



January-March  
2021

**NATIONAL SUGAR INSTITUTE**  
**KANPUR - 208017 (U.P.) INDIA**



In-spite of significant amount of sugar diversion for ethanol and reports coming from Uttar Pradesh about dominating sugarcane variety been red rot affected in central and eastern regions, the sugar production as a whole is to remain surplus during the current year also and is estimated to be around 30.5 MMT. The push on ethanol production to meet blending target continues with new policy interventions supporting setting up 1G ethanol units.

In an effort to broaden the revenue base, there is greater need for utilizing the by-products of sugar industry for producing products having assured market viz. bio-compostable tableware, particle board and compressed bio-gas. Recovery of potash in molasses based distilleries and capturing CO<sub>2</sub> gas from fermenters may be considered areas for further development. I look forward sugar factories setting up joint ventures in and around their factories for prosperity of rural areas and job creation.

**Narendra Mohan**  
**Director**

**NEWSLETTER**

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## WEBINARS ORGANIZED:

1. A webinar on “**Alternate Technologies for Achieving ZLD & Value Added Products in Molasses based Distilleries**” organized by the institute on 19<sup>th</sup> January 2021, with the theme to think beyond available technologies relating to "Bio-composting and Incineration". Many innovative technologies viz. Spray Drying etc. were discussed.



2. A webinar on the topic “**Manufacture of Value added Products by Micro, Small & Medium Sector Units**” was organized on 16<sup>th</sup> March 2021 by National Sugar Institute, Kanpur to discuss project profiles of value added products viz. 100% bio-compostable tableware, particle board, potash rich fertilizer and compressed bio gas from by-products of the sugar industry. Secretary (Food & Public Distribution), Government of India, called upon the sugar factories to set up such units of their own or as joint ventures. New entrepreneurs may also come up; this may

create rural development and job creation as well, he added.



3. Under the auspices of “**Azaadi Ka Amrut Mahotsav**”, One Day Seminar on “**Potential & Possibilities of Energy Saving in Sugar Industries**” was organized by NSI, Kanpur jointly with Spray Engineering Devices Limited & AASCT at M/s Dewan Sugars Ltd., Agwanpur, Moradabad on 22<sup>nd</sup> March 2021. More than 100 delegates from various sugar factories participated in the seminar.





### FACULTY DEVELOPMENT PROGRAMME:

Eight faculty members from Nigerian Sugar Institute, Nigeria joined National Sugar Institute, Kanpur for the six months / one-year Faculty Development Programme which is being conducted from 1<sup>st</sup> February 2021. Theoretical as well as practical training shall be given to these faculty members from Nigerian Sugar Institute.



### ONLINE TRAINING PROGRAMME:

Three days online training programme was conducted in collaboration of CPCB on the topic "**Environmental Sustainability of Ethanol Industry**" for the officers of state pollution control boards. Programme was inaugurated by Mr. Tarun Sawhney, Vice Chairman and Managing Director, Triveni Engineering & Industries Limited on 17<sup>th</sup> February, 2021.



### BRAIN-STORMING SESSION:

A brain-storming session was organized on "**Role of Potassium Salt of Active Phosphorus (PSAP) in Sugar Cane Productivity**" by Isha Agro, Pune in association with National Sugar Institute, Kanpur & Sugar Tech Journal 18<sup>th</sup> February 2021 at NSI, Kanpur. Technological interventions viz. use of potassium salt of active phosphorous and rain irrigation system were discussed.



## WORKSHOP ORGANIZED:

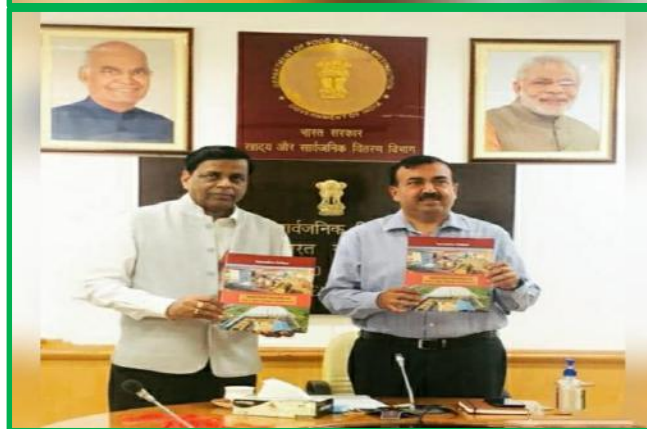
Workshop on the topic “**Use of Stainless Steel to Improve Process Efficiency and Reduce Maintenance Cost**” was held at National Sugar Institute, Kanpur on 5<sup>th</sup> March, 2021. Workshop was organized jointly by NSI, Kanpur and M/s Jindal Stainless Ltd., to create awareness about use of stainless steel at various unit operations in a sugar factory for better overall plant efficiency.



## BOOK RELEASED:

Book entitled “**Analytical Handbook for Cane Sugar Industry**” written by Prof. Narendra Mohan, Director, National Sugar Institute, Kanpur released by Shri Sudhanshu Pandey, Secretary (Food & Public Distribution). Shri Subodh Kumar Singh, Joint Secretary (Sugar &

Administration) also graced the occasion on 10<sup>th</sup> March, 2021.



## RESEARCH

- 1. Studies on isolation of Lignin from sugar industry based biomass and development of the process for the conversion of derived lignin and fermentable sugar to Value-added product** - The separation (by TLC method) of lignin oxidation product obtained during the optimization study has been completed. The related characterization of the products is going on.
- 2. Studies on synthesis of lactic acid from sugarcane bagasse hemicellulose** - The purification of hemicellulose obtained from sugarcane bagasse by using a new fractionation strategy; ethanol-water system, in presence of an organic acid, has been



completed. The further reaction related to access lactic acid from the hemicellulose is to be carried out.

### **3. Studies on pot-efficient synthesis of alkyl-levulinates (Als) using sugarcane bagasse derived cellulose**

- The isolation and purification of methyl levulinate synthesized from bagasse cellulose (derived by implementing a new fractionation strategy- ethanol-water) has been completed. The reproducibility check of the optimized condition is under progress.

### **4. Studies on Production/isolation of C5 – Sugar Alcohol/Sugar using by-product resources of sugar industry**

- The microbial strains from M/s NCIM, Pune, have been received. The experiments related to strain propagation & activation have been performed.

**5. Standardization of method for determination Preparatory Index** - The preparatory index was determined by ICUMSA method, modified Aldrich & Rayner method & Australian method.



Two nos. complete analysis set of preparatory index have been carried out during the month of March, 2021. Four nos. of analysis sets were completed on fiberized cane. Apart from

above, Fibre % cane by direct method was also analysed and found 11.50 % to 15.20 %. Further experiments shall be carried out on laboratory shredded cane to achieve the conclusion.

### **6. Studies on deterioration patterns on different sugars**

- Sugar samples analysis for parameters such as colour, ash, pol, pH, RS, SO<sub>2</sub>, turbidity as per plan of work has been completed in March 2021. Data compilation to draw the final conclusion is under progress.

### **7. Utilization of Potash Rich ash for production of valuable bio fertilizer**

- Sowing of sugarcane crop was done on 23<sup>rd</sup> October 2020 at NSI farm. Then prepared bio-fertilizers (Azatobacter and PSB) will be added to assess its effect on sugarcane productivity and quality parameters of cane juice.

### **8. Comparative study of Nine varieties of sweet sorghum for production of ethanol yield**

- Compilation of the data of the study conducted carried out. pH of the juice of different varieties ranged from 4.80 to 5.0,



whereas total reducing sugar ranged 3.46% to 12.43% and reducing sugar from 1.29% to 2.2%. Ethanol yield varied with varieties and ranged from 22.05 L/T to 6 L/T. This year varieties SSV – 84, ICSSH-28 and CSH – 22SS

performed best for ethanol yield with 22.5 L/T, 21.55 L/T and 18.5 L/T respectively.

### RESEARCH PAPERS/BOOK CHAPTERS:

1. A research paper on **“Sugarcane Industry: by-products valorization for economic sustainability”** by Narendra Mohan and Anushka Agarwal is published in International Journal of Creative Research Thoughts (IJCRT).

2. A paper entitled **“Potential Areas of Energy Generation & Saving in Sugar Industry”** by Prof. D. Swain was presented during the National Seminar on "Potential & Possibilities of Energy Saving in Sugar Industries" organized by NSI, SED & ASSCT at Moradabad on 22<sup>nd</sup> March 2021.

3. A paper entitled **“Potential of Energy Production and Saving in Sugar Industry”** by Prof. D. Swain, sent for publication in sugar journal **“Sharkara”** January – March 2021 addition.

4. Presentation on **“Advancements in Process House for Energy Conservation – A Review”** by Narendra Mohan & M.P. Singh was made during the National Seminar on "Potential & Possibilities of Energy Saving in Sugar Industries" organized by NSI, SED & ASSCT at Moradabad on 22<sup>nd</sup> March 2021.

5. A research paper titled **“Micronutrient Fortification of Sugar”** by Narendra Mohan, Ashok K. Garg & Anushka Agarwal has been accepted on 18<sup>th</sup> February for inclusion in the SASTA Congress 2021.

6. A Review paper titled **“Sugar industry – Sustainable Source of Bio-Energy/Renewable Fuel”** by Narendra Mohan, Sanjay Awasthi and Anushka Agarwal is published in International Journal of

Engineering Research & Technology (IJERT), Vol. 10, Issue 01, January 2021.

7. A book chapter titled **“Advances in sugarcane industry: By-product valorization”** by Narendra Mohan & Anushka Agarwal has been published in book **“Sustainable Food Waste Management”**, Springer, Singapore, 5<sup>th</sup> January, 2021. ISSN: 978-981-15-8967-6.

8. A review paper titled **“Diversification for economic sustainability of Indian sugar industry proposed for”** by Narendra Mohan has been sent for publication in the proceedings of proposed seminar to be organized by National Federation of Co-operative Sugar Factories, New Delhi.

### CONSULTANCY:

The consultancy services of the institute were provided to the following on various technical matters relating to diversion of B Heavy molasses, validation of ETP’s, preparation of DPR’s for various projects etc.:

1	M/s The Sonipat Cooperative Sugar Mills Limited, District - Sonipat, Haryana.
2	M/s Mawana Sugar Works, Mawana, District - Meerut, U.P.
3	M/s Avadh Sugar & Energy Limited, Unit – Seohara, District - Bijnor, U.P.
4	M/s Haryana State Federation of Cooperative Sugar Mills Limited, Panchkula, Haryana.
5	M/s Dalmia Bharat Sugar & Industries Limited, Unit – Ramgarh, District – Sitapur, U.P.
6	M/s Balrampur Chini Mills Limited, Unit – Gularia, District – Lakhimpur – Kheri, U.P.

7	M/s Magadh Sugar & Energy Limited, Unit – New Swadeshi Sugar Mills, District – West Champaran, Bihar.
8	M/s Harinagar Sugar Mills Limited, Distillery Unit – Harinagar, District – West Champaran, Bihar.
9	M/s Kisan Sahakari Chini Mills Limited, Sathiaon, District – Azamgarh, U.P.
10	M/s Akbarpur Chini Mills Limited, Ambedkar Nagar, U.P.
11	Anamika Sugar Mills Private Limited, Agauta, Aurangabad, District – Bulandshahr, U.P.
12	M/s Bajaj Hindusthan Sugar Limited, Gola, District – Lakhimpur-Kheri, U.P.
13	M/s Bajaj Hindusthan Sugar Limited, Palia, District – Lakhimpur-Kheri, U.P.
14	/s Bajaj Hindusthan Sugar Limited, Maqsoodapur, District – Shahjahanpur, U.P.
15	M/s Dalmia Chini Mills, Unit – Nigohi, District – Shahjahanpur, U.P.
16	M/s U.P. State Sugar Corporation, Limited, Munderwa, District – Basti, U.P.
17	M/s Triveni Engineering & Industries Limited, Chandanpur, Hasanpur, District – Amroha, U.P.
18	M/s Triveni Engineering & Industries, Limited, Sabitgarh, District – Bulandshahr, U.P.
19	M/s Saryu Sahkari Chini Mills, Belrayan, District – Lakhimpur-Kheri, U.P.
20	M/s Rosa Sugar Works, Roza, District – Shahjahanpur, U.P.
21	M/s Riga Sugar Co. Limited, Riga, District – Sitamarhi, Bihar.
22	M/s Oswal Overseas Limited, Sugar Division, Nawabganj, District – Bareilly, U.P.
23	M/s Mankapur Chini Mills Limited,

	District – Gonda, U.P.
24	M/s Manjhaulia Sugar Industries Private Limited, District – West Champaran, Bihar.
25	M/s KSCM, Sampurna Nagar, District – Lakhimpur-Kheri, U.P.
26	M/s J.K. Sugar Limited, Meerganj, District – Bareilly, U.P.
27	M/s Hassanpur Sugar Mills, Hassanpur, District – Samastipur, Bihar.
28	M/s Dwarikesh Sugar Industries Limited, Faridpur, District – Bareilly.
29	M/s Bihar Distillery & Bottlers Private Limited, Arra, District – Bhojpur, Bihar.
30	M/s Globus Spirits Limited, Dhandua, Jandaha, District – Vaishali, Bihar.
31	M/s Sonasati Organics Private, Limited, Kothi, District – Gopalganj, Bihar.
32	M/s Kisan Sahakari Chini Mills Limited, Sathiaon, District – Azamgarh, U.P.
33	M/s Venus Sugar Limited, District – Sambhal, U.P.
34	M/s The Sonipat Co-operative Sugar Mills Limited, District – Sonipat, Haryana.
35	M/s Balrampur Chini Mills Limited, Unit – Maizapur, District – Gonda, U.P.
36	M/s Balrampur Chini Mills Limited, Unit – Akbarpur, District – Ambedkarnagar, U.P.
37	M/s Triveni Engineering & Industries Limited, District – Muzaffarnagar, U.P.
38	M/s Triveni Engineering & Industries Limited, Unit – Rani Nangal, District – Moradabad, U.P.
39	M/s Simbhaoli Sugars Limited, Unit – Chilwaria, District – Bahraich, U.P.
40	M/s Bajaj Hindustan Sugar Limited, Golagokarnath, District – Lakhimpur Kheri, U.P.

41	M/s Avadh Sugar & Energy Limited, Unit – New India Sugar Mills, District – Kushinagar, U.P.
42	M/s Parle Biscuits Private Limited, (Sugar Division) District – Bahraich, U.P.
43	M/s DCM Shriram Limited, Sugar Unit – Rupapur, District – Hardoi, U.P.
44	M/s Shree Laxmi Nrusinh Sugars LLP, Amdapur, District – Parbhani, Maharashtra.
45	M/s Bajaj Hindustan Sugar Limited, Unit – Khambharkhera, District – Lakhimpur Kheri, U.P.
46	M/s Dhampur Sugar Mills Limited, Unit – Dhampur, District – Bijnor, U.P.
47	M/s Dhampur Sugar Mills Limited, Unit – Meerganj, District – Bareilly, U.P.
48	M/s Triveni Engineering & Industries Limited, Sugar Unit – Deoband, District – Saharanpur, U.P.
49	M/s DCM Shriam Limited, Sugar Unit – Ajbapur, District – Lakhimpur Kheri, U.P.
50	M/s DCM Shriam Limited, Distillery Unit – Ajbapur, District – Lakhimpur Kheri, U.P.
51	M/s Harinagar Sugar Mills Limited, Distillery Unit – Harinagar, District – West Champaran, Bihar.
52	M/s Dalmia Bharat Sugar & Industries Limited, Distillery Unit – Nigohi, District – Shahjahanpur, U.P.
53	M/s Bajaj Hindusthan Sugar Mills Limited, Unit – Utraula, District – Balrampur, U.P.
54	M/s Uttam Sugar Mills Limited (Distillery Division), Unit – Barkatpur, District – Bijnor, U.P.
55	M/s Hafed Sugar Mills, Assandh, District – Karnal, Haryana.
56	M/s Ramala Sahakari Chini Mills Limited, Ramala, District – Bagpat, U.P.

57	M/s Dhampur Sugar Mills Limited, Unit – Rajpura, District – Sambhal, U.P.
58	M/s Bajaj Hindusthan Sugar Limited, Unit – Thanabhawan, District – Shamli, U.P.
59	M/s Dhampur Sugar Mills Limited, Unit – Mansurpur, District – Muzaffarnagar, U.P.
60	M/s Dalmia Bharat Sugar & Industries Ltd., Unit – Nigohi, Shahjahanpur, U.P.
61	M/s Triveni Engineering & Ind. Ltd., Unit – Deoband, District – Saharanpur, U.P.
62	M/s Simbhaoli Sugar Mills Ltd., Unit – Brijnathpur, District – Hapur, U.P.
63	M/s Balrampur Chini Mills Unit – Maizapur, District – Gonda, U.P.
64	M/s Dhampur Sugar Mills Ltd., Unit – Asmoli, District – Sambhal, U.P.

### ANALYTICAL SERVICES:

Besides analysis of sugar & sugar house products, Ethanol and effluents, institute started offering testing of Ethyl Alcohol based Sanitizer in its sophisticated, most modern NABL accredited analytical laboratory. Analytical services were rendered to following:

1	M/s Balrampur Chini Mills Limited, Unit – Balrampur, U.P.
2	M/s Maa Mahamaya Sahkari Shakkar Kharkhane Maryadit, District – Ambikapur, Chhattisgarh.
3	M/s Triveni Engineering & Industries Limited, Unit – Chandanpur, District – Amroha, U.P.
4	M/s Bajaj Hindusthan Sugar Limited, Rudhauri, U.P.
5	M/s Bajaj Hindusthan Sugar Limited, Utraula, U.P.
6	M/s L.H. Sugar Factory Limited, District –



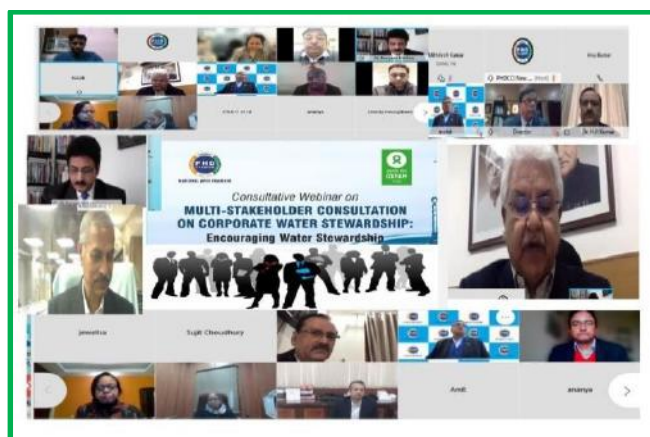
	Pilibhit, U.P.
7	M/s Magadh Sugar & Energy, Unit – New Swadeshi Sugar Mills Limited, Narkatiaganj, Bihar.
8	M/s Triveni Engineering & Industries Limited, Unit Raninangal, District – Moradabad, U.P.
9	M/s DSM Sugar Meerganj, (A unit of Dhampur Sugar Mills Limited), Meerganj, District – Bareilly, U.P.
10	M/s The Shahabad, Co-op. Sugar Mills Limited, District – Kurukshetra, Haryana.
11	M/s Kesar Enterprises Limited, Baheri, District – Bareilly, U.P.
12	M/s The Ugar Sugar Works Ltd., Unit – Malli, District – Kalburgi, Karnataka.
13	M/s L H Sugar Factories Ltd., District – Pilibhit, U.P.
14	M/s The Kisan Sahkari Chini Mills., Mahmudabad, District – Sitapur, U.P.
15	The Kisan Sahkari Chini Mills Ltd., Powayan, District – Shahjahanpur, U.P.
16	The Kisan Sahkari Chini Mills Ltd., Tilhar, District – Shahjahanpur, U.P.

### SALE OF SUGAR STANDARDS:

Sale of sugar standard grades commenced from 1st October 2020 for the sugar season 2020-21. Standard grades can be procured online also. The details are available on our website <http://www.nsi.gov.in> . Total 221 Nos. of Sugar Factories procured 1111 Nos. Standards till March 2021.

### OUR OTHER ACTIVITIES:

1. Director, NSI, participated and made a presentation about "**Water Management in Indian Sugar Factories**" during the "**Multi-stake holder consultation on corporate water Stewardship-Encouraging Water Stewardship**" organized by PHDCCI on 8<sup>th</sup> January, 2021.



2. Dr. Rakesh Bhatnagar, Vice Chancellor, Banaras Hindu University (BHU), also alumni of NSI, Kanpur visited the institute to see the ongoing R&D work on 25<sup>th</sup> January, 2021. Issues regarding development of enzymes for enhancing fermentation efficiency, for use in 2G ethanol production and also on production of Bio-gas/Bio-CNG from agriculture waste discussed.





3. Boiler-Pooja was organized at Experimental Sugar Factory at the institute on 25<sup>th</sup> January 2021.



4. The Institute celebrated 72<sup>nd</sup> Republic Day on 26<sup>th</sup> January, 2021. On this occasion, Director hoisted the National Flag and took the salute from the security guards. Awards were also distributed to the winners of various competitions organized during **“Swachhta and Satarkata Pakhwadas”**.



5. **“New Hostel cum Guest House”** became operational from 18<sup>th</sup> January, 2021 with stay of trainees from Nigerian Sugar Institute.



The hostel cum guest house has all modern amenities including recreation room, lobby and wi-fi facilities.

6. Crushing operations of the Experimental Sugar Factory (ESF) commenced on 12<sup>th</sup> February 2021 to impart practical training to the students of various courses. During the year, Installation of fully automatic batch



centrifugal, continuous centrifugal machine, AC-VFD for mills has been carried out.



7. Students of M.Sc. (Chemistry) and faculty of Christ Church College, Kanpur visited institute on 19<sup>th</sup> and 23<sup>rd</sup> February 2021 to look into various activities of the institute. They visited the Experimental Sugar Factory and various laboratories to get first-hand information about the R&D work being carried out.

The Education In-charge briefed them about the various job oriented courses being offered by the institute.



8. Industrial visit of students of BBA/BCA of Dr. Virendra Swarup College of Management Studies was carried out to observe the unit operations/ manufacturing process at Experimental Sugar Factory of Institute on 26<sup>th</sup> February, 2021.



9. Swachhta oath was administered to staff and students and special cleanliness drive was undertaken in and around campus from 16<sup>th</sup> February 2021 during the "Swachhta Pakhwada".



Essay, painting competitions, tree plantation and nukkad natak were also organized at the institute to create awareness about the swachhta.

10. On the occasion of "National Science Day" on 28<sup>th</sup> February 2021, Director, National Sugar Institute called upon the students at Experimental Sugar Factory to learn the basics

of science upon which the various unit operations in a sugar factory have been developed and the equipment too.



These principles are to be taken forward for development of innovative processes with the concept of taking them from "Lab to Factory". The students are required to make full utilization of Experimental Sugar Factory which is considered as the nursery of budding technologists.

11. Students and Staff of BND College, Kanpur visited various facilities of the institute on 24<sup>th</sup> March, 2021. They took great interest to know career prospects in sugar industry, particularly in Ethanol sector.



12. Students of DBS College, Kanpur during their educational tour visited various laboratories of the institute and also the Experimental Sugar Factory to seek first-hand information about unit operations involved in sugar production and sugarcane management during the crushing season 2021-22.

13. Students of Zee College of Pharmacy, Kanpur visited the institute to look into various facilities at the institute viz. Ethanol Unit, Speciality Sugar Division and Experimental Sugar Factory. They were also given information about various courses being conducted by the institute so that the students can explore the possibilities of building carrier in Sugar Industry/Alcohol Industry.