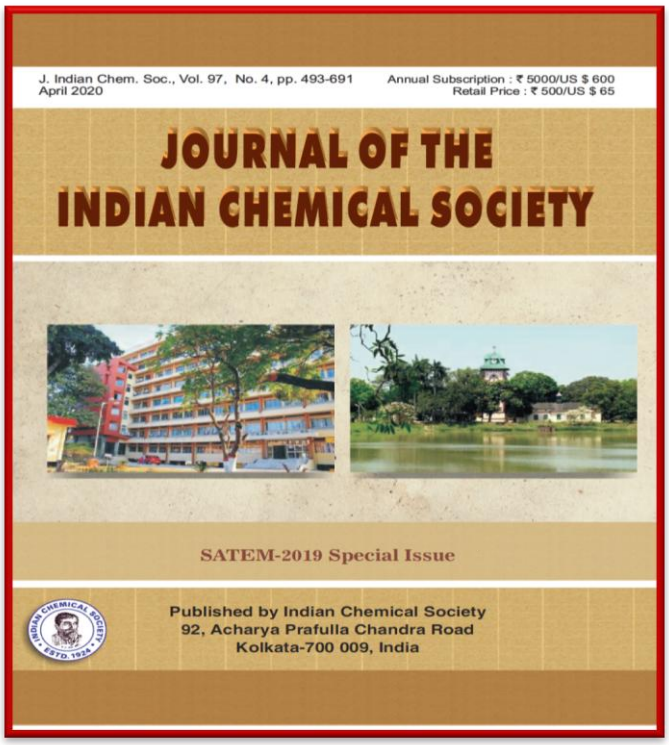
The special issue of JICS, March, 2020 published 35 selected articles delivered in an International Conference of **CHEMBIOEN 2020** organized by Dr. B R Ambedkar National Institute of Technology Jalandhar in association with the Indian Chemical Society, Kolkata. **The Guest Editors** of this special issue were **Dr. Shivendu Ranjan, Editor (Guest), JICS; Dr. Shishir Sinha,** *Indian Institute of Technology Roorkee, Roorkee*; **Dr. J K Ratan, Dr. Sangeeta Garg** from *NIT Jalandhar*, and **Dr. Priyanshu Verma Bansal,** *Institute of Engineering and Technology (BIET), Lucknow*. All the articles published in this issue are available (***open access***) in the Society website ***www.indianchemicalsociety.com.***



This Special Issue highlights the scaling up perspective of post harvested agri-food products and also discusses optimized process design for pharmaceutical waste management. The cutting-edge research of nano(bio)technology has also been discussed which includes the thermo-physical properties, toxicology, and environmental applications. This issue also discussed the energy perspective of the chemical engineers in terms of the impact of different fuels in different fire compartments and chemical engineers kept their views on ceramic membrane for treating oily waste. The environmental and biotechnological perspectives of removal of hazardous medical waste as well as biosorption of heavy metals were also discussed. In a nutshell this Special Issue of CHEMBIOEN 2020 is a common and interdisciplinary viewpoint of bio-engineers, chemical engineers and environmental engineers.

Special Issue on SATEM-2019, April 2020
J. Indian Chem. Soc, Vol. 97, Issue 4

The special issue of JICS, April, 2020 has published 27 selected and peer-reviewed full-length research papers as a part of International Conference organized by the Sustainable Advanced Technologies for Environmental Management (SATEM 2019) during December (18 – 20), 2019 in the Indian Institute of Engineering Science & Technology Shibpur, Howrah, West Bengal. **The Guest Editors** of this special issue were **Prof. Debabrata Mazumder, Dr. Chanchal Majumder, and Dr. Asok Adak**, *Indian Institute of Engineering Science & Technology (IIEST) Shibpur, Howrah, West Bengal*. Out of total number of 75 Extended Abstracts 40 were selected for full length paper. This issue is available (***open access***) in the Society website ***www.indianchemicalsociety.com***



Abatement of environmental pollution presently poses a serious concern to the scientists, engineers and policy makers. In view of exponential fall in environmental quality due to abundant use of nonrenewable resources, the civilization is now in a verge of crisis around the world. With a view to address these issues, a variety of advanced technologies have been innovated; but most of them are not compatible for simplistic application. It also becomes challenging to sustain a new technology for a long span due to dearth of expertise. Under this scenario, all the innovative technologies for environmental pollution control should be economically viable as well as sustainable.

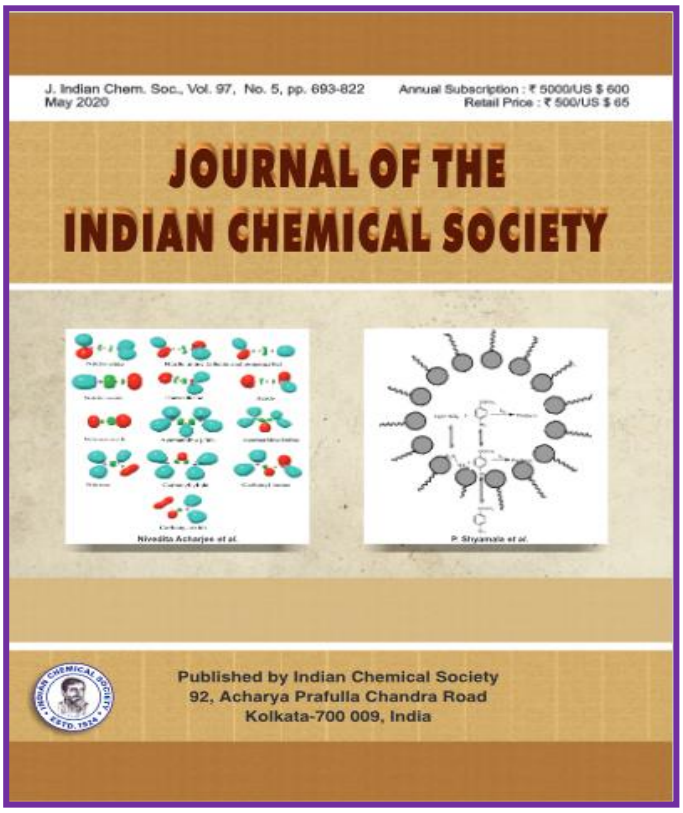
May Issue - 2020
J. Indian Chem. Soc, Vol. 97, Issue 5

May 2020 issue of the Journal of the Indian Chemical Society contains seventeen original research articles in five different sections containing one review article, one article in Inorganic Chemistry Section; five articles in Physical Chemistry

Section, five articles in Organic Chemistry Section; two in Analytical Chemistry and two in Environmental Chemistry Sections of total 130 pages.

Two cover page articles of this particular issue are Comparative DFT analysis of ELF topology and global properties of allyl and allenyl type three atom components (TACs) by Nivedita Acharjee et al from Department of Chemistry, Durgapur Government College, West Bengal and Effect of CTAB reverse micelles on the kinetics of aminolysis of p-nitrophenyl acetate by hydrazine by P. Shyamala et al from Department of PNCO, School of Chemistry, Andhra University, Visakhapatnam, Andhra Pradesh.

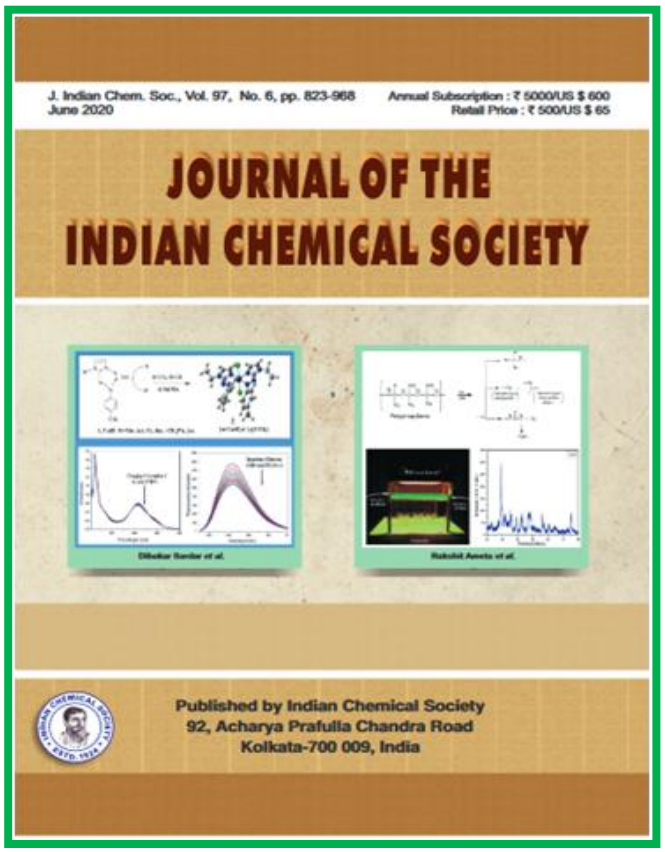
Ali Kemal Garip et al from Turkey, studied the influence of boron impurity for the adiabatic charging energies of thiol-ended thiophene:A DFT study. Nanik Siti Aminah et al from Indonesia, studied a work on β-Sistosterol and β-sitostenone from Eucalyptus deglupta. Vahid Najafi Moghaddam Gilani et al from Iran, evaluated the surface free energy and moisture susceptibility of modified asphalt mixtures with nano hydrated lime under saturated conditions with deicer materials and distilled water. Manish Banerjee from Uttar Pradesh, reported a review paper based on analytical challenges in estimation of precious metals (Ag, Au, Pd, Pt) across a wide range of samples. B. Anupama from Hyderabad, reported a comparative study for the detection of metal on by Schiff base. Harichandra A. Parbat et al from Mumbai, studied a kinetic approach to the oxidation of some primary perfumery alcohols using ammonium metavanadate in acidic medium. Joydeep Dutta et al from Haryana, reported the effect of degree of deacetylation and molecular weight on physicochemical properties of chitosan films. Nagendranath Mahata et al from West Bengal, reported a tuning of pore texture of carbon xerogels synthesized using resorcinol and paraformaldehyde as precursors. S. Manivannan et al from Chennai, reported a kinetics and mechanistic studyof oxidation of β-amino acid leucine by TCICA in aqueousacetic acid medium. K. M. Lokanatha Rai et al from Karnataka, reported the Synthesis, characterization,



antibacterial evaluation and molecular docking study of 4-{[4-(5-phenyl-1,3,4-oxadiazol-2-yl)phenoxy]methyl} benzonitrile derivatives. Anand S. Aswa et al from Maharashtra, reported a one pot synthesis of dexethylphenidate hydrochloride with chiral purity. R. Ranjith et al from Tamilnadu, reported the sulphide stress corrosion cracking of AA7050 hybrid composites. G. V. S. R. Pavan Kumar et al from Andhra Pradesh, reported withdrawal of Mn(II) from aqueous solution using low cost adsorbents: isothermal, kinetic and ANN modeling studies. Subhasish Das et al from Kolkata, reported the increasing threat on groundwater reserves due to seawater intrusion in Contai belt of West Bengal. P. Sanghamitra et al from IIEST, Shibpur, West Bengal, reported a study on aerobic biodegradation of oil and grease containing wastewater.

June Issue - 2020
J. Indian Chem. Soc, Vol. 97, Issue 6

June 2020 issue of the Journal of the Indian Chemical Society contains sixteen original research articles in different section e.g. four articles in Inorganic Chemistry Section; six articles in Physical Chemistry Section, four articles in Organic Chemistry Section; one each in Analytical Chemistry and Environmental Chemistry Sections of 146 pages.



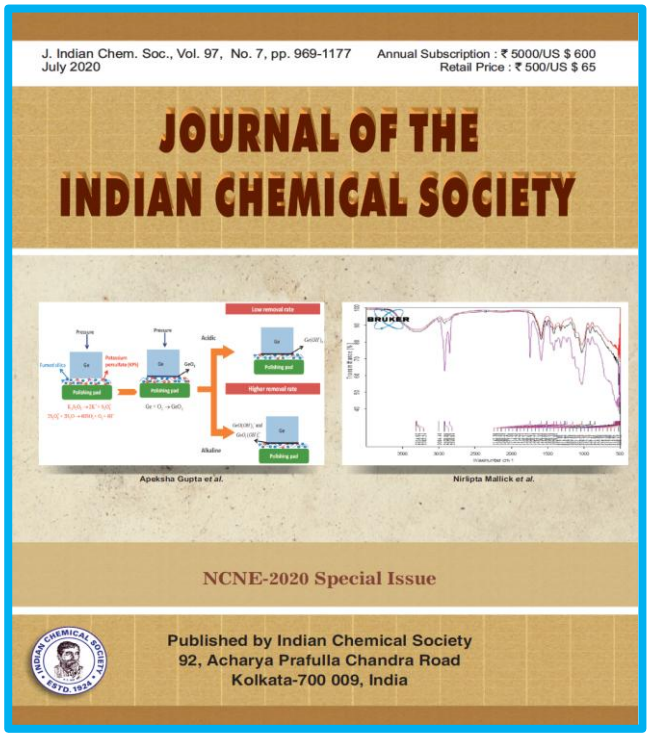
Two cover page articles of this particular issue are DNA binding study of Ir(III) complex by Dibakar Sardar et al from Department of Chemistry, Dinabandhu Andrews College, Garia, Kolkata and Photodegradation of polypropylene using CaO nanoparticles by Rakshit Ameta et al from Department of Chemistry, PAHER University, Udaipur, Rajasthan.

N. Feiziet et al from Iran reported the short-chain branching distribution in polyethylene by combined use of FTIR and TREF. Hassan Hassani et al from Iran, studied the synthesis, characterization and application of Fe3O4@SiO2@PrNH2-Cu

towards synthesis of β-amino ketones. Aparna Das et al from Prince Mohammad Bin Fahd University, KSA studied the Stereoselective synthesis of β-lactams under diverse conditions. Aswini Kalita from Assam reported the reactivity of enamine complex of Cu(II) towards breaking of C=C bond and formation of amide complex. R. N. Dutta Purkayastha et al from Tripura reported the synthesis and spectral characterization of fluoromangante (III), manganate (III) and fluorozincate (III) complex. Bhaskar Biswas et. al from North Bengal University, West Bengal reported synthesis, characterization and catalytic oxidative coupling of 2-aminophenol. Abhiram Hens et.al from West Bengal investigates the CFD based microfluidic thermophoresis. Somnath Nandi from Maharastra reported the study about hibiscus leaves extract towards green corrosion inhibitor. K. Bhargavi et al from Andhra Pradesh studied the effect of cetylammonium bromide micelles on decolouration of rosaniline hydrochloride byperiodate. Meena Sarma et.al from Jammu & Kashmir reported the Acoustical studies of nickel nanoparticles based nanofluids. Barnali Mandal et al from Kolkata reported the Pediocin production by Pediococcus acidilactici in fed batch fermentation using meat processing waste. Jitamanyu Chakrabarty et al from National Institute of Technology Durgapur, West Bengal, studied the frying and freezing effect on nutritional quality of major carps and potential contribution to human health from fatty acid signatures. Harish Kumar et al from Central University of Haryana, Sisra, Haryana, reported hexamine as anti-pit agent for mild steel in sulphuric acid medium.

Special Issue on NCNE -2020, July 2020
J. Indian Chem. Soc, Vol. 97, Issue 7

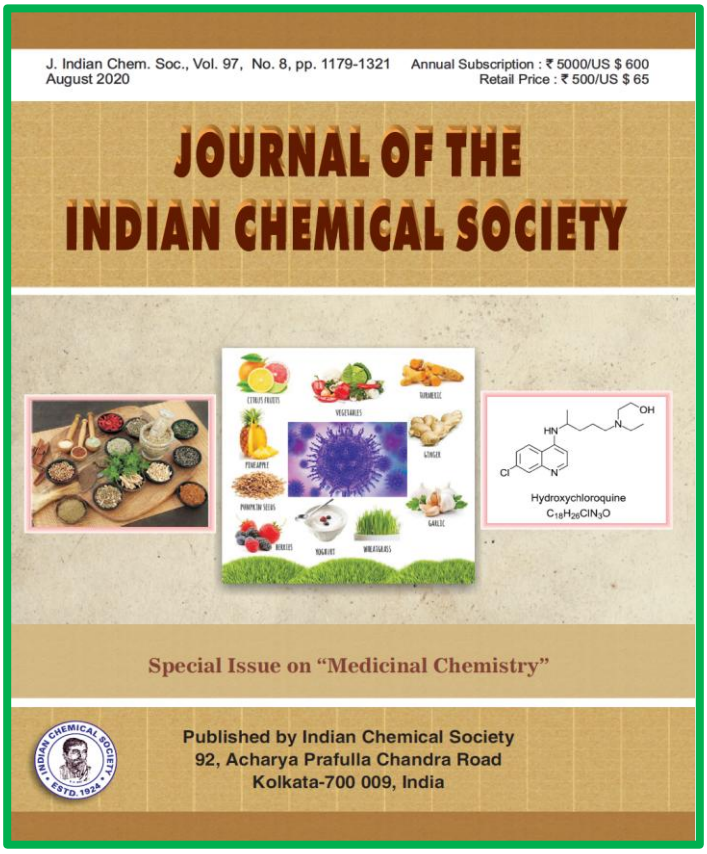
The special issue of JICS, July 2020 has published 39 original peer reviewed research articles out of 90 submitted manuscripts on the occasion of the National Conference on Nanotechnology & Environment (**NCNE 2020**) organised *by* National Institute of Technology Raipur, Chhattisgarh in association with the Indian Chemical Society, Kolkata. **The Guest Editors** of this special issue were **Dr. V K Singh, Dr. Dharm Pal, and Dr. R Manivannan,** *National Institute of*



Technology Raipur, Chhattisgarh. This issue is available (***open access***) in the Society website ***www.indianchemicalsociety.com***

Recent trends in engineering and technology for successful research/scale-up look forward for building-up of the 'Atmanirbhar Bharat'. This Special Issue highlights the cost-effective method of nanoparticle and nanocomposite synthesis and discusses the remedy to combat the environmental pollution issues. The cutting-edge research on nanomaterials, nano(bio)technology and thin film deposition have also been discussed which includes the thermo-physical properties, toxicology, and environmental applications. The environmental and biotechnological perspectives of removal of hazardous waste were also discussed. In a nutshell this Special Issue of NCNE-2020 is a common and interdisciplinary viewpoint of chemical engineers, bio-engineers, and environmental engineers.

Special Issue on Medicinal Chemistry, August 2020
J. Indian Chem. Soc, Vol. 97, Issue 8



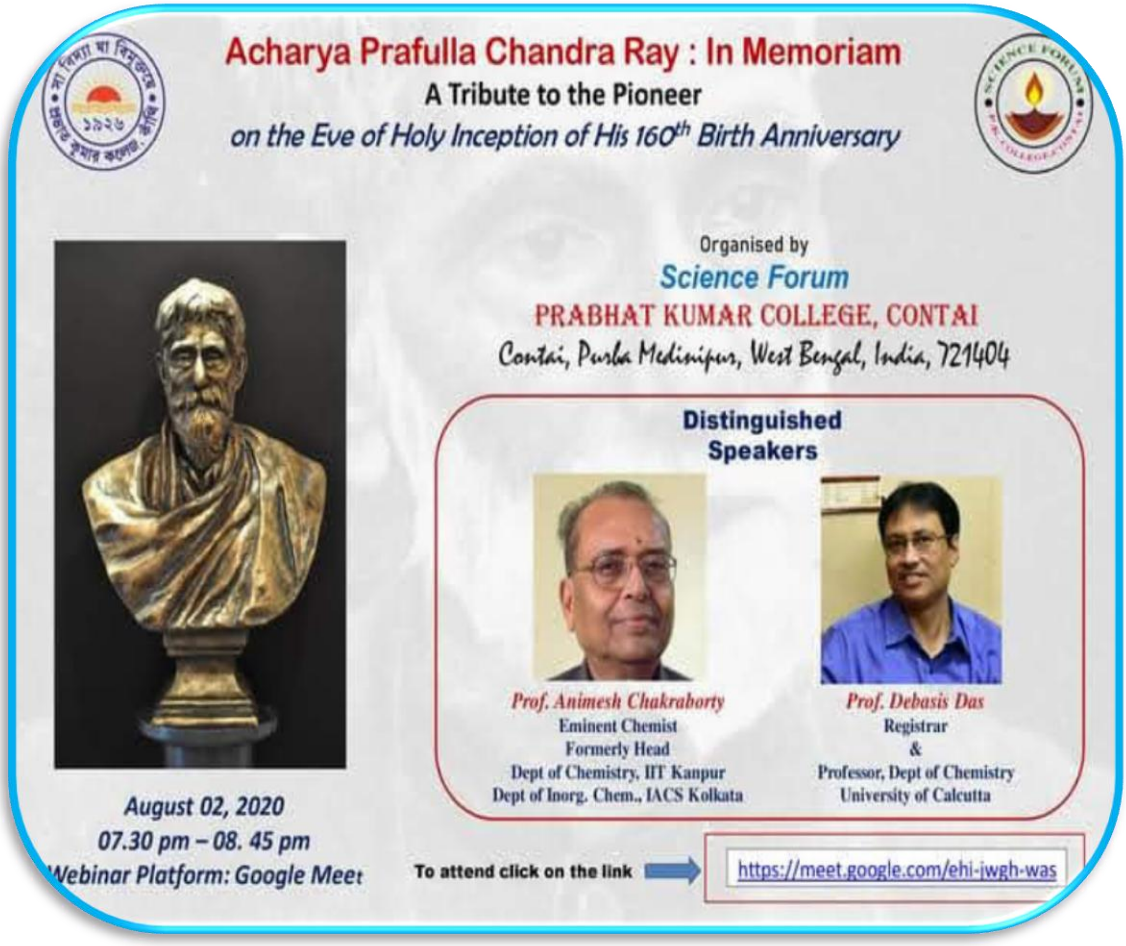
The special issue, containing 17 articles (August, 2020) on a theme of **Medicinal Chemistry** is an attempt to focus the research endeavours towards new drug discovery and development. **The Guest Editors** of this special issue were **Prof. Asit K. Chakraborti**, *Indian Institute of Technology Ropar, Ropar, Punjab*; **Prof. Debprasad Chattopadhyay**, *Director, ICMR-National Institute of Traditional Medicine, Belagavi, Karnataka*; and **Prof. Tapas K. Hazra**, *University of Texas Medical Branch, USA*. All the peer reviewed articles published in this issue are available (***open access***) in the Society website ***www.indianchemicalsociety.com***

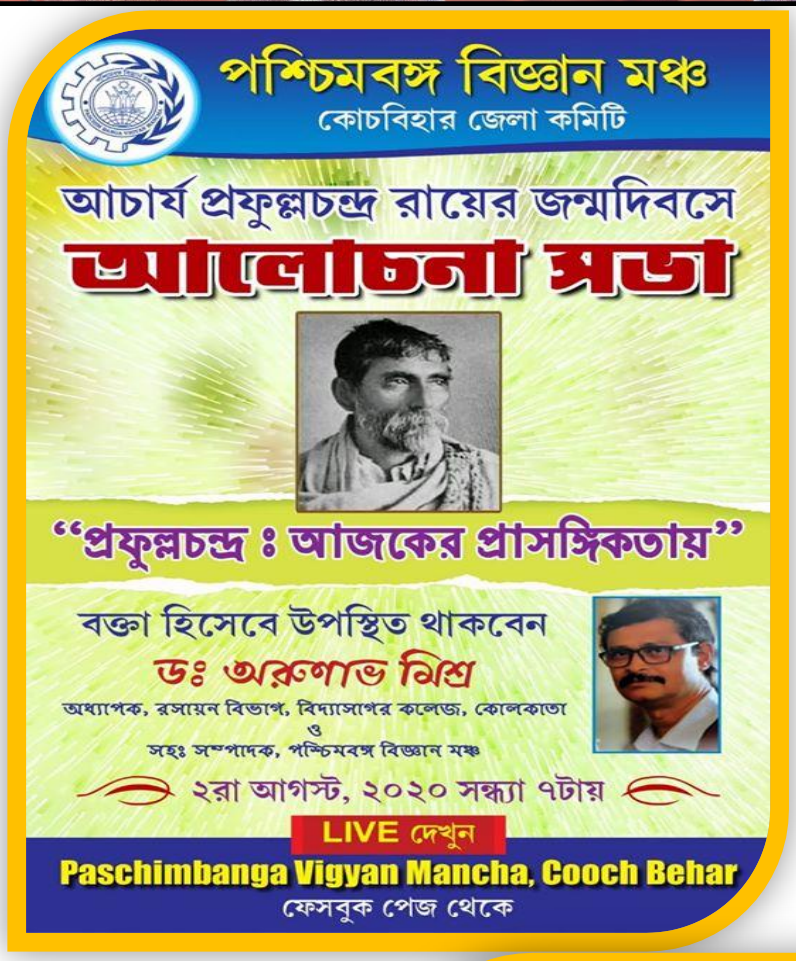
Chemistry underpins everything that the advancement of modern science is associated with. It plays the pivotal role in the health care system and particularly in the realm of pharmaceutical sciences. In drug discovery and development, chemistry

specifically organic synthesis holds the central stage. The advancement in chemical research is the key indicator of the economic growth and the societal development of any country. Chemical research has been one of the major strengths of our country that earned India the status of the pharmacy of the world. Acharya Prafulla Chandra Ray had been the doyen of chemical sciences in India showing it the path and strength of entrepreneurship that laid the foundation of the pharma sector in the country.

We believe that under the scenario of COVID-19 pandemic and realising the necessity of development of therapeutics to cope up such unprecedented adverse impact on the healthcare system the decision of the Indian Chemical Society to dedicate a special issue of the Journal of Indian Chemical Society on Medicinal Chemistry is the most fitting gesture to reflect the act and concern of Acharya Prafulla Chandra Ray under such a need of the hour.

Some Upcoming programmes on – APC Ray Birthday Celebration

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আলোচনা সভা
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২রা আগস্ট, ২০২০ সন্ধ্যা ৭টায়
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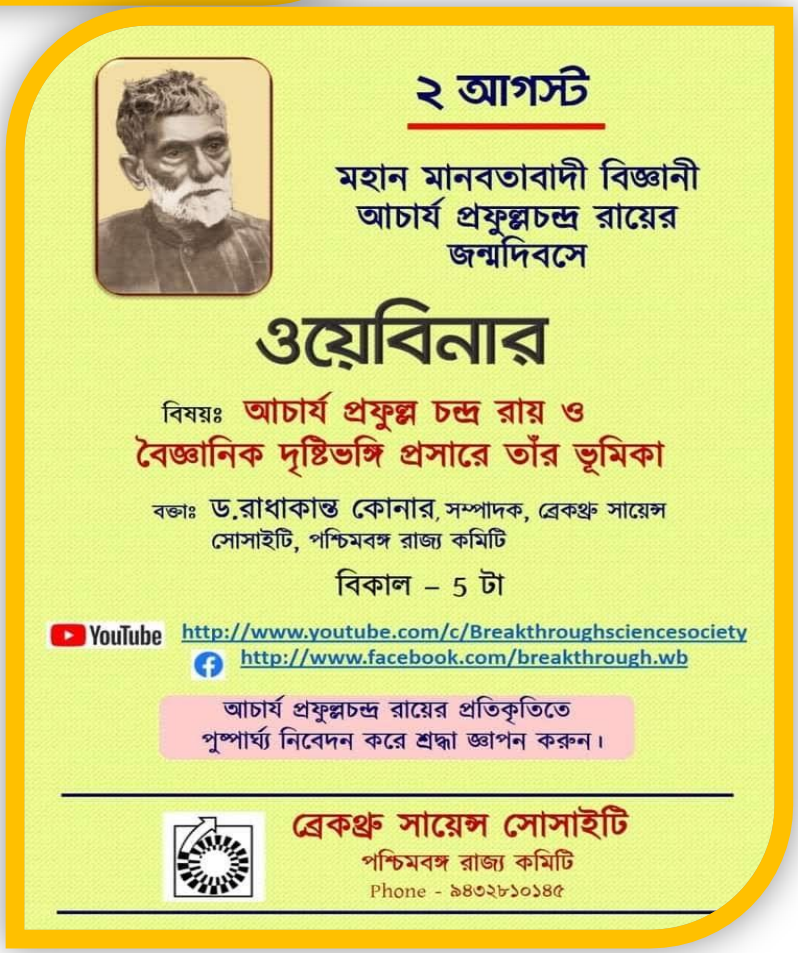
ফেসবুক পেজ থেকে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মহান মানবতাবাদী বিজ্ঞানী
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বক্তাঃ ড.রাধাকান্ত কোনার, সম্পাদক, ব্রেকথ্রু সায়েন্স
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ICS August Conference – 2020

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