A publication of the Association of Carbohydrate Chemists & Technologists (India)

CARBOHYDRATE NEWS LETTER

Issue 16 December 2015

Contents

FROM THE EDITOR'S DESK ...

I feel immense pleasure in bringing forward the 16th issue of Carbohydrate News Letter. I am grateful to the Association of Carbohydrate Chemists and Technologists of India (ACCTI) for munificent support and trust for giving me responsibility to publish CNL-2015. The ACCT(I), constituted in 1984, provides a great platform for bringing together the researchers working on diverse fields of carbohydrate chemistry ranging from chemical biology to catalysis and medicinal chemistry to material sciences.

You all are aware of the significance of natural products in our lives, out of which carbohydrates are the most abundant and important one. Their chemistry and biology are promising fields of interest since long back. The role of carbohydrates in several important biological processes including energy storage, transport, modulation of protein function, intercellular adhesion, malignant transformation, signal transduction, and viral and bacterial cell surface recognition, make this moiety a considerable and promising scaffold for development of molecules of great pharmacological interest. Moreover the readily availability, high functionality and chiral-pool character are some fascinating structural features which enhance synthetic utility of carbohydrates and its derivatives, mainly in asymmetric synthesis as chiral auxiliaries as well as chiral ligands. These amazing aspects have also developed carbohydrate moiety as potent scaffold for enantioselective organocatalysis. Some carbohydrate-based ionic liquids are proven efficient green alternatives of conventional solvents or catalysts.

In the present era of genomics, proteomics and glycomics, the exponential enrichment of possible therapeutic targets is placing an ever-demanding access to novel and diverse chemical libraries. Structural aspects of carbohydrates make this moiety efficiently able to form diverse linkages, substitutions, and branching patterns which has attracted generations of chemists towards harnessing these miraculous properties. Furthermore, the progressive researches made in biochemistry of carbohydrates have also accelerated the importance of the carbohydrates-chemistry.

By the efforts of carbohydrate chemists, a notable progress has been made in simplifying the oligosaccharide synthesis and efficient building of larger and more complex glycopeptide and glycoprotein architectures. In addition to the advancement in construction of oligosaccharides, chemists are also making strides in the ability to assemble glycopeptides and glycoproteins. These are important synthetic targets, not only from a basic research standpoint but also because they play essential biological roles.

Despite so many amazing structural and biological features of carbohydrate moiety, there is still lack of carbohydrate-based efficient drugs. This is because of our little knowledge in understanding fundamental glycobiology. Hence, exchange of ideas between synthetic glyco-chemists, glyco-biologists and representatives of pharmaceutical companies is need of our in order to “conjugate” the synthetic expertise with a deep knowledge of the biological targets and pharmacology.

Conclusively, the application of carbohydrates in different disciplines of science is growing. In this respect, the ACCTI Carbohydrate conference is a judicious effort to communicate the impact of carbohydrates in diverse fields and their extensive applicability. I along with the association am sanguine that maximum researchers will find their future in glycoscience as a challenging and worthwhile area to devote their time with. Thus, with this remark, I heartly welcome you all to be part of ACCTI.

With Best Wishes & New Year Greetings
Vinod K.Tiwari
Editor, Carbohydrate News Letter



Lucid Colloids Ltd.

Lucid in thought, Lucid in deed!

Lucid Colloids Ltd. is a premier producer of Guar and other hydrocolloids for 38 years with a 58-year knowledge database inherited from its parent company Indian Gum Industries Ltd (IGI). We also manufacture Water soluble dietary fiber (from Guar Gum) in our other company called Taiyo Lucid Pvt. Ltd.

Lucid today serves various industries with products and services such as Food, pet-food, nutritional products and pharmaceuticals, Personal care products, Household products, Paints and Building and Construction, Textiles and carpets, Mining and flocculation, Oil, gas and other deep well operations, Paper, Explosives, Foundries and Ceramics, Industrial cleaners and related formulations, Agricultural formulations and applications.

	PRODUCTS
Edicol®	Food grade hydrocolloids.
Stamulcol™ Stapp™	Food grade hydrocolloids, Food additives, Food Stabilizer Systems, Blends & Mixes.
Luctoman™ Dealca®	Pharmaceutical grade hydrocolloids.
Catcol™	Rheology control agents for cosmetics, personal and oral care products.
Techcol®	Hydrocolloids for general technical applications.
Galanol®	Products for oil, gas and other deep well drilling, well stimulation and related operations.
Guarplo®	Products for slurry and stick explosives.
Luctolose™ Hemicel® Daicol®	Additives for the Paper industry.
Latgel™	Products for Agriculture.
Minflo®	Products for Mining and flocculation applications.
Carpex®	Rheology control agents for carpets printing, dyeing and space dyeing.
Thixoid™	Rheology control agents for fabric printing.
Rheoluc™	Rheology control agents for water based paints, inks and building and construction products.
Sofeze®	Dry Food premixes for soft serve ice cream.
Sunfiber®	Water Soluble Dietary Fibre (partially hydrolysed guar gum).
Other hydrocolloids	Cassia, Sesbania, Tamarind, Locust Bean Gum.

Certified ISO 9001, ISO 22000 (FSMS), ISO 14001, OHSAS 18000, Organic Produce, Kosher, Halal.

For More Information, please visit us at: www.lucidgroup.com and www.taiyolucid.com

Presidential Address, CARBO-XXIX, Mohali
(December 29-31, 2014)

Dear and respected Dr Ahuja, Professor Chatterjee, Professor Satyamoorthy, Dr Soni, Dr Sangwan, Prof. Ashok Prasad, distinguished guests, academicians, researchers & industrialists, my dear students, ladies and gentlemen, a very good morning to all of you.

On behalf of the executive committee members of the Association of Carbohydrate Chemists and Technologists India it is my great pleasure to welcome you all to Mohali and the Tricity Beautiful for CARBO-XXIX.

Dr HC Srivastava, the then Senior Deputy Director and Head Chemistry Division of ATIRA in 1984 realized the importance of bringing together all those who are working in the area of carbohydrate chemistry at that time on a common platform. The Association of Carbohydrate Chemists and Technologists India was thus formed in 1984 with Dr Srivastava as its founder President and continued to serve the Association as its president until passing away in 1995. After the first two CARBO conferences between 1984 and 1986, Dr KR Bhattacharya organized CARBO-III at CFTRI Mysore in 1987. In the following years we saw the CARBO series of meetings being carried to different parts of the country. The Association continued to grow and flourish under the dynamic leadership of its past presidents, and after Dr Srivastava, Dr Soni has been instrumental in making the Association what it is today.

Besides organizing the annual conferences, ACCTI has been engaged in fostering and supporting carbohydrate research in various other forms. Publication of Carbohydrate New Letter and its flagship e-journal, Trends in Carbohydrate Research are two other important activities of the Association.

In spite of the continued progress that is being made in the chemistry of carbohydrates, there are many-a holy grails in synthetic carbohydrate chemistry, one such being a starch granule. Nature turns over millions of tons of starch every year but we are still being challenged by the great complexity that the structure of a small granule of starch presents.

In this context, I like to congratulate Dr RS Sangwan, Organizing Secretary, CARBO-XXIX for choosing Carbohydrates: ChemBio Innovations for Bioproducts as the focal theme of this Meeting.

We can recall, 75% of an estimated 200 billion tons/year of the renewable biomass is carbohydrates! Fats, proteins, terpenoids, alkaloids and nucleic acids put together perhaps is only 5%! (Lignin being the remaining 20%) Of the 150 billion tons of the annual carbohydrate-biomass, only a minor fraction of 4% or so is utilized by man at present. The rest therefore decays and get recycled by the nature's biochemical processes. A large chunk of the annually renewable carbohydrate biomass is polysaccharides. And yet their non-food utilization is confined to only a few of the industries such as in textile, paperand coating industries, in oil well-drilling, etc where it is used either as such or in the form of simple derivatives such as esters and ethers. Native and modified tapioca and corn starches, tamarind kernel polysaccharide, native and modified guar gum, etc are some of the examples of polysaccharides used in these industries. A major portion of the less- or non-traditional gums and mucilages thus remain unutilized & waiting to be explored.

As organic commodity-chemicals are usually of low molecular weight, they are most frequently produced from low molecular weight carbohydrates rather than the high molecular weight/large sized polysaccharides. Therefore mono- and disaccharides turn out to be the actual carbohydrate raw materials for organic chemicals with tailor-made industrial applications. And they also are inexpensive, available in large bulk with a largely established and relatively straight forward chemistry. Therefore there is a huge amount of renewable biomass in the form of polymers waiting to be used as feedstock for the production of organic commodity-chemicals. Development and optimization of green chemical and biochemical process therefore are the need of the hour. If fossil fuel has been playing a major role in the world economy today, in the future it is perhaps going to be played by the renewable biomass.

Have a pleasant stay and a grand, successful Meeting.

Prof. K P R Kartha

President, ACCT(I)

Invitation to CARBO XXX

The Carbohydrate Conference is one of the most important events annually organized under the auspices of the ACCT (I). For 30th Annual Carbohydrate conference (CARBO-XXX), the organizing committee cordially invites you to Pondicherry University, Pondicherry on December 29-31, 2015. The theme of CARBO-XXX is "Carbohydrates: Chemistry, Biology & Applications as Green Building-Blocks for Bulk Chemicals, Fuels and Advanced Materials". The Conference will bring together both established and emerging scientists, technologist and industrialist to serve as a forum for discussions on progress in all major areas of carbohydrates. We expect your overwhelming support to this event at the tourist city, Pondicherry where French and Indian culture blended in very interesting proportion.

Dr. Tharanikkarasu Kannan
(Organizing Secretary, CARBO- XXX)

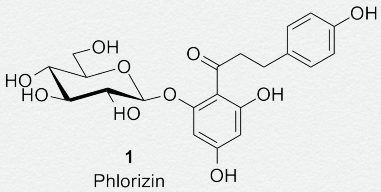
For details about the conference, please contact the Organizing Secretary: Dr. Tharanikkarasu Kannan, Department of Chemistry, Pondicherry University, Kalapet, Puducherry - 605 014, India.Phone (O): +91-413-265 4708; FAX: +91-413-265 6740; Mobile: +91-98942 46406; E-mail: carbo30pu@gmail.com, thavasu@gmail.com

The details about the conference will be informed through websites: www.accti.in and www.pondiuni.edu.in

Logic and Inspiration behind the Emergence of Dapagliflozin as a New Anti-Diabetic Drug

Indra Pal Singh Aidhen*
Department of Chemistry, Indian Institute of Technology, Madras, Chennai, Tamilnadu, 600036
E-mail: isingh@iitm.ac.in

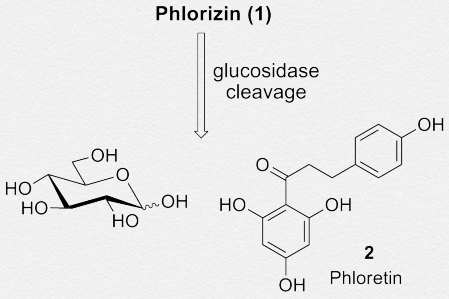
Can the elevated blood glucose levels be simply reduced, by passing-off the excess glucose through urine ? The process of passing glucose through urine is called glucosuria. It is well understood that kidney is one of the major contributor to glucose homeostasis and this is through renal glucose re-absorption. If one can block this re-absorption, the possibility of excreting excess glucose through urine, should help lowering elevated levels of blood sugar in Type II-Diabetes Mellitus) T2DM. Although, it appears to be a part of a new approach, to reduce elevated sugar levels, the phenomenon of passing glucose through urine is more than 100 years old. Phlorizin **1**, a natural O-glucoside present in many plants and also present in the bark of apple trees, was known to cause glucosuria on oral digestion.[1]



1
Phlorizin

So how this happens ? What are the molecular targets in the kidney ? Sodium-glucose linked transporters (SGLT) are responsible for glucose re-absorption from the glomerulus filtrate resulting from the filtration occurring in glomerulus capsule. The sodium-glucose linked transporters are of two types, SGLT1 and SGLT2. The later, SGLT2 are situated in the S1 segment of proximal tubules, are responsible for approximately 90% of the glucose re-absorption from the glomerulus filtrate, while remaining 10% left-out on the filtrate is re-absorbed when it passes through segment S3, which is a site of high affinity, but low capacity SGLT1. In this context, it is logical to deduce that inhibitors of SGLT2 would prevent glucose re-absorption and enable controlling hyperglycemia, through glucosuria.

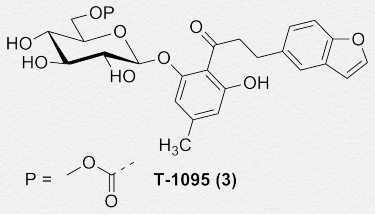
This clue of confirmed glucosuria with the natural product 1 provided all the inspiration for the search of an anti-diabetic drug through SGLT2 inhibition. The first question could be: "Why not Phlorizin itself " Being a O-glucoside, its metabolic instability to b-glucosidase in the intestinal tract is obvious and hence renders it ineffective for oral administration, as it would degrade before reaching the kidneys, through systemic circulation. Additionally the aglycone, phloretin **2**, released on glucosidase cleavage, is found to be a micromolar inhibitor of GLUTs. This is a serious concern as it would affect GLUT mediated glucose uptake in the brain.[2]



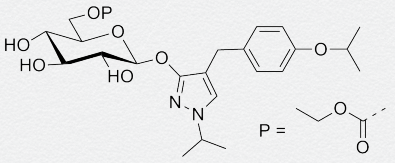
2
Phloretin

Hence, the initial efforts in the scientific community were directed towards systematic design and synthesis

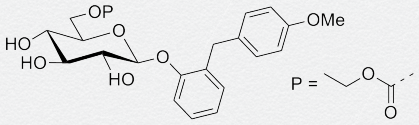
of several O-glycosides with the objective to arrive at a compound, with better efficacy and lesser limitations, compared to Phlorizin. Among the O-glycosides that went up to clinical trials are, T1095 **(3)**[3], Remogliflozin **(4)**[4] and Sergliflozin **(5)**[5] in the form of a prodrug in order to avoid degradation in the gastrointestinal track. However, all these compounds like Phlorizin suffered from relatively low bioavailability, poor pharmacokinetic profile and required relatively larger doses in clinical trials, hence further studies were abandoned.



T-1095 (3)



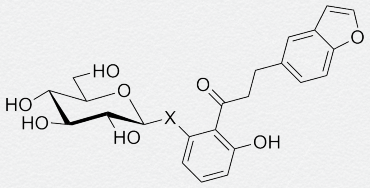
Remogliflozin (4)



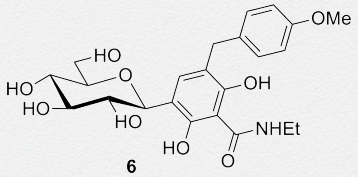
Sergliflozin (5)

Given the fact that C-glycosides are metabolically stable, at the initial stages the glycosidic oxygen of dihydrochalcone analogue **5a** was replaced with a methylene unit. Although the C-analogue **5b** offered stability, its affinity for SGLT2 diminished by several folds.[6] Further search with other C-glycosides and the observation that C-aryl glucoside **6** in particular exhibited significant activity paved the actual way for the discovery of Dapagliflozin **7**,[7] in the offing, as a result of extensive SAR analysis. Bristol-Myers Squibb in partnership with AstraZeneca finally obtained the approval of Dapagliflozin, as drug molecule for treatment of T2DM under the brand name Forxiga in the European Union, during November 2012, while the approval by US FDA came at the beginning of 2014. In US, it appears under the trade name, Farxiga.

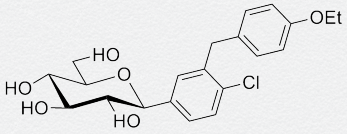
In summary, the discovery of Dapagliflozin, as a potent and selective inhibitor of human SGLT2 represents itself as a first member in the novel class of glucose-lowering agents, through glucosuria, for the efficacious treatment of type 2 diabetes.



5a: X = O
5b: X = CH_2



6



7

References:

1. (a) Stiles, P. G.; Lusk, G., *Amer. J. Physiol*. **1903**,*10*, 67-79 (b) McKee, F. W.; Hawkins, W. B., *Physiol. Rev.* **1945**,*25*, 255-280 (c) Chasis, H.; Jolliffe, N.; Smith, H. W. *J. Clin. Invest*. **1933**,*12*, 1083-90. For a review on Phlorizin, see: Ehrenkranz, J. R. L.; Lewis, N. J.; Kahn, C. R.; Roth, J. Diabetes *Metab. Res. Rev.* **2005**, *21*, 31-38.

2. Katsuno, K.; Fujimori, Y.; Takemura, Y.; Hiratochi, M.; Itoh, F.; Komatsu, Y.; Fujikura, H.; Isaji, M. *J. Pharmacol. Exp. Ther.* **2007**,*320*, 323-330.

3. (a) Oku, A.; Ueta, K.; Arakawa, K.; Ishihara, T.; Nawano, M.; Kuronuma, Y.; Matsumoto, M.; Saito, A.; Tsujihara, K.; Anai, M.; Asano, T.; Kanai, Y.; Endou, H. *Diabetes* **1999**,*48*, 1794-1800; (b)Tsujihara, K.; Hongu, M.; Saito, K.; Kawanishi, H.; Kuriyama, K.; Matsumoto, M.; Oku, A.; Ueta, K.; Tsuda, M.; Saito, A. *J. Med. Chem.* **1999**,*42*, 5311-24; (c) Oku, A.; Ueta, K.; Nawano, M.; Arakawa, K.; Kano-Ishihara, T.; Matsumoto, M.; Saito, A.; Tsujihara, K.; Anai, M.; Asano, T. *Eur. J. Pharmacol*. **2000**,*391*, 183-192.

4. Fujimori, Y.; Katsuno, K.; Nakashima, I.; Ishikawa-Takemura, Y.; Fujikura, H.; Isaji, M. *J. Pharmacol. Exp. Ther.* **2008**,*327*, 268-276.

5. Katsuno, K.; Fujimori, Y.; Takemura, Y.; Hiratochi, M.; Itoh, F.; Komatsu, Y.; Fujikura, H.; Isaji, M. *J. Pharmacol. Exp. Ther.* **2007**,320, 323-330.

6. Link, J. T.; Sorensen, B. K. *Tetrahedron Lett*. **2000**, *41*, 9213-9217.

7. (a) Meng, W.; Ellsworth, B. A.; Nirschl, A. A.; McCann, P. J.; Patel, M.; Girotra, R. N.; Wu, G.; Sher, P. M.; Morrison, E. P.; Biller, S. A.; Zahler, R.; Deshpande, P. P.; Pullockaran, A.; Hagan, D. L.; Morgan, N.; Taylor, J. R.; Obermeier, M. T.; Humphreys, W. G.; Khanna, A.; Discenza, L.; Robertson, J. G.; Wang, A.; Han, S.; Wetterau, J. R.; Janovitz, E. B.; Flint, O. P.; Whaley, J. M.; Washburn, W. N. *J. Med. Chem.* **2008**, *51*, 1145-1149. (b) Washburn, W. N. *J. Med. Chem.* **2009**, *52*, 1786-1794.

Physical properties, nutrient composition, phyto-chemicals and anti-oxidant activities of de-husked rice before and after parboiling pigmented paddy varieties by simple hot soaking

Raja Rajeswari, J., Hrudya, U.B. and Vasudeva Singh*

Department of Studies in Food Science and Nutrition, University of Mysore, Mysore – 570 006.

e-mail: singhva2003@gmail.com

Three varieties of paddy were induced retro-gradation by simple hot soaking at 80^0 C for 2, 2.5 and 3h duration. Physico-chemical properties, phyto-chemicals and anti-oxidant activities of their de-husked rice were studied in their raw and processed form. In raw/native paddy form, l/b ratio and 1000 kernel weight (k w) were high for Jyothi. l/b ratio, 1000 k w, bulk and true density were lowest for Ahikaraya (AK) but porosity was highest. Bulk and true density was high for Meter variety. 1000 k w increased with increase in time of parboiling. The Jyothi variety showed all parameters high at 2h parboiling compared to other periods of parboiling, a AK showed highest equilibrium moisture content (~ 29.5%) (EMC), parboiling increased EMC by 0.5% in Meter, 3% in AK and remained almost same in Jyothi, as the process followed was mild. Total amylose equivalent was highest in AK de-husked rice (27%, d.b) followed by Meter and Jyothi (~ 25%, d.b) but the values did not change much after parboiling. Soluble amylose remained almost same , under the present method parboiling(~ 8 – 13%, d.b). Insoluble amylose equivalent remained almost same after parboiling.

Cooking time of de-husked rice increased marginally after parboiling (26-40 min., to 27-43 min.); cooking volume also increased (220 -240 ml to 250 – 260 ml) indicating greater bulkiness of parboiled cooked grains. Protein, fat content increased but ash content decreased after parboiling. Free poly-phenols were high and bound one were less in de-husked rice of all 3 varieties. Highest total poly-phenols was noticed in AK(462 mg GAE/100g), followed by Meter (406) and Jyothi (340). Parboiling increased polyphenols marginally in Jyothi variety, decreased to a greater extent in Meter variety, remained almost same in AK. Flavonoids were high in de-husked rice of Meter (3.9 mg catachin Eq./100g) & Meter, least in AK (1.5). Parboiling decreased the flavonoids in Jyothi and Meter, but increased by 25% in AK. Highest DPPH scavenging activity was noticed in Meter variety (271 mg Catachin Eqv./100g) and least in Jyothi (~ 207). Parboiling increased DPPH sc. activity in Jyothi, decreased to almost same extent in Meter and AK. Total anti-oxidant activity studies were also made and results will be discussed while presentation.

Shelling, Milling and Tentative Quality Classification of Red Pigmented Paddy/Rice Varieties

Raja Rajeswari, J[1]., Vasudeva Singh[1]* and M.P. Rajanna[2]

[1]*Dept. of Studies in Food Science & Nutrition, University of Mysore, Mysore-570 006.*

[2]*All India Co-ordinated Rice Improvement Project (Rice), Zonal Agricultural Research Station, V.C Farm, Mandya, Karnataka- 571 405*

email: singhva2003@gmail.com

Eighty red pigmented paddy varieties procured from V.C. Farm, Mandya, Karnataka and Tanjavur, Tamilnadu, were subjected to shelling, milling studies by Centrifugal Sheller and Abberation Polisher. De-husked rice and polished rice were subjected to studies on some of the physical properties like length/breadth ratio, normalized grain weigh etc; also subjected to chemical parameter analysis like total and soluble amylose equivalent, equilibrium moisture content on soaking at room temperature, alkali score etc.

Husk content varied from 17% to 28%, de-husked rice varied from ~ 49% to 78%. Broken and head rice in these de-husked rice varied to different extents. Un-dehusked rice (paddy) in these shelled rice types varied from ~ 2% to ~ 15 – 23%. Polishing of these de-husked rice resulted in different degree of polish as well as different extents of broken and head rice. Majority of de-husked rice belonged to medium grain types as their l/b ratio ranged from 2.1 to 2.7. Cooking time of these de-husked rice varied from 25 min to 50 min. Total amylose equivalent varied from ~8 % to 50%; soluble amylose equivalent varied from ~ 2% to 21% and hence insoluble amylose equivalent varied from ~1% to 35%. These data tentatively informed that 34 varieties of the lot came under I group of rice classification, 19 under II group, 18 under III group of rice classification and finally 2 varieties under low/waxy rice classification. The data on polishing differed to a great extent as they were devoid of bran layers; 53 varieties showed I group, 9 showed II, 4 showed III group and further work in this direction are under progress.

Award Winners of CARBO XXIX - 2014

Life Time Achievement Award - 2014

The Association of Carbohydrate Chemists and Technologists of India (ACCTI) is privileged to honor the most successful chemists, biologists and technologists in the country who are working in the field of Glycoscience by giving them Life Time Achievement Award comprising of a Plaque, Citation, Shawl and Cash award of Rs. 50,000 from Lucid Colloid Group, Mumbai annually. Recently, **Dr. P V Salimath** was conferred ACCT(I)-Life Time Achievement Award for the year 2014 at CARBO XXIX held at CIAB Mohali on December 29-31, 2014, for his contribution to Glycobiology. Prof. Salimath has contributed significantly to the understanding of Food Carbohydrates in relation to Structure and Function in Foods. His contributions have received great appreciation for the understanding of glomerular basement membrane constituents in kidney during diabetic nephropathy and modulation by diet. His research contributions are well documented in several leading Journals of high repute internationally, numbering to more than a hundred and some of the works are patented and processes are filled.

Award for the 'Best Paper Published in TCR' 2014

Dr. C. P. Rao, Professor at IIT Bombay has been awarded 5th 'Best Paper published in TCR journal' entitled "Diimino conjugates of glucosyl-cresol as receptor for Cu^{2+} and its complex for cystein and histidine", *Trends Carbohydrate Res.*, **2013,** *5*, 1-5" authored by A. Mitra, S. Areti, A. K. Mittal, S. Bhakta and C. P. Rao, at 'CARBO XXIX Conference held at Mohali, 2014. Dr. Rao received his PhD in organic chemistry from Indian Institute of Science, Bangalore. He has research interests in the following areas such as, Small molecular systems, proteins enzymes and nucleic acid, and Molecular dynamics simulations.

ACCT(I) Carbohydrate Excellence Award-2014

Prof. Indrapal Singh Aidhen, currently Head, Department of Chemistry, Indian Institute of Technology-Madras, Chennai, India is associated with the Department, since December of 1995. He obtained his M.Sc. degree in Organic Chemistry (1983) from Pune University and then proceeded to join the Research Center of Hoechst India Ltd, located at Mulund in Mumbai. He earned his Ph. D in 1991 (Mentor: Professor N. S. Narasimhan at University of Pune) and was selected as a Fellow-Scientist, under the quick-hire scheme at National Chemical Laboratory, Pune. In April 1992, he proceeded for a post-doctoral fellowship at the University of California, Santa Cruz (with Prof. Rebecca Braslau) for exploring synthetic aspects of radical based chemistry. In 1993, with the prestigious AvH fellowship, he joined the group of Professor Richard R Schmidt, University of Konstanz, Germany, the doyen of carbohydrate research and engaged in the most difficult synthetic challenge (then), the C-glycoside of Neuraminic acid towards C-linked Sialyl-Lewis-X. His interests to pursue synthetic carbohydrate chemistry were triggered in this phase of his academic career. In December of 1995, he joined IIT-Madras as Assistant Professor. His research activities have been in two directions. The first direction, aims at developing novel Synthetic equivalents/building blocks based on Weinreb amide (WA) functionality and their applications in synthesis of important molecules. The second direction aims at the synthesis of important and challenging targets from the realm of carbohydrate chemistry, under the broad heading of C-glycosides. One of the building blocks, based on Weinreb-amide, and developed at IIT-Madras, has a place in Aldrich Catalogue [No: 56, 108-8]. He rose to the rank of full Professor in April 2006. During this first decade of his career at IIT-Madras, he was bestowed with yet another prestigious JSPS-invitation Fellowship from Japan (2003 to 2004) to work with another eminent carbohydrate chemist, Prof. S. Kusumoto, at University of Osaka.

He has given several invited lectures in national and international symposia and published over 62 peer reviewed publications and four patents. He was the co-convener of the carbohydrate conference in 1999, at IIT-Madras. In 2013, he has been selected for MNASc. It will be of interest to note that in confidential evaluation by the students at IIT-M during the last twenty years, he has been consistently rated as a very good teacher. Recently, Prof. Indrapal Singh Aidhen was awarded with "Excellence in Carbohydrate Research Award" by the Association of Carbohydrate Chemists & Technologists-India in 2014, for his contribution towards promoting synthetic carbohydrate chemistry through teaching and research.

5th C. G. Merchant Memorial Lecture – 2014

Prof. Ghanshyam S. Chauhan, Professor, Department of Chemistry, Himachal Pradesh University, was awarded 'C.G. Merchant award-2014' sponsored by Lucid Group, Mumbai, India, for his outstanding contribution in the field of functionalization of polysaccharides and biomass utilization for specialty applications ranging from drug delivery devices to synthesis of novel adsorbents and extractants for water treatment. His research contribution is of interdisciplinary nature with deep impact on green and clean alternatives, both products and processes, especially, at the interface of polymer chemistry and environment; and biotechnology and polymer science. And most importantly, he has research commitments both to science and society.

7th Dr. H. C. Srivastava Memorial Lecture – 2014

Dr. H. C. Srivastava Memorial Lecture was given by the eminent Carbohydrate scientist and the speaker is honored with a cash award of Rs. 20,000.00 by the Association. The 7th Dr. H. C. Srivastava Memorial Award is conferred to **Dr. Anup K Misra**, at XXIX Carbohydrate Conference held at CIAB Mohali.

Dr. Anup Kumar Misra is currently working as an Associate Professor in the Division of Molecular Medicine, Bose Institute, Kolkata. Before that he was working as a Senior Scientist and Principal scientist in the Medicinal and Process Chemistry Division, Central Drug Research Institute, Lucknow during 2001-2008. Dr. Misra did postdoctoral studies in the University of St. Andrews, Scotland, UK (1997) and The Burnham Institute, La Jolla, California, USA (1998-2000). He has made significant contributions to the area of synthetic carbohydrate chemistry and medicinal chemistry and published 145 research publications in several international journals. Eleven students received Ph.D. degree under his supervision and six Ph.D. students are working in the area of carbohydrate chemistry in his laboratory. Dr. Misra's contributions have been duly recognized by awarding him CSIR YOUNG SCIENTIST AWARD 2005 in Chemical Sciences, DST RAMANNA FELLOWSHIP (2007-2010), INSA-DFG visiting scientist fellowship to visit University of Konstanz, Germany (2009) and Academy of Finland-DBT visiting scientist fellowship to visit Abo Academy University, Finland (2013) and INSA-HAS visiting scientist to the University of Debrecen, Hungary (2015). Dr Misra recently conferred Dr. H. C. Srivastava Young Scientist Award-2014 by ACCTI.

Fellow-ACCT(I)

The highest recognition from ACCTI is the Fellowship (F-ACCTI) which has been awarded to **Prof. (Dr.) Rama P Tripathi,** Chief Scientist, Central Drug Research Institute, Lucknow. His current research is actively focuses on development of carbohydrate-based molecules against Tuberculosis. His work is well documented in 150 peer reviewed publications (Citation = 2800, h-index = 28) and over 20 patents. We all congratulate him and all the ACCT(I) awardees for their wonderful credentials.

MINUTES OF THE ANNUAL GENERAL BODY MEETING – 2014 AND EC MEETINGS HELD ON 28.12.2014 at CIAB, MOHALI

The Annual General Body meeting of the Association of Carbohydrate Chemists and Technologists (India) was organized at the IISER Mohali at 6.30 PM on 29/12/2014 at Conference Venue. Total seventy six members of the Association and delegates attended the meeting along with the participants and guests attending the XXIX Carbohydrate Conference organized by CIAB Mohali. President, ACCT(I), Dr. K P R Kartha gave the introductory speech while Prof. Ashok Prasad, Secretary of the ACCT(I), then read out the minutes of the previous AGB meeting held during the XXVIII Carbohydrate Conference which was organized by y the ACCTI at Hotel Sun Park Inn, Dehradun on 22.1.2014 at 6.00 PM. The minutes were accepted unanimously as proposed by Dr. P L Soni and seconded by Dr. Ashish K Sen as well Dr. Naveen Khare and Dr R P Tripathi. Prof. Ashok Prasad then described the previous years' activities of the Association and the agenda finalized by the EC members. The meeting of the Executive Committee members was held for five hours followed by Dinner where the EC members exchanged their views for the betterment of the activities of the Association.

Dr. Amit Bhatt, treasurer of the Association, ACCTI presented the audited 'Statement of Accounts' of the ACCT(I). After brief discussion, the 'Statement of Accounts' was accepted by the members. It was proposed by Dr. P L Soni and seconded by Dr R P Tripathi. Dr. Vinod Tiwari, Editor, Carbohydrate News Letter (CNL) placed the 'Statement of Accounts' of CNL (Issue – 15) which was accepted unanimously, proposed by Prof. Ashok Kumar and seconded by Dr. Brij Sharma. The CNL is currently published once a year on 'no loss no gain' basis. The publication of the CNL is partially sponsored by the ACCT(I) and also from the earnings from the advertisements of Lucid Colloids, Hindustan Gum & Chemicals Ltd., Sunita Hydrocolloids P. Ltd. and Encore Natural Polymers P. Ltd. The members also requested the industrial houses to come forward to sustain the CNL. To make up the deficit in statement of account of CNL, members has advised to raise the number of contributors for advertisement in CNL while Mr. NC Dhuldhoya suggested increasing the financial support from Tamarind Industries also for advertisement. Now

proposed to raise the rate of full color page advertisement to Rs. 6000.00 and half page to Rs, 4000.00 which was seconded by Dr. Brij Raj Sharma. Dr. A K Sen proposed that CNL may be published biannually, which was after discussion differed by the members.

The recommendation of the constitution and bye-law subcommittee was discussed and committee was constituted which will be headed by Dr A K Sen. Matter to constitute a chair on carbohydrate chemistry was discussed but a final outcome was not attained and matter was differed for the next meet.

Members also showed concern about the less interaction existing between participants of academia and industries in Carbohydrate Conferences. Prof. A K Sen and Dr. Vasudeva Singh were given this responsibility to increase and invite new people from Industry to the ambit of future Carbohydrate Conferences for which he was given two months' time. Members thank Prof Tharanikkarasu Kannan, University of Pondicherry for his initiation and kind consent to hold the next XXX Carbohydrate Conference (CARBO XXX) and the venue was announced officially on the 1st Day of Conference CARBO XXIX. All the members deeply expressed their gratitude to Prof. Kannan. It is also proposed that a special ACCTI symposium may be organized at Delhi to invite eminent Carbohydrate Researchers around the world. With a great pleasure, it was deliberated that further after the XXXI Carbohydrate conference may be held at Delhi University, under the dynamic leadership of Prof. Ashok Prasad. It has been decided that to bring the visibility of ACCTI, about 10-20 renowned scientists from Academia and Industry should be invited from India and Abroad to the forthcoming CARBOS. Simultaneously, the EC members are also requested to recommend the names of accomplished scientists and technologists so that they may be conferred as Fellow of ACCTI (F-ACCTI). It was also decided that the change of address of the life members of ACCTI should be posted on the ACCTI website. All the life members are requested to inform the website-in-charge for their change of address so that ACCTI website is updated regularly with the changed new addresses. A brief discussion about ACCTI local chapters was made. Also, to plan the organization of next international conference either in India or in abroad was addressed. Prof. Ashok Prasad was given responsibility to find out the viability to hold this kind of India International symposium. This mega event should include mostly Carbohydrate Scientists from abroad as invited speakers. These foreign delegates would be invited by Local Organizing Committee and their local hospitality will be borne by the Association. It was also decided that this kind of International Conference would be held once in three years with option to hold it outside India like in Taiwan, China, Malaysia, Bangkok, South Korea, etc. Matter was discussed about the donation from wife of late Prof. A K Mukherjee to constitute a new ACCTI award to support young scientist. House thank Dr. A K Sen for the initiation and after discussion the issue was although differed, however ACCTI thank to Madam and send a humble request to increase the award money from 25,000.00 to 1,00000/- Rs. It was also decided in this EC Meeting that a new Industry award would be initiated by ACCTI to be called as "ACCTI Excellence in Carbohydrate Entrepreneurship Award". EC happily approves to hold a debate on Indian Sciences (40 min) from CARBO XXIX and appreciate the efforts made by Dr A K Sen. A long discussion was made about how to attract good contributions from abroad and India for TCR.

The Association has introduced a new award for the best Ph. D. thesis from 2014. The ˜ACCT(I) Best Thesis Award" aims to recognize the best doctoral research work carried out in the area of glycosciences and to promote carbohydrate research worldwide including India. The award will be bestowed during the Carbohydrate Conference organized by the ACCTI every year. The winner of the award will receive cash award of Rs. 10,000.00 (sponsored by M/s. Lucid Colloids Ltd.), a citation and an opportunity to give a presentation at the annual conference of the ACCTI. After a long discussion, exact rule and regulation for ACCTI best PhD Thesis award was finalized and now applications are invited from eligible candidate. Eligibility criterion and rules is now available online to the website of the Association, www.accti.in.

The general body of the association congratulated Dr. P. V. Salimath, Prof. C. P. Rao, and Prof. Indra Pal Singh for receiving the Life Time Achievement Award, fifth e-TCR award and third- Excellence in Carbohydrate Research award, respectively. Members thank Dr. B P Chatterjee for the Key Note Lecture on the first day of even at CIAB Mohali. The GB also thanked Dr. Anup K Mishra and Prof. Ghanshyam S Chauhan for giving the Dr. H.C. Srivastava Young Scientist Award and fifth Mr. C. G. Merchant memorial lecture, respectively. ACCTI members and delegates greatly appreciate Dr. R S Sangwan, Chief Executive Officer, Center of Innovative and Applied Bioprocessing (CIAB) Mohali for the nice arrangement during CARBO-XXIX.

General Body meeting lasted for nearly two hours and was concluded with a vote of thanks to the chair by Ashok Prasad.

Prof. Ashok Prasad
(Secretary, ACCTI)

Report of the XXIX Carbohydrate Conference

The XXIX carbohydrate conference was organized by Center of Innovative and Applied Bioprocessing (CIAB), Mohali from December 29-31, 2014.The conference organized with the objective 'Carbohydrates: ChemBio Innovation for BioProducts', was inaugurated on 29th December 2014 at IISER-Mohali (venue) by the Chief Guest Dr. Paramvir Singh Ahuja, Director General CSIR. Prof. N. Sathyamurthy, Director IISER, Mohali grace the event. Dr. R. S. Sangwan, CEO-CIAB, and also the Organizing Secretary of the CARBO-XXIX welcomed the gathering and briefed about the theme of the conference.Chief Guest Dr. Paramvir Singh Ahuja inaugurated the conference by lighting the lamp along with the other dignitaries. Prof. K. P. R. Kartha, President ACCT(I) presented a report on the ACCT(I) activities. Dr. P. L.Soni, Chief Adviser ACCT(I), and Executive Editor, TCR spoke about TCR e-Journal. Mr. Uday Merchant released the souvenir and detailed the prospects of the Indian Gum Industry. Chief guest Dr. Paramvir Singh Ahuja gave the presidential address. Prof. Ashok K. Prasad, Secretary, ACCT(I) announced the ACCT(I) awards for 2014. Dr. P. V. Salimath, CSIR-CFTRI received Lifetime Achievement Award, and Prof. Indrapal Singh Aidhen, IIT, Madras received Excellence in Carbohydrate Research Award. Prof. Ghanshyam S. Chauhan, HP University received the C. G. Memorial award. Dr. Anup Mishra, Bose Institute, Kolkata received the H. C. Srivastava Memorial Young Scientist award. Prof. C.P. Rao, IIT Bombay received TCR best paper award. Prof. B.P. Chatterjee, ISCA-Sir Ashutosh Mukherjee Fellow and Emeritus Scientist, West Bengal University of Technology delivered the Keynote lecture.

In a total of 10 technical sessions, the conference covered 58 lectures including 7 plenary, 5 award, 15 invited lectures, 21 oral presentations, and 65 poster presentation, where 10 best presented by the scholars below the age of 35 years were selected for best poster, and invited for short oral presentation, and then finally three of them were selected for the ACCT(I) Young Scientist Award-2014. The following lectures were delivered in technical sessions:

Technical Session I: Award Lectures (Chaired by Prof. Naveen Khare and Mr. Sanjay Modi)

· Excitement of Working with Complex Carbohydrates for the Last Three Decades by Dr. P. V. Salimath, CSIR-CFTRI, Mysore.

· C-Aryl-glycosides and Glycosylated Phenstatins by Dr. Indrapal Singh Aidhen, IIT Madras

· Modification of Polysaccharides for Specialty Applications by Prof. Ghanshyam S. Chauhan, HP University.

Technical Session II: Innovative Chemistry of Carbohydrates: Natural & Synthetic (Chaired by Dr. Sandeep Kale and Prof. V.S. Bisaria)

· Innovative Use of Chemo-enzymatic Processes in Nucleoside Chemistry and Drug Delivery Applications by Dr. Ashok K. Prasad, University of Delhi.

· Application of Sugars in Development of New Chemotherapeutic Agents by Dr. R. P. Tripathi, CSIR-CDRI, Lucknow.

· One-Pot Synthesis of Glycosyl Thiozolodinone and Thiourea Using Glycosyl Azidoalcohols/Azides by Dr. Vinod Tiwari, Banaras Hindu University.

Technical Session III: Excitements and Future Life with Carbohydrates (Chaired by Dr. Balaram Mukhopadhyay and Dr. P. L. Soni)

· Whither Cellulases in Second Generation Ethanol from Lignocellulosic Residues by Dr. Virendra S. Bisaria, IIT, Delhi.

· Effect of Cellulose Nano-whiskers on Performance Properties of Carbohydrate Based Film as Packaging Material, Dr. Shashank T. Mhaske, ICT, Mumbai.

· Advancement in Processing for Production of Sugars and Polysaccharides, Dr. Sandeep Kale, ICT, Mumbai.

· Functionalized Biopolymer: Fascinating Sustainable Material of Future Prospective, Dr. Kalpana Chauhan, Shoolini University, Solan.

· Fabrication and Study of Oligosaccharides using High-Throughput Gold Plate Array in Search for Novel Glycobiomarkers, Dr. Santanu Mandal, University of Manchester, UK.

· In Vitro Digestibility of Native and Chemically Modified Pearl Millet Starches, Dr. Baljeet Singh Yadav, M. D. University, Rohtak

· Partial Characterization of Native and Modified Mothbean (Vignaaconitifolia) Starches, Dr. Ritika B. Yadav, M.D. University, Rohtak

Technical Session IV: Synthesis, Pharmacology and Applications of Carbohydrate Conjugates (Chaired by Dr. Chitra Mandal and Prof. Yasuhiro Ozeki)

· Sialylation of Outer Membrane Porin Protein-D Impedes ß-Lactam Antibiotic Resistance in Pseudomonas Aeruginosa, Dr. Chitra Mandal, CSIR-IICB, Kolkata.

· Application of Nano-Domain Cuprous Oxide for the Synthesis of Oligosaccharides and Sugar Containing Heterocycles,Dr. Asish K Sen, CSIR-IICB, Kolkata.

· H_2SO_4-Silica: A Versatile Reagent for Carbohydrate Transformations and Synthesis of Oligosaccharides,Dr.

B Mukhopadhyay, IISER, Kolkata.

· Microwave Assisted Greener Synthesis of Chitosan Stabilized Silver Nanocomposites for Biological Applications, Dr. Rahul Sharma, Shoolini University, Solan.

· Design Synthesis and Reactivities of Amino Acid derived Glycoconjugates, Dr. Ajay K. Sah, BITS, Pilani.

Technical Session V: Structural & Functional Diversity of Carbohydrates (Chaired by Dr. Vasudev Singh and Prof. Sunil K. Sharma)

· Lectin-Glycomics and Their Application in Biomedical Research, Dr. Yasuhiro Ozeki, Yokohama City University, Japan.

· Phytochemical Investigation of Indian Medicinal Plant for Rare Deoxyoligosaccharides/Glycosides with Their Proposed Biosynthesis, Prof. Naveen Khare, University of Lucknow.

· 2D NMR Studies of Milk Oligosaccharides, Dr. Desh Deepak, University of Lucknow.

Technical Session VI: Carbohydrate-based Foods, Nutraceuticals & Other Materials (Chaired by Dr. B. P. Chatterjee and Dr. R. S. Sangwan)

· Cereals and Pulses Starch: Functionality and Applications in Food Industry, Prof. Narpinder Singh, Guru Nanak Dev University, Amritsar.

· Nutraceutical Properties, Processing and Food Applications of Aloe Vera Gel, Dr. B. S. Khatkar, GJUS&T, Hisar.

· Applicability of Native and Recombinant Endoxylanase and ß-Xylosidase of the Extremely Thermophilic Bacterium Geobacillusther modenitrificans in Generating Prebiotic Xylooligosaccharides and Alkylxylosides, Prof. T. Satyanarayana, University of Delhi.

· Synthesis and Properties of Cassava Starch based Hydrogels and Composites with Multifaceted Applications,Dr. A. N. Jyothi, Central Tuber Crops Research Institute, Thiruvanathapuram.

· Edible Coatings from Pectin and Alginates in OSMEMB process,Dr. Charanjiv Singh Saini, SantLongowal Institute of Engg. and Tech., Sangrur.

· Physico-chemical, Pasting, Granule Size Distribution and Morphological Characteristics of Starches from Potato, Kidney Bean and Banana, Dr. Amritpal Kaur, Guru Nanak Dev University, Amritsar.

· Characteristics of Ready-To-Eat Extruded Complementary Foods, Dr. R. Parimalavalli, Periyar University, Salem.

Technical Session VII: Oral presentation of 10 best posters by the young researchers

Out of 65 poster presentation, the 10 best posters presented by scholars were selected for best poster, and invited for short oral presentations.

Technical Session VIII: Consolidated Processing of Carbohydrate Rich Bioresources(Chaired by Prof. Narpinder Singh and B.S. Khatkar)

· Chemical Innovations of Bio-polysaccharides: Structural Investigation and functionalization, Dr. Vineet Kumar, FRI, Dehradun.

· Cellulose Crystal Structure and Polymorphic Transformation, Dr. Praveen K. Gupta, FRI, Dehradun.

· Cleaner & Greener Chemo-enzymatic Synthesis of Glycerol Based Value Added Products for Biomedical Applications, Dr. Sunil K. Sharma, University of Delhi.

· Biosynthesis of Bacterial cellulose: Research progress, Development and Newer Industrial Applications, Dr. R. K. Saxena, University of Delhi South Campus.

· Rice Straw a Waste Biomass as a Source of Biofuel and Value Added Chemicals, Dr. R. K. Jain, Central Pulp & Paper Research Institute, Saharanpur.

· Pulping and Strength Properties Evaluation of the mixtures of Areca and Bagasse Fibres, Dr. Vikas Rana, FRI, Dehradun.

Technical Session IX: Biotechnology and Omics of Carbohydrate Rich Bioresources (Chaired by Dr. Rakesh Tuli and Dr. P.V. Salimath)

· Fun with Some Carbohydrate-Processing Enzymes, Prof. PurnanandaGuptasarma, IISER, Mohali

· GREEN TECH: Use of Microbial Enzymes in Paper Industry,Prof. Prince Sharma, Panjab University

Technical Session X: Carbohydrate Linked Industries: Status and Scopes (Co-ordinated by Mr. Bharat Joshi, PEP Technologies, USA)

Opening remarks were given by Dr. Rakesh Tuli, Panjab University, Chandigarh; Dr. S.S. Marwaha, Punjab Biotechnology Institute, Mohali; Dr. Rajesh Kapur, Advisor DBT.

Dr. K. P. R. Kartha, NIPER, Mohali coordinated the valedictory function and invited delegates and participants to express their views about the organization of the event. Prof. Yasuhiro Ozeki and other experts appreciated, and congratulated the organization committee for quality of lectures and other elements of conference regarding ambience, stay, food etc. Dr. P.L. Soni, Chief Advisor ACCTI and Dr. Asish K. Sen expressed pleasure on smooth and excellent organization of conference. Prof. Naveen Khare, Vice President (Academic)ACCT(I) announced different awards. The ACCT(I) Young Scientist award was given to Mr. Vinod Khatri, University of Delhi. Ms. Manisha Sharma, Center of Innovative and Applied Bioprocessing (CIAB), Mohali was awarded with the Lucid Colloid award. Finally, Dr. P.L.Soniproposed the vote of thanks, and ended the XXIX Carbohydrate Conference.

Prof. R S Sangwan
(Organizing Secretary, CARBO XXIX)

Debate on : "Research has Not Reached Its Pinnacle Carbohydrate"

For the first time, ACCTI organized a debate on 30th December, 2014, during the CARBO-XXIX symposium organized by the Center of Innovative & Applied Bioprocessing (CIAB), Mohali, Punjab. The venue of the debate was IISER- Mohali auditorium. The motion of the debate was "Carbohydrate Research has not reached its Pinnacle". The debate assumed a modified Karl Popper format (http://debatovani.cz/files/dokumenty/120923_kp-debate-rules.pdf).

The Affirmative and Negative teams each consisted of 4 members. The affirmative team was headed by Dr. Rajender Singh Sangwan [CEO, CIAB] and the other members were Prof. Naveen K. Khare, Dr. Sanjay V. Modi and Mr. Santanu Mandal.

The Negative team was headed by Dr. Rakesh Tuli [Ex-director, CSIR-NBRI & founder Director NABI (DBT)] and the other members were Prof. Ashok K. Prasad, Dr. B. R. Sharma and Mr. Amit Kumar.

The debate was moderated by Mr. Atriya Sen, under the overall planning and guidance of Dr. Asish Kumar Sen.

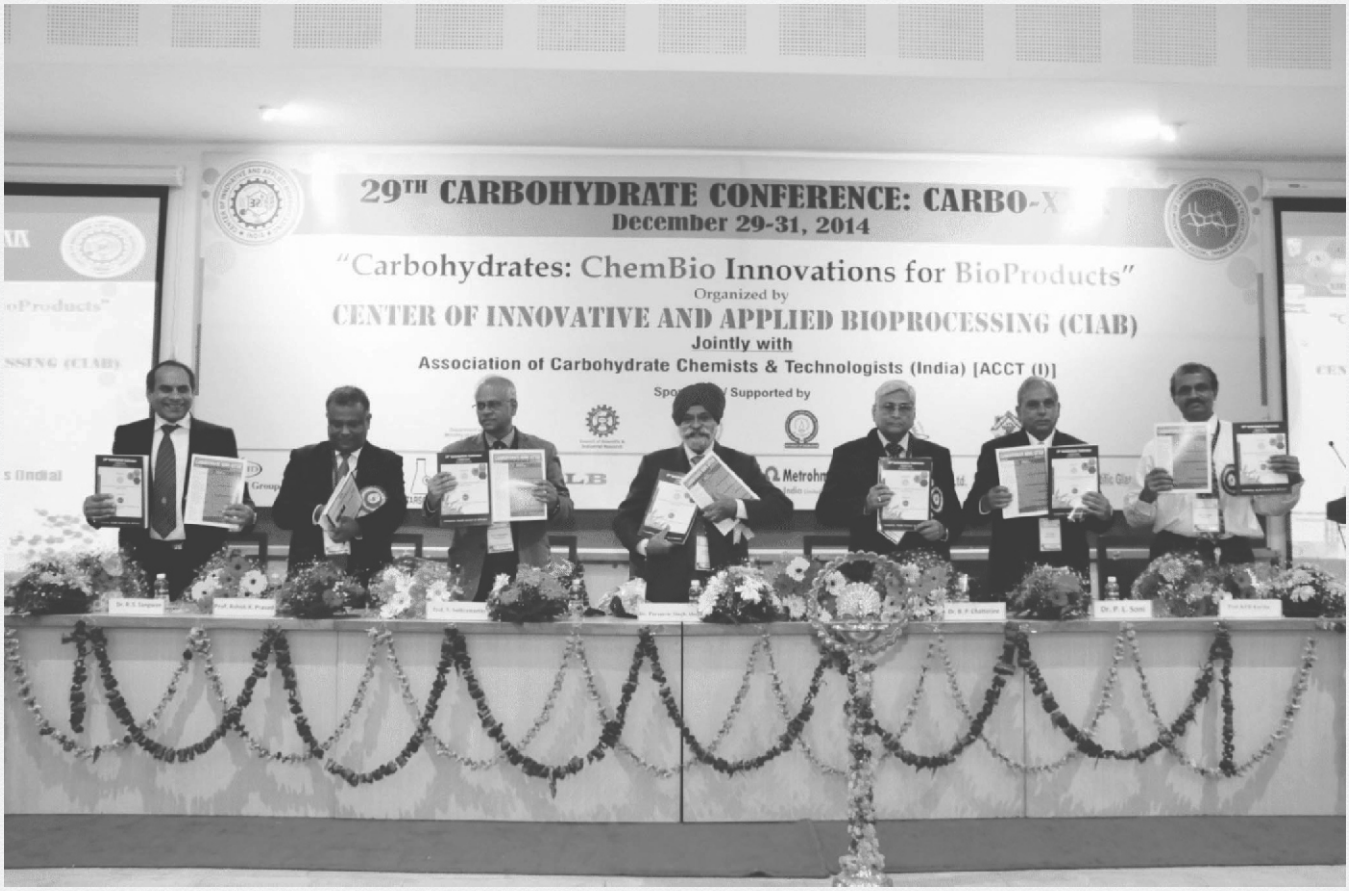
The main argument of the Affirmative team was that carbohydrate research is still in an infant stage and there is lot more to be done to understand the role of these wonder molecules in biology and its various applications. On the other hand, led by Dr. Tuli, the Negative team argued that it is for more than 70 years that scientists have been trying to understand the role and purpose of sugar molecules in various fields. There were some initial successes, but no break-through achievements have been made in the last two decades. This is because carbohydrate research has already reached its pinnacle.

The debate received an overwhelming response from the conference attendees. The members of both teams argued and counter-argued; the audience spontaneously opined their views in between. Finally, the motion was put to vote. The House voted in favor of the motion.

ACCT(I) Sincerely thanks Dr. Ashish K. Sen to bring this debate.

ASSOCIATION OF CARBOHYDRATE CHEMISTS & TECHNOLOGISTS (India)
EXECUTIVE COMMITTEE MEMBERS (2014)

OPENING CEREMONY OF CARBO XXIX



CARBO-XXIX Conference in Print Media

दैनिक भास्कर चंडीगढ़, बुधवार 31 दिसंबर, 2014

मोहाली में हुई नेशनल कॉन्फ्रेंस

मोहाली. सेंटर ऑफ इनोवेटिव एंड अप्लाइड बायोप्रोसेसिंग (सीआईएबी) में तीन दिनों की नेशनल कॉन्फ्रेंस का आयोजन किया गया। डिपार्टमेंट ऑफ बायोटेक्नोलॉजी के सहयोग से हुए इस सेमिनार में सीएसआईआर के डायरेक्टर जनरल डॉक्टर परमवीर सिंह अहुजा बतौर चीफ गेस्ट शामिल हुए। आईआईएसईआर के डायरेक्टर प्रो. एन सत्यमूर्ति भी इस यहां मौजूद थे।

THE TIMES OF INDIA, CHANDIGARH
WEDNESDAY, DECEMBER 31, 2014

CARBO-29 meet at CIAB

Center of Innovative and Applied Bioprocessing (CIAB), a national institute in Mohali under the Department of Biotechnology (Govt of India) is organising a three days (Dec 29-31), 29th Carbohydrate Conference (CARBO-XXIX) at IISER, Mohali. The conference was inaugurated by the chief guest, Dr Paramvir Singh Ahuja, director general of CSIR and Prof N Sathyamurthy, director, IISER, was the guest of honour on the occasion. Dr RS Sangwan, organizing secretary, CARBO-XXIX and chief executive officer, CIAB, welcomed the guests and conference delegates. The inaugural session was also addressed by Prof KPR Kartha, president, ACCTI, Prof Ashok Prasad (hony secretary, ACCTI) and Dr PL Soni (editor-in-chief, Trends in Carbohydrate Research). Prof BP Chatterjee delivered the keynote address on the occasion.

HONOURS / AWARDS

Prof. Naveen Khare is associated with Lucknow University as Professor of Organic Chemistry. At present he holds Vice-president, ACCTI (also, actively supported ACCTI as Hon. Secretary during 2009-2013). His research interest focuses on Synthetic Carbohydrate Chemistry and also Phytochemical Investigation of Medicinal Plants. In addition, Prof. Khare is very dedicated teacher and recently awarded with **"Best Teacher Award-2015"** by 'Avadhnama Educational and Charitable Trust' on Sept. 5, 2015 at National Botanical Research Institute (NBRI auditorium), Lucknow for that we all heartily congratulate him for his excellent credential and recognition.

Prof. (Dr.) Vasudeva Singh, FRSC, FACCTI, Retd. Chief Scientist, CSIR-Central Food Technological Research Institute, Mysore, Karnataka, India, is presently associated with Dept. of Food Science and Nutrition, University of Mysore, Mysore as Emeritus Medical Scientist. ACCTI proud to share that Prof. Vasudev Singh recently awarded with **"Teachers Excellence Award-2015"** for his outstanding contribution in the field of education. Also he recieved '**Indo-Nepal Shiromani Award**' on 11th April, 2015 at Kathmandu, Nepal by Global Achievers Foundation, New Delhi for his innovative research at frontiers of food science and inspired leadership in food processing technology.

Prof. Ashok K Prasad is associated with University of Delhi as a Professor of Organic Chemistry. He significantly contributed over 210 publications (citations over 2700 and h-Index: 27) and also seven patents of high repute. Prof. Prasad received '**ISCB Award for excellence -2014**' in the area of Chemical Science and recently on 8th December 2015, he has been invited for the Visiting Professorship at JAIST, Japan for that we all congratulate him.

Divya Mishra, got best poster award entitles "Synthesis of oligosaccharide fragments related to E. Coli strains" in National Convention of Chemistry Teachers (NCCT-2015) held at Lucknow University, Oct. 8-10, 2015 along with the award certificate by the organized by Association of Chemistry Teachers (ACT). Divya Mishra is perusing her doctoral research under the supervision of Prof. Naveen Khare at Lucknow University.

Vinod K. Tiwari, born in Bihar, India in 1976, is an Assistant Professor of Organic Chemistry in Banaras Hindu University since 2005. **Dr. V. K. Tiwari** has significantly contributed over 100 peer-reviewed publications (h-index = 25) including several patents and invited book chapters. He received many prestigious awards and medals. Recently, in 2015 he was awarded with Three Year **American Chemical Society Membership Award (2015-2018)** and 'Certificate of **Appreciation-2015' by Bentham Science Publication for his article published in Current Organic Synthesis (in 2013).** His recent COS article (in 2016) was selected for the **'Journal Cover Page'**.

List of newly joined ACCTI Life Members

DR. MANMOHAN CHIBBER (LM/231/14)
Assistant Professor, School of Chemistry & Biochemistry,Thapar University, Patiala-147004.
Email: mcchibber@thapar.edu

DR. RATAN SINGH VIKRAM (LM/232/14)
Chief Chemist, Drilling Fluid(R & D)
IDT. O.N.G.C, Kaulagarh Road, Dehra Dun
Email: rajanvikram@yahoo.co.in

DR. I. DARREN GRICE (LM/233/14)
Research Leader, Institute of Glycomics, Gold Coast Campus, Griffith University, Gold Coast, Queensland, Australia
Email: d.grice@griffith.edu.au

DR. MAINAK BANERJEE (LM/234/14)
Asst. Professor, Department of Chemistry
BITS PILANI, K K Birla Campus, Goa
Email: mainak@goa.Bits_pilani.ac.in

MS. SHIPRA NAGAR (LM/235/14)
Research Scholar, Chemistry Deptt, Forest Research Institute, Dehra Dun
Email: shhipranagar@gmail.com

DR. MRS. SAKSHI CHAUDHARY (LM/236/14)
C.C.S. University, Meerut B-62, Devlok, Near Sport Complex Delhi Road, Meerut
Email: shivashish08@gmail.com

DR. RAKESH KUMAR (LM/237/14)
Chemistry Department, Kirori Mal College
University of Delhi, Delhi-110007
Email: rakeshkp@email.com

DR. CHANDRA SOURABH AZAD (LM/238/14)
Senior Research Fellow, Central Drug Research Institute, Lucknow-226001
Email: csazad@gmail.com

DR. MANUEL A. COIMBRA (LM/239/14)
Professor, Department of Chemistry
University of Aveiro, 380-193 Aveiro, Portugal
Email: dac@ua.pt

MS. CLAUDIA PEREIRA PASSOS (LM/240/14)
Researcher, University of Aveiro, 380-193 Aveiro, Portugal
Email: cpassos@ua.pt

DR. ASHISH K BHATTACHARYA (LM/241/14)
Division of Organic Chemistry
CSIR-National Chemical Laboratory (CSIR-NCL), Dr . Homi Bhaba road, Pune-411008
Email: ak.bhattacharya@ncl.res.in

DR. NIMAI CHANDRA PAN (LM/242/14)
National Institute of Research on Jute & Allied Fibre Technology
CSIR-National Chemical Laborator y(CSIR-NCL)Indian Council of Agricultural Research, 12, Regent Park, Kolkata-700 040
Email: ncpan__in@yahoo.com

DR. SAMBHU N CHATTOPADHYAY (LM/243/14)
National Institute of Research on Jute & Allied Fibre Technology, (CSIR-NCL) Indian Council of Agricultural Research, Kolkata-700 040
E-mail: sambhu_in@yahoo.com

DR. MANISHA DUSEJA (LM/244/14)
Deptt. of Chemistry, DIT University
Dehra Dun, Uttarakhand
Email: manisha_duseja@yahoo.co.in

DR. ANUJ KUMAR (LM/245/14)
Deptt. of Chemistry, DIT University, Dehra Dun,
Email: anuj.budhera@gmail.com

DR. AMRIT PAL KAUR (LM/246/14)
Deptt. of Food Science & Technology Guru Nanak Dev University, Amritsar, Punjab
Email: amritft33@yahoo.co.in

DR. NARPINDER SINGH (LM/247/14)
Deptt. of Food Science & Technology
Guru Nanak Dev University,
Amritsar, Punjab
Email: narpinders@yahoo.com

DR. KALPANA CHAUHAN (LM/248/14)
Deptt. of Chemistry
Shoolini University, Solan . H.P
Email: kalpana13chauhan@gmail.com

MS. SHIVANI JAMWAL (LM/249/14)
Deptt. of Chemistry, Himachal Pradesh University Shimla
Email: shivanijamwal9@gmail.com

MS. SAPNA KUMARI (LM/251/14)
Deptt. of Chemistry, Himachal Pradesh University, Shimla
Email: naddasapana@gmail.com

DR. AJAY KUMAR SAH (LM/252/14)
Deptt. of Chemistry, Birla Institute of Technology & Science, Pilani, Rajasthan-333031
Email: asah@pilani.bits_pilani.ac.in

DR. YASUHIRO OZEKI (LM/253/14)
Yokohama City University, 22-Z Seto, Kanazawa-ku, Ykohama 2360027, Japan
Email: ozeki@yokohama_cu.ac.jp

MR. ASHUTOSH GUPTA (LM/254/14)
Indian Institute of Technology, Gowahti
E-mail: ashutoshbiotech89@gmail.com

MR. KARTIKEY SINGH (LM/255/14)
Deptt. of Chemistry, Lucknow University, Lucknow
Email: kartikey.singh82@gmail.com

DR. R. PARIMALAVALLI (LM/256/14)
Deptt. of Food Science & Nutrition
Periyar University, Salem, Tamil Nadu
Email: parimala1996@gmail.com

PROF. K. THARANIKARASU (LM/257/14)
Deptt. Of Chemistry
Pondicherry University
R.V. Nagar, Kalapet, Pondicherry-605014
Email: tharani.che.@pondiuni.edu.in

DR. RAJENDER SINGH SANGWAN (LM/258/14)
Chief Executive Officer
Center of Innovative & Applied Bioprocessing, Mohali-160071 (Punjab)
Email: sangwan.lab@gmail.com

DR. C. D. NANDINI (LM/258/15)
Principal Scientist, Dept. of Molecular Nutrition,
CSIR-CFTRI, Mysore-570 023
Email: cdnandini@yahoo.com

DR. NAVEEN SINGHAL (LM/259/15)
Head, Chemistry Department, DIT University, Dehra dun, Uttarakhand-248001
Email:drnaveen.singhal@gmail.com

DR. SHAILEY SINGHAL (LM/260/15)
Associate Professor
University of Petroleum and Energy Studies
Dehra Dun, Uttarakhand
Email:shailey@ddn.upes.ac.in

DR. KAUSHIK CHATTOPADHYAY (LM/261/15)
Asst. Professor, Department of Chemistry Burdwan Raj College, Burdwan 713104, W.B. India
Email: Kausik_Carb@rediffmail.com

DR. AMIT KUMAR (LM/262/15)
Asst. Professor, Deptt. Of Chemistry
Indian Institute of Technology, Patna Patliputra Colony, Patna-800013
Email: amitkt@iitp.ac.in

ACCTI Membership Fee

Application long with subscription fee in favor of **"Association of Carbohydrate Chemists & Technologists (India)"** payable at Dehradun to be sent to Treasurer, **Dr. Amit Bhatt**, DIT University, Dehra Dun, Uttarakahand, India.

Patron Membership (Acadmia)	Rs. 5000 one time only including admission fee of Rs.5.00 only
Life membership	Rs. 2005.00 (One time only including admission fee of Rs. 5.00 only)
Life membership (Industrial)	Rs. 4005.00 (One time only including admission fee of Rs. 5.00 only)
Life membership (Foreign National)	US$ 200.00 (includes the Registration Fee waiver in CARBO)
Institutional Membership	Rs. 10,000.00 (Yearly + Admission fee of Rs. 5.00 only for new members)
Ordinary Membership	Rs. 500.00 (Yearly + Admission fee of Rs. 5.00 only for new members)

Eligibility:
Ordinary/Life member; any person with degree from recognized University in basic and applied Sciences. Patron/Institutional membership; Organization/Institution concerned with Science & Technology of Carbohydrate.

Note: Application form for ACCTI membership may be downloaded through www.accti.in

ACCTI YOUNG SCIENTIST AWARDS- 2014

To encourage young students, the Association of Carbohydrate Chemists & Technologists (India) gives cash award of Rs. 5000.00 (Rupees Five Thousands only) and a citation for the best oral/poster presentation at the Carbohydrate Conference' every year. Only research scholars, research associates etc. (below the age of 30) are eligible for this award.

At the XXIX Carbohydrate Conference held at CIAB, Mohali from December 29-31, 2014, paper entitled "Bioethanol production from Copra meal involving recombinant ß-(1 4)-Mannanase from Clostridium thermocellum" by Ashutosh Gupta, A Ghosh, D Das and A Goyal judged as Best Poster Presentation. The paper entitled "Chiral [2]pseudorotaxane from sugar aza-24-crown-8 and dibenzylammonium cation" by Vinod Khatri and Ashok K Prasad was also judged as another Best Poster Presentation. We express our heartiest congratulations to Mr. Ashutosh Gupta and Mr. Vinod Khatri.

Ashutosh Gupta is working with various CAZymes involving recombinant biology, metabolic and bio-process engineering at IITG, with the topic "Saccharification of pretreated lignocellulosic biomass by recombinant cellulase and hemicellulase from Clostridium thermocellum for bioethanol production". He has qualified various exams like GATE, CSIR-UGC (NET), CEEB-JNU, DBT-JRF etc. and joined PhD position with Prof. Arun Goyal and Dr. Debasish Das at IIT Guwahati

Vinod Khatri completed his M. Sc. (Organic Chemistry) in 2010 from Kurukshetra University, Kurukshetra. He qualified CSIR-JRF in 2010 and joined the group of Professor Ashok K. Prasad, Department of Chemistry, University of Delhi for pursue PhD in 2011. His PhD research work is focused on "Synthesis and Study of Supramolecular Assemblies of 2,6-Anhydro-heptitols, Sugar-based Polymers and Macrocycles".

LUCID COLLOID AWARD-2014

To encourage research on hydrocolloids, Ms. Lucid Colloids Limited, Mumbai, offers a cash award of Rs. 5000.00 (Rupees five thousand only) and a citation for the best paper presentation on hydrocolloids since 2003. At the XXIX Carbohydrate Conference held at CIAB Mohali from December 29-31, 2014, paper presentation entitled "Guar Gum (Cyamopsistetragono -loba) process by-product and Chickpea (Cicerarietinu - m) Hullas sources of pectin for commercial use" by Ms. Manisha Sharma from CIAB was selected for the award. We express our heartiest congratulation for her.

Manisha Sharma was born on 1st December 1988 (Nangal, Punjab). She did her graduation and post graduation in Biochemistry from Panjab University, Chandigarh. Currently she is working as Project Fellow in Center of Innovative and Applied Bioprocessing (CIAB), Mohali and also got enrolled for PhD in Guru Jambeshwar University of Science and Technology (GJUST), Hisar.

THE ABSTRACTS OF YOUNG SCIENTIST AWARDEES AT CARBO XXIX

Bioethanol production from Copra meal involving recombinant ß-(1 4)-Mannanase from Clostridium thermocellum

Ashutosh Gupta, Arabinda Ghosh, Debasish Das and Arun Goyal

Department of Biotechnology, Indian Institute of Technology Guwahati, Guwahati-781039, Assam, India,

Email: ashutoshbiotech89@gmail.com

In the present study copra meal (dry coconut) was utilized as a sustainable lignocellulosic resource owing to high mannan (hemicellulose) content. The recombinant hydrolytic enzyme ß-(1→4)-mannanase from Clostridium thermocellum (Ghosh et. al., 2013) and the use of fermentative microbe Candida shehatae were attempted for bioethanol production at shake flask level (Gupta et. al., 2014). Prior to the saccharification two individual pretreatments viz., alkali and microwave assisted alkali (MAA) and a mixed pretreatment strategy. Pretreatments were performed on copra meal for the removal of excessive oil and the effective hydrolytic actions of saccharifying biological catalyst. The structural destabilization with increased porosity was confirmed by field emission scanning electron microscopy (FESEM). The recombinant C. thermocellum ß-(1→4)-mannanase along with Candida shehatae was involved in separate hydrolysis and fermentation (SHF) and simultaneous saccharification and fermentation (SSF) trials at shake flask level. SHF

experiment with 1% (w v-1) alkali pretreated copra meal resulted ethanol concentration (0.34 g L-1), whereas SSF resulted in a 1.2-fold higher ethanol titer of 0.41 g L-1. SHF and SSF trails of MAA pretreated substrate yielded an ethanol titre of 0.44 g L-1 and 0.64 g L-1, respectively. With mixed pretreated 1% (w w-1) biomass, a 1.3-fold escalation in ethanol titer (0.71 g L-1) was obtained and a yield of 0.101 (g of ethanol g of substrate-1). Increasing the substrate concentration to 5% (w v-1) in shake flask gave an ethanol titre (3.89 g L-1) and yield (0.110 g of ethanol g of substrate-1).

References

1. Ghosh, A., Luis, L. S. A., Brás, L.A. J., Fontes, M.G.A.C. and Goyal. A., Thermostable recombinant endo-β-(1 4)-mannanase from Clostridium thermocellum: Biochemical characterization and manno-oligosaccharides production. J. *Agric. Food. Chem. 61*(50), 12333-12344, **2013**.

2. Gupta, A., Das, S. P., Ghosh, A., Choudhary, R., Das, D. and Goyal. A., Bioethanol production from Populus nigra involving recombinant hemicellulases from Clostridium thermocellum. *Bioresour. Technol. 165*, 205–213, **2014**.

Chiral [2]pseudorotaxane from sugar aza-24-crown-8 and dibenzylammonium cation

Vinod Khatri, Amit Kumar, Balram Singh and Ashok K. Prasad*

Bioorganic Laboratory, Department of Chemistry, University of Delhi, Delhi 110 007, India

Email:ashokenzyme@yahoo.com

The noncovalent synthesis has evolved over decades and greatly contributes to the evolution of mechanically interlocked molecules. Noncovlent bonding has proven a bottom up approach for the design of interlocked molecules like molecular machines, muscles, valves, elevators and switches. The methods for the synthesis of mechanically interlocked molecules are ased on the penetration of the electron poor thread like molecule-the axle, through the cavity of electron rich cyclic guest molecule-the wheel, which constitute [2]pseudorotaxane. The designs of novel and stable pseudorotaxane are of great significance since the stable pseudorotaxane are the precursor for advanced rotaxanes and catenanes.In many cases rotaxane becomes chiral after the penetration of chiral axle in achiral wheel. We herein design and develop a new template by introducing the sugar molecule that would provide the new chiral cavity for secondary ammonium ions (Figure 1). Such advances will definitely add values in further contribution to supramolecular chemistry for designing of chiral rotaxanes and catenanes.

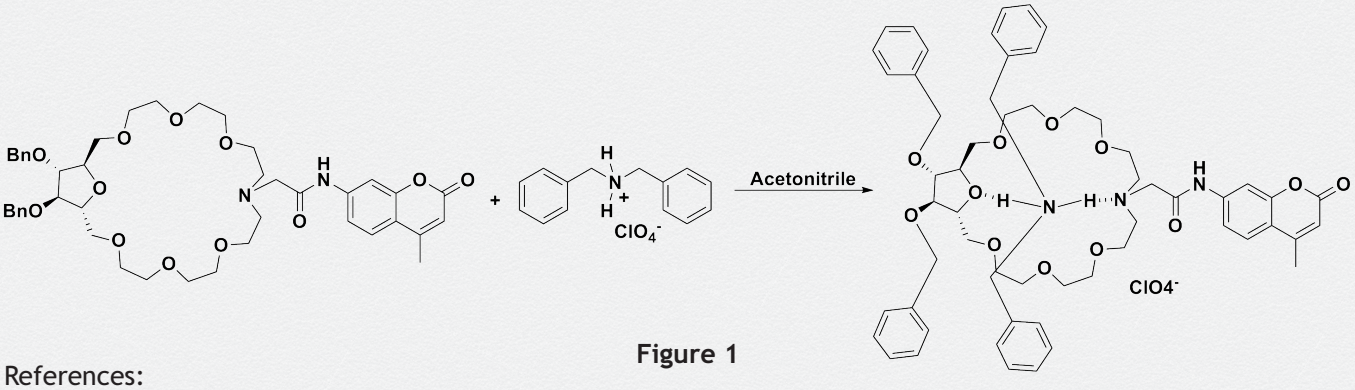


Figure 1

References:

1. (a) Neal, E. A.; Goldup, S. M. *ChemCommun.* **2014**, *50*, 5128-5142. (b) Bo, G. D.; Kuschel, S.; Leigh, D. A.; Lewandowski, B.; Papmeyer, M.; Ward, J. W. *J. Am. Chem. Soc.* **2014**, *136*, 5811−5814.

2. Blanco, V.; Leigh, D. A.; Marcos, V.; Serna, J. A. M.; Nussbaumer, A. L. *J. Am. Chem. Soc.* **2014**, *136*, 4905-4908.

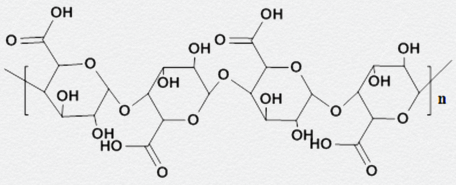
3. Griffiths, K. E.; Stoddart, J. F. *Pure Appl. Chem.* **2008**, *80*, 485-506

Guar Gum (Cyamopsistetragonoloba) process by-product and Chickpea (Cicerarietinum) Hullas sources of pectin for commercial use

Manisha Sharma and Rajender S. Sangwan

Center of Innovative and Applied Bioprocessing (CIAB), A National Institute under Department of Biotechnology (Govt. of India), C-127, Phase 8, Industrial Area, Mohali – 160071

Pectin, a natural polysaccharide with α-1,4linked D-galacturonic acid backbone, has a growing importance in food as well as pharmaceutical industries due to its properties asgelling agent, thickener, stabilizer and pharmacological action as such or in modified form. At present, apple pomace and citrus peel are the main sources for the production of pectins at commercial scale in industries. Alternative sources that are also being limitedly used for extraction of pectins include sugar beet waste and sunflower heads. For value



Pectin (Polygalacturonic acid)

addition to processing industry by-product, herein, we report guar (Cyamopsistetragonoloba) and chickpea (Cicerarietinum)hull, as sources of pectin. The study reportsyieldsand characteristics of pectins isolated from these sources. The study reveals 4%, 13%, 3.96% and 4.4% yield of the pectin from chickpea hull, guar meal, guar korma and guar seed hull respectively. The compositional and rheological properties of acid-extracted pectins from chickpea hull, guar meal, guar korma and guar seed hull will be discussed in the presentation and reveals that guar and chickpea hull have good potential for processing for pectin production.

References:

1. Jianga Y, Dua Y, Zhua X, Xionga H, Woob M.W, Hu J. Physicochemical and comparative properties of pectins extracted from Akebiatrifoliata var. australis peel. *Carbohydrate Polymers*, **2012**, *87*, 1663-1669.

2. Wang X, Chen Q, Lu X. Pectin extracted from apple pomace and citrus peel by subcritical water. *Food Hydrocolloids*, **2014**, *38*, 129-137.

A profile of Dr K. R. Bhattacharya

OBITUARY: The Association of Carbohydrate Chemists and Technologists (India) deeply mourns the sad demise (22 Feb 2013) of **Dr. K. R. Bhattacharya**. He always gave his utmost to the Association and helped in making it a great platform for bringing together all researchers of the carbohydrate field. His immense contributions to the field by way of his publications shall always guide us and show us the way towards excellence in carbohydrate research & development. The executive body and the members of ACCT(I) pray to the almighty that his soul rests in peace and the members of his family have the strength and courage to bear this immense loss. Dr. Kshirod R Bhattacharya, obtained his D.Sc. degree in Biochemistry from the University of Calcutta, Kolkata in 1960 and started his career as Scientific Officer at Central Food Technological Research Institute, Mysuru. He retired as Head, Dept. of Grain Science and Technology, in December 1988. Dr. Bhattacharya, as a scientist to the core, had devoted his entire research career, which spread over a span of more than 50 years, including his contributions to the rice industry, to work on rice. He built an internationally recognized school that made unique contributions to the science of rice as well as to its technology, in the areas of rice quality, parboiling, ageing, milling and products made from rice.

While pursuing his research to understand the basis of differences that existed in eating and cooking quality of rice among different rice varieties across the globe, he opened up a new dimension to the understanding the structure of rice starch which explained these differences. This in turn threw new light on the basic knowledge on the molecular structure of starch in general. This is the notable contribution he made to the field of starch as such.

He significantly contributed over 140 research and review articles and also several book chapters of high national and international repute. His latest book, 'An Introduction to Rice-grain Technology', with Dr S. Z. Ali, as the co-author, published in July 2015, is aimed at explaining the various areas of rice technology in a simple style that is accessible even to the lay person. He was awarded the Mysore University Golden Jubilee Award for scientific research for the year 1984 and the Life-Time Achievement Award of the Association of Carbohydrate Chemists and Technologists (India) in 2003.

Dr. Bhattacharya left us for his heavenly abode, on 22nd September, 2015, leaving behind his wife, Shibani Bhattacharya, son, Prof. Kaushik Bhattacharya, Caltech, USA, daughter, Dr Banani Poddar, M.B.B.S., MD, working for Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow and their families.

TCR Trends in Carbohydrate Research

Trends in Carbohydrate Research (TCR) published by ACCTI, is completing five years of its launching and is a peer reviewed, quarterly, International, fast track, open access, e journal on Investigation, Application and Technology of Carbohydrates and their derivatives with a distinguished editorial and advisory board composed of leading carbohydrate researches from around the world. Recently, TCR has acquired national repute with **NAAS score 3.34.** The TCR is devoted for promotion and utilization of latest research and developments related to various scientific and technological aspects of carbohydrates. The publication of TCR will definitely affect the dynamics of Carbohydrate Science and Technology in this country and world around.

We have also decided to select one best paper per volume which has very high standard, for award of Rs. 30,000 (US $ 400) along with the certificate from the journal to this effect starting from the Silver Jubilee year of the ACCTI at the annual conference of carbohydrate from CARBO XXV, Shimla. The first e-TCR awardee was Dr. R. P. Tripathi, Senior Scientist, Central Drug Research Institute, Lucknow. Prof. Ghanshyam

Chauhan received the second e-TCR award at CARBO XXVI at IICB, Kolkata. The third e-TCR award has been given to Prof. Ashok Prasad, Delhi University at CARBO XXV at CFTRI Mysore. Recently, the 4th TCR Awards has been given to Prof. Darren Grice, Griffith University, Australia at 'ACCTI International Conference on Challenges in Chemistry and Biology of Carbohydrates' held at Dehradun during 20-22, January, 2014. From 5th year award money has been increased to 30,000/ which would sponsor by PFP technology, USA.

The 5th TCR Awards has been given to Prof. C P Rao, IIT Bombay. Title of 5th e-TCR Paper Award is: "Diimino conjugates of glucosyl-cresol as receptor for Cu^{2+} and its complex for cystein and histidine", A. Mitra, S. Areti, A. K. Mittal, S. Bhakta and C. P. Rao, Trends Carbohydrate Res., 2013, 5, 1-5.

TCR with ISSN 0975-0304 is being abstracted by Chemical Abstract Service (CAS) and in process of getting impact factor (Thomson Reuters) and to be listed in Scopus (Elsevier Bibliographic database Amsterdam) shortly. Our papers are being viewed, downloaded and uploaded by researches all over the world. Now time has come when we wish libraries of Universities/Institutes and individuals start prescribing this journal in order to make it more accessible. You can subscribe by going our website and may contact us if you have any difficulty in doing so.

Aims and Scope:

The overall aim of the TCR is to advance and disseminate knowledge in all related areas of carbohydrates to benefit the whole carbohydrate's community. It offers an international forum for exchange of latest research and developments related to various scientific and technological aspects of carbohydrates and publish original research in form of normal length research papers, short reports, review articles in the following facets lie well within the scope of this journal.

1. Carbohydrate polymers having current or potential industrial applications, their structures, properties, and modifications both chemical and microbiological.
2. Chemistry and biology of carbohydrates including synthesis, structure elucidations, stereochemistry, reaction mechanisms, isolation of natural molecules, physicochemical studies, biosynthesis, metabolism, degradation, structural and functional biochemistry, enzymes-their action and mechanism, immunochemistry and glycobiology.
3. Analytical methods / chemistry of carbohydrates.
4. Technologies for conversion or production of industrially important carbohydrates including methods, processes and systems.

The journal will also publish reports of conferences, book reviews, news items, details of forthcoming meetings and contribution describing industrial applications. Audience will include Scientists, Researches, Technologists, Academia, Industrialists, R & D institutes, Universities, Planners, Users and Producers of carbohydrate products.

The Manuscript may be submitted to TCR online at www.trendscarbo.com or direct to the one of the editors. Once a manuscript has been accepted for publication, it will undergo language copy editing, typesetting and reference validation in order to provide the highest publication quality. The average review time for TCR is 30-40 days from submission to final decision on a manuscript.

Looking at your expertise and experience in the area of carbohydrate research, we would like to invite you to contribute your valued manuscripts for publication in TCR. We trust that your esteemed association will definitely give new dimensions, magnitude and directions for continual promotion and growth of the TCR and in placing it in the forefront for the dissemination of novel, exciting and cutting edge research in all areas of carbohydrates.

Dr. P. L. Soni
Editor in Chief, TCR

ACCT(I) National and International Carbohydrate Conferences

21 CARBO-XXI: Department of Chemistry, University of Delhi, Delhi	(2006)
22. CARBO-XXII: Medicinal Chemistry Dept., NIPER, Mohali	(2007)
23. CARBO-XXIII: Bhavnagar University, Bhavnagar, Gujarat	(2008)
24. CARBO-XXIV: Lachoo Memorial College of Pharmacy, Jodhpur	(2009)
25. CARBO-XXV: Himachal Pradesh University, Shimla	(2010)
26. CARBO-XXVI: CSIR-Indian Institute of Chemical Biology, Kolkata	(2011)
27. CARBO-XXVII: CSIR-Central Food Technological Research Institute, Mysore	(2012)
28. CARBO-XXVIII: ACCTI at Hotel Sunpark Inn, Dehradun (1st International Conference)	(2013)
29. CARBO-XXIX: Center of Innovative and Applied Bioprocessing, Mohali	(2014)
30. CARBO-XXX: To be held at University of Puduchery	**(2015)**
31. CARBO XXXI to be held at university of delhi (2nd international conference)	(2016)

Note: From CARBO-I to CARBO-XX please see previous year Carbohydrate News Letter (CNL-2014)

SHPL
Sunita Hydrocolloids Pvt. Ltd.
A Joint Venture Company of Weatherford International Ltd.

Sunita Hydrocolloids Pvt. Ltd.

ISO 90001:2008 & HACCP Certified Company

Grade Name	Product	Application
SUNCOL	Native Gaur Gum Powder	Food & Pharma Industry
SUNCOL-DB	Blend of Hydrocolloids & Specialty Chemicals	Stabilizer Cum Emulsifier for Ice-cream
SUNCOS-PG	Cationic Guar Gum	Paper & Pulp Industry
SUNCOS-CG	Cationic Guar Gum	Cosmetic & Personnel Care Industry
SUNTECH	Technical Grades of Guar Gum Powder	Oil Well Drilling, Mining & Explosives
SUNTEX	Chemically Modified Derivatives of Guar, Tamarind and Starch	Textile Industry

Contact details:

E-394, MIA, Phase-II, Basni, Jodhpur-342005, Rajasthan (INDIA)
Phone: +91-291-2740075 / 2740270; Fax: +91-291-2740867
E-mail: info@shplindia.com, export@shplindia.com; Web: www.shplindia.com

---

HIGUM

A HALL MARK OF ECONOMIC EXCELENCE IN INDUSTRIAL GUMS

A PRODUCT OF U.S. COLLABORATION, LATEST IN TECHNOLOGY FROM A COMPLETELY AUTOMATIC PLANT OFFERING SPECIALISED

HIGUM BRAND GUMS:

Guar Gum Powder Manufactures for-

TEXTILE & JUTE INDUSTRIES, PAPER INDUSTRY, EXPLOSIVES INDUSTRY, PESTICIDE INDUSTRY, MOSQUITO COIL INDUSTRY, OIL WELL FRACTURING, COSMATICS & PERSONAL CARE, FLOCCULANTS Applications

Manufactures:

HINDUSTAN GUM & CHEMICAL LIMITED
Birla Colony, Bhiwani (Haryana)
Phone: 243891, 243892, 243894, 243811; Fax: (01664) 243813
E-mail: bhiwani@hindustangum.com, Website: www.hindustangum.com

With best compliments from

****

encore natural polymers private limited

IMS – ISO 9001, ISO 14001, ISO 50001 & OHSAS 18001 Certified Company

Manufacturers and exporters of Guar Gums, modified and derivatised guar, tamarind and other natural polymers for

Textile, Water based Paints, Construction Chemicals, Oil & Gas Well Drilling & Fracturing, Cosmetics & Personal Care, Paper and Reconstituted Tobacco

-: Our most reputed products :-

Indrez	Textile Printing Thickeners
Encocat	Cosmetics & Personal Care
Encotech - P, PS	Water Based Paints
Encotech - CN	Building & Constructions
Encotech - FR	Oil & Gas Well Drilling & Fracturing

---

encore natural polymers private limited

Regd. Office : 405/408, "B" Wing, Navbharat Estates, Zakaria Bunder Road, Sewri (West), Mumbai-400 015.

Phones: 022-24158860 Fax: 022-24158862

E mail: encore@encoregroup.net

Plant : 227/233 GIDC Estate, Naroda, Ahmedabad 382 330

Phones : 079-2282 2548/ 2559 Fax : 079-22822393

E mail : ahmedabad@encoregroup.net marketing@encoregroup.net

encore