



**April-
June
2023**

NATIONAL SUGAR INSTITUTE KANPUR – 208017 (U.P.) INDIA



As per the revised estimates, the sugar production in the country during the sugar season 2022-23 is likely to be about 32.7 MMT and thus after considering exports to the extent of 6.0 MMT, the sugar availability in the domestic market shall be just adequate to meet the requirement. On the ethanol front, all out efforts shall be required to cope with 12% blending during ethanol supply year 2022-23.

While greater diversion of juice or syrup for ethanol production shall be required for higher blending targets in future, it would be essential to improve the sugarcane productivity on pan India basis. Newer sugarcane varieties are desperately required in the state of Uttar Pradesh where the dominating sugarcane variety has shown deterioration. Climate resilient, high yielding & high sugared varieties requiring lower irrigation water are to be developed.

Institute continued its endeavour to bring forth newer processing techniques viz. production of refined sugar using carbon dioxide from distillery fermenters, water purification technique based on phytoremediation and developing various value added products from sweet sorghum bagasse. In order to disseminate knowledge, the institute has planned many activities in coming months e.g. Executive Development Programme and International Conference where active participation of all stake holders is solicited.

**Narendra Mohan
Director**

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NSI AWARDED SECOND PRIZE FOR SWACHHATA ACTIVITIES:

National Sugar Institute, Kanpur was ranked second amongst all the organizations of Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution, Government of India for the exemplary cleanliness drive taken up during the **“Swachhata Pakhwada’s”** for the two consecutive years 2022 and 2023.

Shri Sanjiv Chopra, Secretary (Food & Public Distribution), Government of India gave away the awards to Director, National Sugar Institute in a ceremony at Krishi Bhawan, New Delhi on 6th April 2023.



NATIONAL SEMINAR ORGANIZED:

One day National Seminar on **“Water & Effluent Management in Sugar Industry- Emerging Challenges”** was jointly organized by National Sugar Institute and Central Pollution Control Board (CPCB) on 10th May 2023 at NSI, Kanpur. It was attended by large no. of delegates from Haryana, Bihar, Uttar Pradesh, Uttarakhand, Madhya Pradesh, Maharashtra and Karnataka.

Mrs. Reena Satawan, Additional Director, Central Pollution Control Board, New Delhi in her address stressed upon adoption of best available technologies and standard operating procedures for reducing the quantity of effluent discharge.



Shri Narendra Mohan, Director, National Sugar Institute, Kanpur suggested that instead of insisting on quantity of effluent discharge, the norms should stress on fresh water intake and quality of discharge, which may be made more stringent.

SHORT DURATION TRAINING PROGRAMMES ORGANIZED:

- i. National Sugar Institute, Kanpur organized training programme on **“Quality Control”** at the institute

from 15th May 2023 to 23rd June 2023. Technical personnel from 21 sugar factories of Uttar Pradesh Cooperative Sugar Federation participated in two weeks long programme. On similar lines various other training programme were conducted on the topics related to **“Efficient Ethanol Production”**, **“Cogeneration”** and **“Sugar crystallization** subsequently.



- ii. Three days training programme on **“Advanced Treatment Technology of Waste Water with Respect to Recycle/ Reuse of Treated Water”** was organized at National Sugar Institute, Kanpur 29th–31st May 2023. The programme was attended by officers of Central & State Pollution Control Boards (CPCB).



INAUGURATION OF SPORT STADIUM:

“N.A. Ramaiah Sports Stadium” was inaugurated by Sadhvi Niranjan Jyoti, Hon'ble Minister of State, Ministry of Consumer Affairs, Food & Public Distribution & Rural Development, Government of India on 18th May 2023 at National Sugar Institute, Kanpur. The stadium is equipped with a visitor gallery, dug outs & a change room. It will be used for athletic, cricket and other outdoor activities.



WORKSHOP ORGANIZED:

National sugar institute, Kanpur organized workshop jointly with Bharatiya Sugar at Kolhapur on 23rd-

24th June 2023. Director NSI, Kanpur addressed the participants on the matters related to modelling of sugar industry. He highlighted newer environment friendly processes to produce sugar quality as per market requirement, producing value added products and on boosting ethanol production.



INAUGURATION OF CHILDREN PARK & OPEN GYM:

A “**Children Park & Open Gym**” was inaugurated on 7th June 2023 by Mrs Pramila Pandey, Mayor, Kanpur at National Sugar Institute, Kanpur. The park on the one hand has swings, slides and sea-saw etc. for children, it also has sky walker, chest & shoulder press, hand rotator and pull up bars etc. in the open gym.



RESEARCH WORK:

1. Studies on Sweet Sorghum bagasse value addition:

The Experiments (two batches-10 gm bagasse each) related to fractionation of individual component of the SSB (cellulose, hemicellulose, lignin) have been completed. Observations on cellulose content in bagasse were not found in conformity with the literature values. Thus, reanalysis of cellulose content is currently ongoing. Along with the experimental work, literature survey related to CMF (SSB) is also ongoing.

2. Cane juice syrup study for shelf-life and production of alcohol:

Syrup Samples collected from three different factories viz; M/s Dalmia Bharat Sugar & Ind. Ltd., Unit – Jawaharpur, M/s Dalmia Bharat Sugar & Ind. Ltd. Unit - Nigohi, & M/s DCM Shriram Unit - Ajbapur after recording initial parameters like °brix, Pol purity, TRS etc. were kept at room temperature in Biochemistry laboratory to assess the shelf life of the syrup. It has been observed that no deterioration was seen in sample having high brix.

3. Study of Sugar beet lines for ethanol production:

Six sugar beet germplasm lines, viz., IISR Comp 1, LS 6, LKC HB, LKC 2020, LKC LB, LKC 2006 were sown by agriculture division and varieties were harvested in the month of April & May first week. Out of three varieties

only LS-6, IISR Comp and LKC2020 germinated and harvested. The ethanol yield from the same has been evaluated.

4. Comparative study on polarization by using lead, non-lead clarificants and NIR polarimetry:

Samples of B heavy molasses was used for the purpose & polarization was made at 589.9 nm & 880 nm by using lead & Carrez reagent. A decrease in pol % & purity by 0.4 & 3.68 unit respectively was observed at 880 nm, in case of samples clarified with Carrez reagent. However, the polarization was out of range at 589.9 nm by using Carrez reagent. As regards, colour (IU) of B heavy molasses, it was also observed that the colour reduction was 56.1% in case of sample clarified with lead subacetate while it was only 19.10% in case of Carrez reagent.

5. Production of Invert syrup directly from sugarcane juice and Raw sugar:

Two batches of medium invert sugar were prepared from raw sugar solution (271 IU, using ICUMSA METHOD GS 10) using membrane filtration. One batch was dosed with Monk fruit extract (98% pure) while the other batch was dosed with Stevia extract (99 % pure). Quarterly analysis of parameters such as brix, pol, purity, RS, TRS, colour was carried out. The medium invert liquid sugar samples exhibited good keeping quality with no microbial growth. The liquid sugar samples were kept at 3

different temperatures (@ 15 °C, 32 °C and 36 °C) to observe changes such as microbial growth, crystal formation etc. No marked changes were seen in the samples kept at different temperatures in second month also. No microbial growth or any type of crystal formation is observed however, the stevia sample of liquid sugar kept at 15 °C formed a cloudy mass, which upon reheating disappeared.

6. Comparative study of activated bio-char from sugarcane and sweet sorghum bagasse in decolourization of sugar melt:

Characterization and data interpretation of prepared biochars was carried out. Manuscript of a paper for the comparative study of the efficiency of biochars prepared from sweet sorghum bagasse and sugarcane bagasse for decolourization of 65° brix of sugar melt liquor has been sent for publication.

7. Conversion of wastewater into potable water through Bioremediation technique:

Further trials with effluent for different retention time in primary and secondary stages of treatment was done. For the purpose an innovative Bio-filter was developed for primary treatment, secondary treatment was based on Phytoremediation using water hyacinths. Analysis of physiochemical parameters of the samples before and after treatment indicate satisfactory performance of the system.



8. Shelf life study of press mud over the period of time: Samples of press mud from UP, Bihar, Haryana and Chhattisgarh were stored at the institute.

10 blank + 10 treated samples (enzyme provided by M/s Praj Industries Ltd.) of each factory were analysed for various parameters such as pH, total solids (moisture content), ash content, total volatile solids (TVS), Lignin and total convertible volatile solids (TCVS) on monthly basis to observe the degradation in both blank as well as treated press mud samples.

9. Utilisation of Sweet Sorghum bagasse for production of Dietary Fibre: Microwave-aided alkali treatment and autoclave-aided alkali treatment was given to sweet sorghum bagasse. Treated samples have been analysed for physicochemical properties and structural characterization of sweet sample has been done by Fourier Transform Infrared Spectroscopy (FTIR). A paper has been prepared on the outcome of the results for

presentation in some forthcoming convention.

RESEARCH PAPERS:

1. A research paper entitled **“Melt Carbonation – A Different Approach & its Comparison with Phosphatation”** by Narendra Mohan & Mahendra Yadav, sent for publication in the proceeding of Deccan Sugar Technologists Association (DSTA).
2. A research paper entitled **“Silica Nanoparticles from Sugarcane Bagasse Fly Ash: Converting Waste to Wealth”** by Shalini Kumari, Vishnu Prabhakar Srivastava & Narendra Mohan sent for publication in the International Journal of Science and Research (IJSR) Volume 12, Issue 4, April-2023.
3. A research paper entitled **“Ethanol from Maize: A Potential Feed Stock”** by Narendra Mohan sent for publication in the proceeding of Annual Convention of Sugar Technologists' Association of India (STAI).
4. A research paper entitled **“Performance of Grossly Polluting Industries-Sugar & Distillery Units Located in River Ganga Basin”** by Narendra Mohan & Anoop Kanaujia, published in the proceeding of National Seminar on “Water & Effluent Management in Sugar Industry-Emerging Challenges” organized at National Sugar Institute, Kanpur.

5. A research paper entitled **“A Sustainable Indian Sugar Industry Through Efficient Exploitation of Sugarcane By-Products”** by Narendra Mohan & Anoop Kanaujia published in the Sharkara, APRIL-JUNE 2023, VOLUME: 55, NO. 01 ISBN: 978-93-5445-372-4.

6. A research paper entitled **“Sweet Sorghum: A Wonder Crop”** by Shalini Kumari, Mamta Shukla, Shruti Shukla and Himanshu Mishra has been sent for publication in proceeding of the Annual Convention of The Sugar Technologists' Association of India (STAI).

7. A research paper entitled **“Comparative Study of Activated Biochar from Sugarcane Bagasse and Sweet Sorghum Bagasse in Dec-colorisation of Sugar Melt”** by Shalini Kumari, Sudhanshu Mohan and Narendra Mohan, has been sent for publication in proceeding of the Annual Convention of Sugar Technologists' Association of India (STAI).

MoU SIGNED:

1. National Sugar Institute, Kanpur signed Memorandum of Understanding with ICAR- Indian Institute of Maize Research, Ludhiana on 10th April 2023. The MoU focusses on development of new maize hybrids suitable for different agro-climatic zones and evaluation of performance with

respect to ethanol production potential.



2. National Sugar Institute, Kanpur signed Memorandum of Understanding with Great Lakes University of Kisumu, Kenya on virtual platform on 19th May 2023, for conducting teaching & training in the area of sugar processing for the personnel working in Kenyan sugar factories.



CONSULTANCY:

Requests for availing consultancy services of the institute were received and also provided to various sugar factories ethanol & other allied units on various technical matters relating to diversion of B Heavy molasses/syrup, validation of ETP's, preparation of

DPR's, validation of no increase in pollution loads in ethanol units upon enhancement in capacity etc.

Sr. No.	Factory Name
1	M/s Magadh Sugar and Energy Ltd., (Unit - Bharat sugar Mills), Gopalganj, Bihar.
2	M/s KM Sugar Mills Ltd., Ayodhya, U.P.
3	M/s PBS Food (Sugar) Pvt., Ltd., Bijnor, U.P.
4	M/s Wave Industries Pvt. Ltd., Bulandshahar, U.P.
5	M/s Balrampur Chini Mills Ltd., Chemical Division –Balrampur, U.P.
6	M/s Triveni Engineering & Industries Ltd., Unit – Raninangal, Moradabad, U.P.
7	M/s The Amaravathi Co-operative Sugar Mills, Tirupur, Tamil Nadu
8	M/s Bajaj Hindusthan Sugar Mills Ltd., Unit- Kinauni, Meerut, U.P.
9	M/s UP Co-operative Sugar Factories Federation Ltd., Lucknow, U.P.
10	M/s Dhampur Sugar Mills Ltd., Chemical Division, Bijnor, U.P.
11	M/s Ganga Kisan Sahkari Chini Mills Ltd., Unit- Morna, Muzaffarnagar, U.P.
12	M/s E.I.D. Parry (India) Ltd., Sankil, Vazianagaram, Andhra Pradesh
13	M/s Nirani Sugar Mills Ltd., (Sugar Division), Mudhol, Bagalkote, Karnataka

14	M/s MRN Cane power India Ltd. (Sugar Division), Bagalkote, Karnataka
15	M/s DCM Shriram Ltd., Unit- Hariawan, Hardoi, U.P.
16	M/s LH Sugar Factories Ltd., Distillery Division, Pilibhit, U.P.
17	M/s Dhampur Sugar Mills Ltd., Unit – Dhampur, Bijnor, U.P.
18	M/s The Shahabad Cooperative Sugar Mills Ltd., Shahabad, Kurukshetra, Haryana
19	M/s Dalmia Bharat Sugar & Industries Ltd., Unit – Ramgarh, Sitapur, U.P.
20	M/s Balrampur Chini Mills Ltd., Unit – Balrampur, U.P.
21	M/s Shri Sai Priya Sugar Ltd., Bagalkot, Karnataka.
22	M/s Bajaj Hindusthan Sugar Ltd., Unit – Kundarkhi, U.P.
23	M/s Dalmia Bharat Sugar & Industries Ltd., Unit – Nigohi, Shahjahanpur, U.P.
24	M/s Piccadily Agro Industries Ltd., Karnal, Haryana.
25	M/s Shravasti Kisan Sahkari Chini Mills Ltd., Nandra, Bahraich, U.P.
26	M/s SBEC Sugar Ltd., Malakpur, Baraut, Bagpat, U.P.
27	M/s Aarti Distilleries Pvt. Ltd., Kanpur Dehat, U.P.

ANALYTICAL SERVICES:

Besides analysis of sugar & sugar house products, ethanol and effluents etc., Institute offers testing of Ethyl Alcohol based Sanitizer in its sophisticated, most modern NABL accredited analytical laboratory and other laboratories of the institute.

Analytical services were rendered to following:

Sr. No	Factory Name
1	M/s Triveni Engineering & Ind. Ltd., Sugar Unit- Chandanpur, Amroha U.P.
2	M/s Balrampur Chini Mills Ltd., Unit – Balrampur, U.P.
3	M/s Triveni Engineering & Ind. Ltd., Sugar Unit- Rani Nangal, Moradabad, U.P.
4	M/s Rana Sugars Ltd., Moradabad, U.P.
5	M/s Shree Dwarikadheesh Sugar Industry, Lakhimpur Kheri, U.P.
6	M/s Triveni Engineering & Ind. Ltd., Sugar Unit- Khatauli, Muzaffarnagar, U.P.
7	M/s Dhampur Bio Organic Ltd., Unit – Meerganj, Bareilly, U.P.
8	M/s Dhampur Bio Organic Ltd., unit – Mansurpur, Muzaffarnagar, U.P.
9	M/s Dhampur Bio Organic Ltd., unit – Asmoli, Sambhal, U.P.
10	M/s Balrampur Chini Mills Ltd., unit – Akbarpur, Ambedkar Nagar, U.P.

12	M/s Govind Sugar Mills, unit – Aira, Lakhimpur Kheri, U.P.
13	M/s Avadh Sugar & Energy Ltd., unit – Seohara, Bijnor, U.P.
14	M/s Maa Mahamaya Sahkari Shakkar Karkhana Maryadit, Ambikapur, Chattisgarh
15	M/s Rudra-Bilas KisanSahkari Chini Mills, Bilaspur, Rampur, U.P.
16	M/s L.H. Sugar Factories Ltd., Pilibhit, U.P.
17	M/s Lakshmi Sugar Mills Company Ltd, Roorkee, U.K.
18	M/s Magadh Sugar & Energy Ltd. Unit – Narkatiaganj, Bihar
19	M/s Kisan Sahkari Chini Mills, Budaun, U.P.
20	M/s Kisan Sahkari Chini Mills Ltd., Puranpur, Pilibhit, U.P.
21	M/s Kisan Sahkari Chini mills Ltd., Gajraula, Amroha, U.P.
22	M/s Sarjoo Sahkari Chini Mills, Belrayan, Lakhimpur Kheri, U.P.
23	M/s Balrampur Chini Mills Ltd., Unit – Kumbhi, Lakhimpur, U.P.
24	M/s Kisan Sahkari Chini mills Ltd., Bijnor, U.P.
25	M/s Kisan Sahkari Chini mills Ltd, Kaimganj, Farrukhabad, U.P.
26	M/s Magadh Sugar & Energy Ltd., Unit – Bharat Sugar Mill, Gopalganj, Bihar
27	M/s Avadh Sugar & Energy Ltd., Ltd. Unit- Seohara, Bijnor, U.P.

OUR OTHER ACTIVITIES:

1. Director (Sugar), Directorate of Sugar & Vegetable Oils (Department of Food and Public Distribution Ministry of Consumer Affairs, Food and Public Distribution Department of Food & Public Distribution, Krishi Bhawan, New Delhi visited Ethanol Unit, Special Sugar Division and other facilities at National Sugar Institute, Kanpur on 17th April 2023.



2. Students of B. Tech. (Chemical Engineering) CSJM University, Kanpur visited National Sugar Institute, Kanpur on their study tour to understand unit operations in sugar and ethanol units on 17th April 2023.



3. National Sugar Institute in its endeavour to produce healthier and nutritive sugars, got success in producing **“Super Sugar”** containing carbohydrates, protein, essential fatty acids, vitamins, dietary fibre and minerals.



The **“Super Sugar”** has been produced by blending the **“Natural Cane Sugar”** with Spirulina and Basil under controlled conditions.

4. **“World Earth Day”** celebrated at NSI, Kanpur on 23rd April 2023 by taking a pledge for planting more trees, saving water, reducing and recycling waste.



5. Director, National Sugar Institute, Kanpur attended **“Chintan Shivir”**

of the Department of Food & Public Distribution at Surajkund, Faridabad on 27th-28th April 2023.

S/Shri R. S. Sodhi, Sh. Ashok Gulati, Sh. S Shivakumar who are experts in the field of Agriculture, Food management, PDS chain etc. shared their ideas on how to fulfil the Vision of the #DFPD and on realignment of #PDS System with expectations of its beneficiaries. Shri Shiv Kherra, Author of some best sellers, also delivered a motivational talk.



6. Director, National Sugar Institute, Kanpur attended National Seminar on **"Maize to Ethanol"** organized by Department of Food & Public Distribution at Vanija Bhawan on 2nd May 2023.



He also chaired a session on **"Maximizing Ethanol Production by Improving Technical Efficiency and Reducing Cost of Production through Optimizing Inputs and Value Addition"**.

7. Faculty & Students of Biotechnology discipline of Axis College of Engineering, Kanpur visited National Sugar Institute, Kanpur on their study tour to visit the institute on 9th May 2023. They were Imparted knowledge about process of industrial fermentation and role of biotechnology in distillation sector.



8. Students of M.Sc. (Life Science) and B.Sc. (Biotechnology) of KIET, Kanpur undertook study tour of the institute on 23rd May 2023. Information provided to them about courses conducted by the institute and also about the Indian Sugar Industry.

9. National Sugar Institute, Kanpur in pursuit of developing alternate feed stocks for production of ethanol joined hands with leading sugar groups, M/s Balrampur Chini Mills Ltd. and M/s Dalmia Bharat Sugar Mills Ltd. to undertake trials for

intercropping of sweet sorghum with sugarcane at Maizapur and Nigohi respectively. Various varieties of Sweet Sorghum and Sugar Beet have also been grown at institute.



10. Director, NSI, Kanpur addressed the seminar at National Chemical Laboratory, Pune on the topic **"Sugar Industry- An Industry of Enormous Possibilities"** on 26th May 2023.



11. During the **"Environment Week"**, a poster making competition was organized at the institute on 3rd June 2023, for different categories on the topics "Save Trees for Better Earth", "Save Water to Save Environment" & "Protecting Environment through Efficient Plastic & e-Waste Management". The winners were awarded by the Director, NSI for their efforts.



12. Director, NSI, Kanpur & Assistant Professor Sugar Technology, attended the 33rd session of International Commission for Sugar Standards (ICUMSA) at Vienna, Austria on 14th June 2023. Director, NSI, Kanpur deliberated on analysis of sugar for Sulphur content and on use of non-lead clarifying agents during polarimetry. They also met Ambassador of India in Austria and briefed him about institute activities.

