

ANNUAL REPORT

2022-23



NATIONAL SUGAR INSTITUTE

Department of Food & Public Distribution
Ministry of Consumer Affairs, Food & Public Distribution
Government of India
Kanpur-208 017, INDIA
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FROM DIRECTOR'S DESK



National Sugar Institute achieved many more milestones during the year 2022-23. The year saw upsurge in institute activities in all spheres of academics, research, consultancy and those related to quality control of sugar. Efforts to take institute activities to other countries continued during the year also and yielded desired results as well. The institute signed a MoU with Great Lakes University of Kisumu, Kenya for conducting training program for technical personnel from Kenyan sugar factories, developing infrastructural facilities at University of academic and research activities and miscellaneous other technical matters. Process for signing of MoU's with organizations from Cuba and Fiji was also initiated for similar objectives.

Institute continued its endeavor 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 addition to it, laboratory scale trials continued for production of low glycemic index sugar and on production of bio-ethanol from sugar beet and sweet sorghum. Institute worked extensively on production of value-added products from bagasse and could successfully develop technologies for producing Vanillin and Activated Bio-char. Institute in pursuit of converting waste to resource, developed technology for production of nano- silica particles from bagasse based boiler ash and for which patent application was also filed.

In order to disseminate knowledge, the institute organized training program on behalf of Central Pollution Control Board besides conducting workshops on "Efficient water management & ETP operation" and "Intellectual Property Rights" with CPCB and NRDC respectively. Institute has planned many activities in coming months too e.g Executive Development Program and International Conference where active participation of all stake

holders is solicited. The new academic session 2023-24 to commence from July 2023 and for admission to various courses, online examination was conducted at twelve centers in various sugar producing states of the country.

As regards domestic sugar industry, 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 (with 4.1 MMT of sugar diverted for ethanol production) 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. Indian sugar industry although is well placed presently but as I always stress shall have to make effective utilization of entire sugarcane value chain by investing more on R&D to develop value added products and integrating with other industries, particularly the MSME sector. Production of specialty sugars and hygienic packaging of sugar are going to be key areas for the sugar industry in future.

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 the need of hour.

On behalf of the institute, I would like to extend my warm regards and gratitude to Shri Piyush Goyal, Hon'ble Minister of Commerce & Industry, Consumer Affairs, Food & Public Distribution and Textiles, Government of India for his keen interest in the interest in the institute activities and continued support. I also extend my sincere thanks to Sadhvi Niranjana Jyoti, Hon'ble Minister of State, Ministry of Consumer Affairs, Food & Public Distribution and Rural Development, Government of India for her valuable guidance in taking the institute activities forward.

I gratefully acknowledge the keen interest, unstinted support and guidance of Secretary (Food & Public Distribution) and Joint Secretary (Sugar & Administration), Department of Food & Public Distribution due to which the institute activities were made more vibrant and could be taken beyond the boundaries. The support of other ministry officials is also gratefully acknowledged which helped the institute in taking up many developmental activities and spreading activities to many other sugar producing countries across the globe. Last but not the least, hard work, support and keen involvement of all the faculty, staff and students is deeply acknowledged.



(Narendra Mohan)
Director

❖ ABOUT NSI

❖ GENESIS:

Sugar production from different raw material is as old as evolution of civilization although the sugar quality & processing technique has undergone significant change over the years. It is believed to be first discovered in New Guinea thousands of years ago, before taking the route to India. In India, earliest known production of crystalline sugar began in northern India, although the exact period is unclear. The earliest evidence of sugar production comes from ancient Sanskrit & Pali texts. However, the history of modern method of sugar manufacture in India is traced back to 1930 when protection was granted to the industry by Government. Soon thereafter, in 1936 the Imperial Institute of Sugar Institute was established which over the years having gone through change of the names and is known as National Sugar Institute, since 1957. Previously housed in one of the premier engineering institute, namely, HBTI (now HBTU), it was shifted to its present premises in the year 1963.

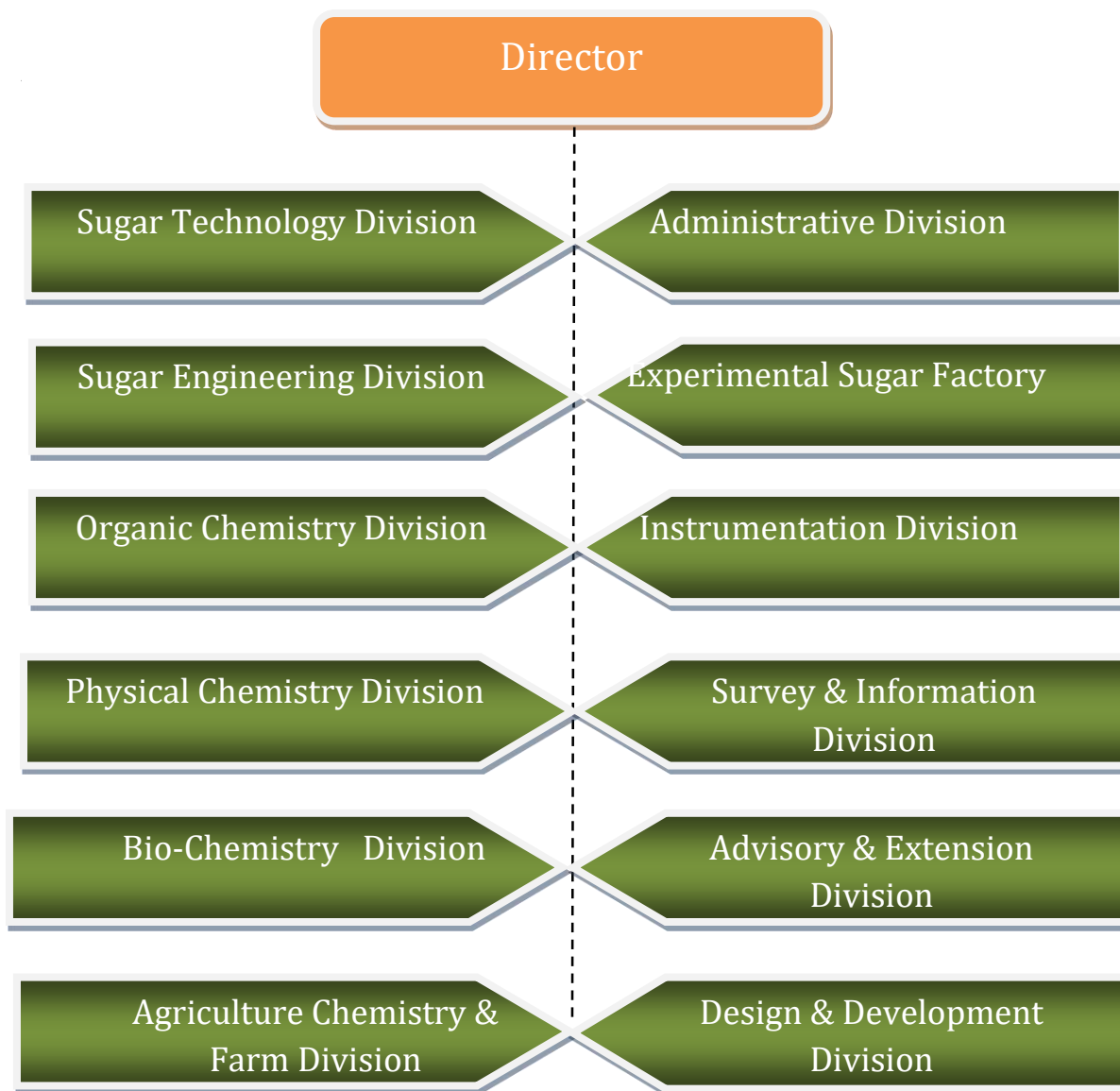
National Sugar Institute under Government of India, Ministry of Consumer Affairs, Food & Public Distribution, Department of Food & Public Distribution having its global presence is engaged in multiple activities of teaching, research & consultancy for the benefit of the sugar & allied industry. In fact, National Sugar Institute can claim to be the premier Institute providing lab to land service to the sugar & allied Industry all across the globe.



➤ **OBJECTIVES:**

- To work extensively for the creation of new knowledge in the area of sugar & alcohol production.
- To include strong understanding of the complex interdisciplinary subjects.
- To create realization that the application of science can solve the sweet sugar problems.
- To develop economic, indigenous technologies for sugar processing, alcohol production & for producing value added products.
- To provide solid foundation of scientific principles, skills and practical training.
- To create awareness about environmental issues in sugar, alcohol & allied industries and to develop innovative technologies for water conservation & effluent treatment.
- To develop roadmap for economic & environmental sustainability of the sugar industry.

❖ ORGANIZATIONAL SETUP:



Each division has its predefined aims & objectives, according to which they plan & execute the work, particularly, with a vision to convert institute as an institute of eminence having its global presence. Keeping this objective in view, the institute has also taken up an exercise for restructuring so as to strengthen the various divisions looking to the institute vision plan. The different divisions support each other in various academic, research & consultancy activities for rendering institute services effectively and in a time bound manner.

❖ ADVISORY BOARD:

The Government of India constitutes the Advisory Board of the National Sugar Institute, Kanpur to review the working of the institute & guide for carrying out its functions more effectively. The present constitution of the existing Advisory Board is as under:

- | | |
|---|----------|
| 1. Joint Secretary (S&A),
Ministry of Consumer Affairs, Food & Public Distribution,
Department of Food & Public Distribution,
Krishi Bhawan, New Delhi -110001 | Chairman |
| 2. Director (Sugar Administration),
Ministry of Consumer Affairs, Food & Public Distribution,
Department of Food & Public Distribution,
Krishi Bhawan, New Delhi -110001 | Member |
| 3. The Director,
Directorate of Sugar and Vegetable Oils,
Ministry of Consumer Affairs, Food & Public Distribution,
Department of Food & Public Distribution,
Krishi Bhawan, New Delhi-110001 | Member |
| 4. Professor & Head,
Chemical Engineering Department,
Indian Institute of Technology,
Kalyanpur, Kanpur – 208016 (U.P.) | Member |
| 5. Director,
Indian Institute of Sugarcane Research,
Raibareli Road, PO-Dilkusha,
Lucknow – 226 002 (U.P.) | Member |
| 6. President
The Sugar Technologists' Association of India,
Plot no. 15, 3 rd Floor, 301, Agarwal Okhla Plaza,
Community Centre, Okhla Phase-1,
New Delhi – 110 020 | Member |
| 7. President
Indian Sugar Mills Association,
Ansal Plaza, Blcok-C, 2 nd Floor,
August Kranti Marg,
New Delhi – 110 049 | Member |

- | | |
|---|---------------------|
| 8. The President
National Federation of Co-operative Sugar Factories Ltd.,
Ansal Plaza, Block-C, 2 nd Floor,
August Kranti Marg,
New Delhi – 110 049 | Member |
| 9. The President
All India Distillers Association,
805, Sidhartha,
96, Nehru Place,
New Delhi – 110 011 | Member |
| 10. Managing Director,
Maharashtra State Co-operative Sugar
Factories Federation Limited, Sakhar Bhawan,
11th Floor, Plot No. 230, Nariman Point,
Mumbai - 400021 | Member |
| 11. Technical Advisor (Sugar),
Haryana State Federation of Coop.
Sugar Mills Ltd.,
Panchkula, (Haryana) - 134109 | Member |
| 12. Director,
U.P. Council of Sugarcane Research,
Gandhiganj,
Shahjahanpur – 242001 (U.P.) | Member |
| 13. Director,
Sugarcane Breeding Institute,
Coimbatore, (Tamil Nadu) - 641007 | Member |
| 14. Vice Chancellor
Harcourt Butler Technological University
Nawabganj,
Kanpur (U.P.), 208002 | Member |
| 15. Director,
National Sugar Institute,
Kalyanpur,
Kanpur- 208017 (U.P.) | Member
Secretary |

❖ SERVICES:

❖ HUMAN RESOURCE DEVELOPMENT:

Besides conducting Fellowship programmes, institute conducts various Post Graduate Diploma & Certificate Courses in Sugar Technology, Sugar Engineering, Alcohol Technology & other related disciplines.

Entrance examination for admission to these Courses viz. Sugar Technology, Alcohol Technology, Sugar Engineering, Quality Control & Environment Science, Sugarcane Productivity & Maturity Management, Industrial Instrumentation & Process Automation and Sugar Boiling etc. was conducted on 26th June 2023 at twelve centers, namely; Kanpur, New Delhi, Patna, Chennai, Kolkata, Pune, Meerut & Gorakhpur etc. The entrance examination was conducted through on-line mode to facilitate candidates also during pandemic considering various restrictions and to follow COVID appropriate behavior.

❖ DETAILS OF COURSES:

Institute is dedicated towards development of required technical manpower for the sugar, alcohol & allied industries from more than eight decades. Institute keeps closer interaction with the industry to take measures for restructuring of existing & introduction of new courses so as to meet requirement of technical personnel in the sugar industry. The Post Graduate Diploma Courses in Sugar Technology, Sugar Engineering & Alcohol Technology have been recognized by All India Council for Technical Education (AICTE). Following courses conducted during the academic year 2022-23.

Research Programme/Fellowship Courses	No. of Seats	Duration	Minimum Qualifications
Fellowship of National Sugar Institute in Sugar Technology or Sugar Chemistry	As per requirement	One year or three off-seasons of four months, each followed or preceded by practical training for two cane-crushing seasons in a sugar factory.	Associateship of National Sugar Institute or Vasantdada Sugar Institute in Sugar Technology
Fellowship of National Sugar Institute in Sugar Engineering	As per requirement	One year or three off-seasons of four months, each followed or preceded by practical training for two cane-crushing seasons in a sugar factory.	Associateship of National Sugar Institute or Vasantdada Sugar Institute in Sugar Engineering

Fellowship of National Sugar Institute in Fermentation Technology	As per requirement	One year followed or proceeded by practical training of one year in a distillery or brewery.	Diploma in Industrial Fermentation & Alcohol Technology from National Sugar Institute, Kanpur or Vasantdada Sugar Institute, Pune
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Post Graduate Diploma Courses	No. of Seats	Duration	Minimum Qualifications
Associateship of National Sugar Institute in Sugar Technology	66	Two and half academic years	B.Sc. with Chemistry, Physics and Mathematics or Bachelor Degree in Chemical Engineering.
Associateship of National Sugar Institute in Sugar Engineering	40	One and half academic years	Bachelor Degree or AMIE (from Institute of Engineers, India) in Mechanical/Production/Electrical/Electrical & Electronics.
Post Graduate Diploma Course in Industrial Fermentation and Alcohol Technology	50	One and half academic year.	B.Sc. with Chemistry/Applied Chem./Industrial Chem. or Bio-Chem. as one of the subject or B.Tech. in Bio-Technology/Chemical Engineering or Bio-chemical Engineering.
Post Graduate Diploma Course in Sugarcane Productivity & Maturity Management	20	One Academic Year	B.Sc./ B.Sc. Agriculture
Post Graduate Diploma Course in Industrial Instrumentation & Process Automation	17	One Academic Year	Bachelor's Degree or A.M.I.E. (from The Institutions of Engineers, India) in Electronics & Instrumentation/Electronics/Instrumentation/Electrical & Electronics/Applied Electronics & Instrumentation/ Electronics & Communication/ Instrumentation & Control

Post Graduate Diploma Course in Quality Control and Environmental Science	22	One Academic Year	B.Sc. with Physics, Chemistry, Maths or Zoology, Botany, Chemistry/B.Sc. with Environmental Science/ B.Sc. (Bio Tech)/B. Tech. (Bio Tech).
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Certificate Courses	No. of Seats	Duration	Minimum Qualification
Certificate Course in Sugar Engineering	17	One and half academic years	Diploma in Mechanical/Production/Electrical/Electrical & Electronics from a recognized Technical Institute/Polytechnic.
Certificate Course in Sugar Boiling	63	One off-season (July to Nov.) followed by 5 months practical training from Dec. to April in a sugar factory.	Matriculate/High school with Science/Agriculture.
Certificate Course in Quality Control	30	Four months(July to October)	12th standard in Science (Physics, Chemistry & Mathematics)

❖ MANPOWER TRAINED:

(UPTO ACADEMIC SESSION 2022-23)

National Sugar Institute since its inception has been catering to the manpower needs of sugar & allied industry by providing trained technical personnel. In the beginning only the Post Graduate Course in Sugar Technology was conducted, however, with the passage of time in order to cater to the growing requirement of sugar and allied industries, courses in other disciplines at Post Graduate and Certificate levels were also introduced. Students from many sugar producing countries e.g. Australia, Egypt, Nigeria, Kenya, Myanmar, Yemen, Sri Lanka, Ethiopia, Uganda, Bangla Desh, Nepal, Bhutan, Iran, Iraq and Ghana etc. have taken up studies at the institute.

Name of the Courses	Indian	Foreign	Total
Ph.D.	140	1	141
Fellowship of National Sugar Institute in Sugar Technology or Sugar Chemistry/Sugar Engineering/Fermentation Technology	53	01	54

Associateship of National Sugar Institute in Sugar Technology	3504	80	3584
Associateship of National Sugar Institute in Sugar Engineering	752	29	781
Post Graduate Diploma Course in Sugarcane Productivity & Maturity Management*	349	05	354
Post Graduate Diploma Course in Industrial Instrumentation & Process Automation*	58	1	59
Post Graduate Diploma in Industrial Fermentation and Alcohol Technology	1292	15	1307
Certificate Course in Sugar Engineering	419	17	436
Certificate Course in Sugar Boiling	2552	32	2584
Certificate Course in Quality Control	152	--	152
Total	9271	181	9452

*Earlier conducted as Certificate Course.

❖ ENROLMENT OF THE STUDENTS FOR ACADEMIC YEAR 2022-23:

Details of students admitted in various courses during the academic year 2022-23 are as under:

S.No.	Course	No. of students
1.	Associateship of National Sugar Institute (Sugar Technology)	66
2.	Associateship of National Sugar Institute (Sugar Engineering)	40
3.	Post Graduate Diploma in Industrial Fermentation and Alcohol Technology	50
4.	Post Graduate Diploma Course in Sugarcane Productivity & Maturity Management	20
5.	Post Graduate Diploma Course in Industrial Instrumentation & Process Automation	03
6.	Post Graduate Diploma Course in Quality Control and Environmental Science	22
7.	Sugar Engineering Certificate Course	17
8.	Sugar Boiling Certificate Course	63

9.	Certificate Course in Quality Control	30
Total		311

In the above mentioned courses, the institute awards Post Graduate Diploma or Certificates to the successful students. The students are trained in all the relevant areas of Sugarcane Agriculture, Engineering and Technology of the Sugar & Alcohol manufacturing or on the subjects as per the curriculum of the respective courses.

The institute also arranges lectures of eminent scientists and practicing engineers/technologists so as to enrich the knowledge of students with latest technological developments taking place in the sugar and allied industries across the globe. During the year 2022-23 also, many such lectures of practicing engineers and technologists were arranged on the topics of sugar production, ethanol production, by-product utilization and on environmental issues either in physical or virtual mode.

❖ SCHOLARSHIPS AWARDED TO THE STUDENTS DURING ACADEMIC YEAR 2022-23

S.No.	Name of Scholarship	Name of student	Course	Year	Basis of Award
1.	Government of India Scholarship	1. Mayank Singh 2. Dheeraj Chauhan 3. Adarsh Rajput 4. Arjun Prasad	ANSI (SE) First Year	2022-23	1 st & 2 nd in order of merit from entrance exam
		1. Abhinav Singh 2. Tushar Baliyan	ANSI (ST) 1 st Year	2022-23	1 st & 2 nd in order of merit 1 st Year
2.	Late Dr. Kripa Shankar Memorial Scholarship	Abhinav Singh	ANSI (ST) 1 st Year	2022-23	Highest marks in Sugar Tech. 1 st Year
3.	Late S.N. Gundu Rao Memorial Scholarship	Abhinav Singh	ANSI (ST) 1 st Year	2022-23	1 st in the In order of merit from 1 st Year exam

❖ AWARDS/SCHOLARSHIPS:

S. No.	Donor	Name of the Student	Course	Year	No.	Basis of Award/Scholarship
1	Indian Sugar Mill Association, New Delhi	1. Abhinav Singh 2. Tushar Baliyan 3. Ayush Bhati 4. Manvendra Singh 5. Ashutosh Tiwari 6. Subham Kumar	ANSI (ST) 1 st Year ANSI (ST) 1 st Year ANSI (SE) Final Year ANSI (SE) Final Year ANSI (SE) Final Year DIFAT Final Year	2022-23 2022-23 2022-23 2022-23 2022-23 2022-23	01 01 01 01 01 01	Outstanding academic performance & participation in various extra-curricular activities.
2	ISGEC Award by M/s ISGEC, Noida	1. Samson Akorede Adeoya 2. Subham Kumar 3. Garvjeet Dahiya	ANSI (ST) Final Year DIFAT Final Year ANSI (SE) Final Year	2022-23 2022-23 2022-23	01 01 01	1 st in the order of merit
3	Praj Excellence Award by M/s Praj Industries, Pune	Subham Kumar	DIFAT Final Year	2022-23	01	1 st in the order of merit
4	Award by National Federation of Co-operative Sugar Factories, New Delhi	Samson Akorede Adeoya	ANSI (ST) Final Year	2022-23	01	1 st in the order of merit
5	Award by M/s Global Cane Sugar	1. Virendra Mathur	SECC Final Year	2022-23	01	1 st in the order of merit

	Services Pvt. Ltd., New Delhi	2. Kaushal Kumar	SBCC Final Year	2022-23	01	1 st in the order of merit
		3. Sonam Prajapati	CCQC	2022-23	01	1 st in the order of merit
6	Bhagwanta Devi Memorial Scholarship	1. Rahul Singh	SBCC	2022-23	01	1 st in the order of merit in Entrance Examination
		2. Manish Kumar				
		Manish Singh	CCQC	2022-23	01	1 st in the order of merit
		Raju Gupta	SECC Final Year	2022-23	01	1 st in the order of merit

❖ PLACEMENT:

Since its inception National Sugar Institute, Kanpur has been recognized for its academic excellence and is considered as the **'first choice'** for most of the Sugar factories, distilleries and other related organizations for recruiting undergraduate and post-graduate students. Institute truly appreciates the faith bestowed and looks forward to continuing relationship with them.

The Placement Cell is run and managed by a painstaking and an efficient faculty team which handles all aspects of placements at National Sugar Institute, Kanpur. Right from contacting companies to managing all logistics of arranging for tests, pre-placement talks and conducting final interviews, the Placement Cell team provides its best possible assistance to the recruiters. The hospitality and the functioning of Student Placement Cell has been applauded and well received by the visiting recruiters every year.

Sugar and allied industry being in better state of health and large nos. of new projects, particularly, ethanol projects, coming up, institute was flooded with requests for campus recruitment. It is a matter of pride and pleasure to place on record that this year again the Student Placement Cell proved its worth. Institute endeavor to stay contextually relevant with industry oriented academic standards has once again translated into a phenomenal placement drive. On/Off line campus interviews were conducted by sugar factories and other reputed companies to recruit students of various courses during the year. It was heartening to see that some overseas companies also expressed their inclination to recruit the Institute students and the same is likely to continue as institute's is in the process of signing MoU's with various overseas sugar companies.

The trust reinforced by our recruiters reflects the institute's commitment to excellence and the campus placements are a testimony to this. NSI Kanpur looks forward to continuing strengthening our industry engagement and delivering impact through creating socially conscious future leaders of the Sugar Industry.



OUR RECRUITERS (2022-23)

Following were the main recruiters of the students of various courses offering them attractive pay packages & service conditions:

1. M/s Balrampur Chini Mills Ltd., U.P.
2. M/s DCM Shriram Ltd., New Delhi
3. M/s Dalmia Bharat Sugar & Industries Ltd., New Delhi
4. M/s Dhampur Sugar Mills Ltd., New Delhi
5. M/s ISGEC Heavy Engg. Ltd., Noida
6. M/s Mawana Sugars Ltd., New Delhi
7. M/s Daurala Sugar Works, Meerut
8. M/s Dhampur Bio-Organics Ltd., Noida
9. M/s Dwarikesh Sugar Industries Ltd., Dwarikesh Nagar, U.P
10. M/s Uttam Sugar Mills Ltd., Noida
11. M/s Spray Engineering Devices Ltd., Mohali
12. M/s Shree Renuka Sugars Ltd., Mumbai
13. M/s Triveni Engg. & Industries Ltd., Noida
14. M/s Radico Khaitan Ltd., Rampur
15. M/s Wave Industries Pvt. Ltd., Noida, U.P.
16. M/s Saraswati Sugars Ltd., Yamunanagar, Haryana
17. M/s NSL Sugars Ltd., Hyderabad
18. M/s S.S. Engineers & Consultants Pvt. Ltd., Pune
19. M/s Gobind Sugar Mills Ltd., Aira, Lakhimpur Kheri
20. M/s India Glycols Ltd., New Delhi
21. M/s Catalyst Biotechnologies Pvt. Ltd, Noida
22. M/s Avadh Sugar & Energy Ltd., New Delhi
23. M/s Suzalkem Technologies Pvt. Ltd., Hyderabad
24. M/s Chemical System Technologies, New Delhi
25. M/s Varuna Biocell Pvt. Ltd., Varanasi

❖ CONSULTANCY:

During the financial year 2022-23, consultancy services were provided to the following units:

Sr. No.	Factory Name	Issue Referred
1	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Palia Kalan District – Lakhimpur, U.P.</i>	<i>Validation of ZLD system of distillery unit</i>
2	<i>M/s Dhampur Sugar Mills Ltd., Unit – Dhampur, District - Bijnor, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
3	<i>M/s Dhampur Sugar Mills LTD., Unit – Rajpura, District - Sambhal, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
4	<i>M/s Dhampur Bio Organic Ltd., Unit – Asmoli, District - Sambhal, U.P.</i>	<i>Validation of ETP</i>
5	<i>M/s Dhampur Bio Organic Ltd., Unit – Asmoli, District - Sambhal, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
6	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Palia Kalan, (Distillery) Lakhimpur, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
7	<i>M/s Kesar Enterprises Ltd., Baheri, District – Bareilly, U.P.</i>	<i>Report on low Sugar Recovery</i>
8	<i>M/s Majhulia Sugar Industries Pvt. Ltd., Majhulia, W. Champaran, Bihar</i>	<i>Validation of ethanol production from B-Hy molasses</i>
9	<i>M/s Simbhaoli Sugar Mills Ltd., Unit – Simbhaoli, Ghaziabad, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
10	<i>M/s Kesar Enterprises Ltd., Baheri, District – Bareilly, U.P.</i>	<i>Validation of ZLD system of distillery unit</i>
11	<i>M/s Dalmia Bharat Sugar & Industries Ltd., Distillery Unit – Ramgarh, Sitapur, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
12	<i>M/s Dhampur Sugar Mills Ltd., Chemical Division Dhampur, Bijnor, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
13	<i>M/s Dalmia Bharat Sugar & Industries Ltd., Distillery, Nigohi, Shahjahanpur, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
14	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Khambarkhera, U.P.</i>	<i>Validation of ZLD system</i>
15	<i>M/s Daurala Sugar Works (A unit of DCM Shriram Ind. Ltd.), Daurala, Meerut, U.P.</i>	<i>Adequacy assessment of distillery unit</i>
16	<i>M/s Magadh Sugar & Energy Ltd., Unit- Narkatiaganj, West Champaran, Bihar</i>	<i>Validation of B-Hy Molasses diversion process</i>
17	<i>M/s Triveni Engineering & Industries Ltd., Unit – Milak Narayanpur, Rampur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>

18	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Kinauni, Meerut, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
19	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Kinauni, Meerut, U.P.</i>	<i>Validation of no increase in pollution load</i>
20	<i>M/s E.I.D. Parry (India) Ltd., Sankili, Srikakulam, Andhra Pradesh</i>	<i>Validation of B-Hy Molasses diversion process</i>
21	<i>M/s Uttam Sugar Mills Ltd., Distillery Unit - Barkhera, Bijnor, U.P.</i>	<i>Validation of no increase in pollution load</i>
22	<i>M/s Lokmangal Sugar Ethanol & Co-generation Industries Ltd., Distt-Solapur, Maharashtra</i>	<i>DPR for expansion of plant from 6000 to 7500 TCD</i>
23	<i>M/s Dhampur Bio Organics Unit – Asmoli, Sambhal, U.P.</i>	<i>Validation of zld system of distillery unit</i>
24	<i>M/s Balrampur Chini Mills Ltd., Chemical Division, Babhnan, Gonda, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
25	<i>M/s Dalmia Bharat Sugar & Ind. Ltd., Unit – Jawaharpur, Sitapur, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
26	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Rudhauri, Basti, U.P.</i>	<i>Validation of ZLD system</i>
27	<i>M/s The Kisan Sahkari Chini Mills Ltd., Mahmudabad, Sitapur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
28	<i>M/s The Kisan Sahkari Chini Mills Ltd., Badaun, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
29	<i>M/s Doon Valley Dsitillers (AD), Dehradun, U.K.</i>	<i>Validation of ETP adequacy report</i>
30	<i>M/s SBEC Sugar Ltd., Malakpur, Bagpat, U.P.</i>	<i>Validation of plant capacity enhancement</i>
31	<i>M/s Kisan Sahkari Chini Mills Ltd., Nanauta, Saharanpur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
32	<i>M/s Balrampur Chini Mills Ltd., Unit - Balrampur, U.P.</i>	<i>Validation of plant capacity enhancement</i>
33	<i>M/s Parle Biscuits Pvt. Ltd., Unit- Parsendi, Baharaich, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
34	<i>M/s The Kisan Sahkari Chini Mills Ltd. Distillery Unit-Kaimganj, Farrukhabad, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
35	<i>M/s Parle Biscuits Pvt. Ltd., Unit- Parsendi, Baharaich, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
36	<i>M/s Parle Biscuits Pvt. Ltd., Unit- Parsendi, Baharaich, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
37	<i>Maa Mahamaya Sahkari Shakkar Karkhana Maryadit, Ambikapur, Chhattisgarh</i>	<i>To establish hybrid ethanol plant</i>

38	<i>M/s Magadh Sugar & Energy Ltd., Unit - Hasanpur, West Champaran, Bihar</i>	<i>Validation of B-Hy Molasses diversion process</i>
39	<i>M/s Ponni Sugars (Erode) Ltd., Erode, Tamil Nadu</i>	<i>DPR for capacity enhancement</i>
40	<i>M/s Shravasti Kisan Sahkari Chini Mills Ltd., Nanpara, Distt-Bahraich, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
41	<i>M/s Triveni Engineering & Industries Ltd., Unit – Milak Narayanpur, Rampur, U.P.</i>	<i>Validation of no increase in pollution load</i>
42	<i>M/s Uttam Sugar Mills Ltd., Sugar Unit – Khaikheri, Muzaffarnagar, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
43	<i>M/s Triveni Engineering & Industries Ltd., Sugar Unit - Rani Nangal, Moradabad, U.P.</i>	<i>Validation of no increase in pollution load</i>
44	<i>M/s Daya Sugar (A Unit of B.K. Investment Services Pvt. Ltd.), Gopalhari, Saharanpur, UP</i>	<i>Validation of ETP adequacy report</i>
45	<i>M/s Rajasthan State Ganganagar Sugar Mills Ltd., Rajasthan</i>	<i>DPR on cane development & Conversion of R.S. Plant ot ENA plant</i>
46	<i>M/s Uttam Sugar Mills Ltd., Unit-Barkatpur, Bijnor, UP</i>	<i>Validation of B-Hy Molasses diversion process</i>
47	<i>M/s Triveni Engineering & Ind. Ltd., Unit – Chandanpur, Amroha, U.P</i>	<i>Validation of B-Hy Molasses diversion process</i>
48	<i>M/s Bajaj Hindustan Sugars Ltd., Unit-Golagokarnath, Kheri, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
49	<i>M/s Bajaj Hindustan Sugars Ltd., Unit-Palia Kalan, Kheri, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
50	<i>M/s Bajaj Hindustan Sugars Ltd., Unit-Khambharkhera, Lakhimpur Kheri, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
51	<i>M/s Saraswati Sugar Mills Ltd., Yamunanagar, Haryana</i>	<i>Validation of B-Hy Molasses diversion process</i>
52	<i>M/s Triveni Engineering & Industries Ltd., Unit-Deoband, Saharanpur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
53	<i>M/s Magadh Sugar & Energy Ltd., Unit - Hasanpur, West Champaran, Bihar</i>	<i>Validation of ETP adequacy report</i>
54	<i>M/s Bajaj Hindustan Sugars Ltd., Unit-Maqsoodapur, Shahjahanpur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
55	<i>M/s Bajaj Hindustan Sugars Ltd., Unit-Thana Bhawan, Shamli, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
56	<i>M/s Triveni Engineering & Industries Ltd., Unit – Milak Narayanpur, Rampur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
57	<i>M/s DCM Shriram Limited, Sugar Unit – Ajbapur, Lakhimpur Kheri, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>

58	<i>M/s DCM Shriram Limited, Sugar Unit – Ajbapur, Lakhimpur Kheri, U.P.</i>	<i>Vetting of B-Hy molasses</i>
59	<i>M/s Dalmia Bharat Sugar & Industries Limited, Unit-Nigohi, Shahjahanpur, U.P.</i>	<i>Validation of partial diversion of syrup</i>
60	<i>M/s Dalmia Bharat Sugar & Industries Limited, Unit-Nigohi, Shahjahanpur, U.P.</i>	<i>Validation of ethanol production from cane juice</i>
61	<i>M/s Triveni Engineering & Industries Ltd., Sugar Unit - Rani Nangal, Moradabad, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
62	<i>M/s Balrampur Chini Mills Ltd., Unit-Tulsipur, Balrampur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
63	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Kinauni, Meerut, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
64	<i>M/s Bajaj Hindusthan Sugar Ltd., Distillery Unit – Gangnauli, Saharanpur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
65	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Kundarkhi, Gonda, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
66	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Pratapur, Deoria, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
67	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Rudhauri, Basti, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
68	<i>M/s Avadh Sugar & Energy Ltd., Sugar Unit – Hargaon, Sitapur, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
69	<i>M/s Avadh Sugar & Energy Ltd., Distillery Unit – Hargaon, Sitapur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
70	<i>M/s Avadh Sugar & Energy Ltd., Sugar Unit – Seohara, Bijnor, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
71	<i>M/s Avadh Sugar & Energy Ltd., Sugar Unit – Seohara, Bijnor, U.P.</i>	<i>Validation of Syrup diversion process</i>
72	<i>M/s Avadh Sugar & Energy Ltd., Distillery Unit – Seohara, Bijnor, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
73	<i>M/s Avadh Sugar & Energy Ltd., Distillery Unit – Seohara, Bijnor, U.P.</i>	<i>Validation of cane syrup for raw sugar production</i>
74	<i>M/s Avadh Sugar & Energy Ltd., Distillery Unit – Seohara, Bijnor, U.P.</i>	<i>Validation of b-Hy during plantation white sugar</i>
75	<i>M/s Avadh Sugar & Energy Ltd., Distillery Unit – Seohara, Bijnor, U.P.</i>	<i>Capacity enhancement at cane syrup</i>
76	<i>M/s Dalmia Bharat Sugar & Industries Ltd., Distillery Unit – Ramgarh, Sitapur, U.P.</i>	<i>Validation of partial diversion of syrup</i>
77	<i>M/s Dalmia Bharat Sugar & Industries Ltd., Distillery Unit – Ramgarh, Sitapur, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>

78	<i>M/s Dalmia Bharat Sugar & Industries Ltd., Distillery Unit – Ramgarh, Sitapur, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
79	<i>M/s Dwarikesh Sugar Ind. Ltd., Unit – Dwarikesh Nagar, Bijnor, U.P.</i>	<i>Validation of B-Hy molasses diversion process</i>
80	<i>M/s Dwarikesh Sugar Ind. Ltd., Unit – Dwarikesh Nagar, Bijnor, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
81	<i>M/s Dwarikesh Sugar Ind. Ltd., Unit – Dwarikesh Dham, Bijnor, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
82	<i>M/s Dwarikesh Sugar Ind. Ltd., Unit – Dwarikesh Dham, Bijnor, U.P.</i>	<i>Validation of ethanol production from B-Hy molasses</i>
83	<i>M/s Triveni Engineering & Ind. Ltd., Unit – Sabitgarh, Bulandshahr, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
84	<i>M/s Naglamal Sugar Complex, Unit – Naglamal, (A Unit of Mawana Sugar Ltd.), Meerut, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
85	<i>M/s Wave Industries Pvt. Ltd., Unit – Dhanaura, Amroha, U.P.</i>	<i>Validation of ETP adequacy report</i>
86	<i>M/s Wave Industries Pvt. Ltd., Unit – Dhanaura, Amroha, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
87	<i>M/s DCM Shriram Ltd., Sugar Unit – Loni, Hardoi, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
88	<i>M/s Uttarakhand Pollution Control Board, Dehradun, U.K.</i>	<i>Validation of no increase in pollution load</i>
89	<i>M/s Triveni Engineering & Ind. Ltd., Unit – Khatauli, Muzaffarnagar, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
90	<i>M/s Saraswati Sugar Mills Ltd., Yamunanagar, Haryana</i>	<i>Validation of ethanol production from B-hy Molasses</i>
91	<i>M/s Harinagar Sugar Mills Ltd., Unit – Harinagar, West Champaran, Bihar</i>	<i>Validation of ethanol production from B-hy Molasses</i>
92	<i>M/s L H Sugar Factories Ltd, Distillery Unit - Jangrauli, Distt - Pilibhit, U.P</i>	<i>Validation of B-Hy Molasses diversion process</i>
93	<i>M/s Balrampur Chini Mills Ltd., Unit – Gularia, Lakhimpur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
94	<i>M/s Uttam Sugar Mills Ltd., Unit – Libberheri, Haridwar, U.K.</i>	<i>Validation of B-Hy Molasses diversion process</i>
95	<i>M/s Balrampur Chini Mills Ltd., Unit – Akbarpur, Ambedkar Nagar, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
96	<i>M/s Balrampur Chini Mills Ltd., Unit – Kumbhi, Lakhimpur Kheri, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
97	<i>M/s DCM Shriram Ltd., Unit – Rupapur, Hardoi, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>

98	<i>M/s DCM Shriram Ltd., Unit – Rupapur, Hardoi, U.P.</i>	<i>Validation of ethanol production from B-hy molasses</i>
99	<i>M/s The Haryana Co-operative Sugar Mills Ltd., Rohtak, Haryana</i>	<i>DPR for condensate polishing unit</i>
100	<i>M/s Wave Industries Pvt. Ltd., Unit – Bijnor, Bijnor, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
101	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit - Utraula, Distt - Balrampur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
102	<i>M/s Bajaj Hindusthan Sugar Ltd., Distillery Unit – Khambharkhera, Lakhimpur Kheri, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
103	<i>M/s Balrampur Chini Mills Ltd., Unit - Kumbhi, Distt - Lakhimpur Kheri, U.P.</i>	<i>Validation of ETP adequacy report</i>
104	<i>M/s Dalmia Bharat Sugar & Industries Ltd., Unit – Jawaharpur, Sitapur, U.P.</i>	<i>Validation of thick juice diversion from sugar</i>
105	<i>M/s Balrampur Chini Mills Ltd., Unit - Gularia, Distt - Lakhimpur Kheri, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
106	<i>M/s L H Sugar Factories Ltd, Distillery Unit - Jangrauli, Distt - Pilibhit, U.P</i>	<i>Validation of ethanol production from B-hy Molasses</i>
107	<i>M/s Magadh Sugar & Energy Ltd., Unit – New Swadeshi Sugar Mills Ltd., Bihar</i>	<i>Validation of B-Hy Molasses diversion process</i>
108	<i>M/s Magadh Sugar & Energy Ltd., Unit – New Swadeshi Sugar Mills Ltd., Bihar</i>	<i>Validation of ethanol production from B-hy Molasses</i>
109	<i>M/s UP Co-operative Sugar Factories Federation Ltd., Distillery Unit – Nanauta, U.P.</i>	<i>Validation of ZLD system</i>
110	<i>M/s Saraswati Sugar Mills Ltd., Yamunanagar, Haryana</i>	<i>Validation of ethanol production from B-hy Molasses</i>
111	<i>M/s Balrampur Chini Mills Ltd., Unit – Babhnan, Gonda, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
112	<i>M/s Naglamal Sugar Complex, Unit – Naglamal, (A Unit of Mawana Sugar Ltd.), Meerut, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
113	<i>M/s Seksaria Biswan Sugar Factories Ltd., Sitapur, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
114	<i>M/s Bajaj Hindusthan Sugar Ltd., Distillery Unit – Gangnauli, Saharanpur, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
115	<i>M/s Gobind Sugar Mills, Aira (A Division of Zuari Industries), Lakhimpur Kheri, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
116	<i>M/s DCM Shriram Ltd., Unit – Hariawan, Hardoi, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
117	<i>M/s Avadh Sugar & Energy Ltd., Unit – Rosa Sugar Works, Shahjahanpur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>

118	<i>M/s Doon Valley Distillers Kuanwala, Dehradun, U.K.</i>	<i>Validation of ZLD system of distillery unit</i>
119	<i>M/s Magadh Sugar & Energy Ltd, Unit - Bharat Sugar Mills, Sidhwalia, Gopalganj, Bihar</i>	<i>Validation of ethanol production from B-hy Molasses</i>
120	<i>M/s Tikaula Sugar Mills Ltd., Unit - Tikaula, Muzaffarnagar, U.P.</i>	<i>validation of ETP adequacy report</i>
121	<i>M/s The Aska cooperative Sugar Industry, Ganjam, Odisha</i>	<i>DPR for sugar unit</i>
122	<i>M/s Dalmia Bharat Sugar & Industries, Sugar Unit - Nigohi, Distt - Shahjahanpur, U.P,</i>	<i>Validation of B-Hy molasses diversion process</i>
123	<i>M/s Rai Bahadur Narain Singh Sugar Mills, Laksar, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
124	<i>M/s Balrampur Chini Mills Ltd., Sugar Unit - Maizapur, Gonda, U.P.</i>	<i>Validation of syrup diversion process</i>
125	<i>M/s Balrampur Chini Mills Ltd., Sugar Unit - Maizapur, Gonda, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
126	<i>M/s Balrampur Chini Mills Ltd., Sugar Unit - Maizapur, Gonda, U.P.</i>	<i>Vetting of syrup diversion</i>
127	<i>M/s Dhampur Sugar Mills Ltd., Unit - Dhampur, Bijnor, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
128	<i>M/s Simbhaoli Sugars Ltd., Unit - Chilwaria, Bahraich, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
129	<i>M/s Magadh Sugar & Energy Ltd, Unit - Bharat Sugar Mills, Sidhwalia, Gopalganj, Bihar</i>	<i>Validation of B-Hy Molasses diversion process</i>
130	<i>M/s Balrampur Chini Mills Ltd., Chemical Division, Balrampur, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
131	<i>M/s Majhaulia Sugar Industries Pvt. Ltd., Distillery Division, W. Champaran, Bihar</i>	<i>Validation of ethanol production from B-hy Molasses</i>
132	<i>M/s Daurala Sugar Works (A unit of DCM Shriram Ind. Ltd.), Daurala, Meerut, U.P.</i>	<i>Validation of b-hy molasses diversion process</i>
133	<i>M/s Daurala Sugar Works (A unit of DCM Shriram Ind. Ltd.), Daurala, Meerut, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
134	<i>M/s U.P. State Sugar Corporation Ltd., Lucknow, U.P.</i>	<i>Reasons for lower sugar recovery</i>
135	<i>M/s Gobind Sugar Mills, Aira (A Division of Zuari Industries), Lakhimpur Kheri, U.P.</i>	<i>Validation of no increase in pollution load</i>
136	<i>M/s HAFED Sugar Mill Assandh, Karnal, Haryana</i>	<i>Validation of ETP adequacy report</i>
137	<i>M/s Tiruttani Cooperative Sugar Mills Ltd., Tamilnadu</i>	<i>DPR for modernization of sugar mills machineries</i>
138	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit - Gola Gokharnath, Lakhimpur, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>

139	<i>M/s Saraswati Sugar Mills Ltd., Yamunanagar, Haryana</i>	<i>Validation of non-sugar in juice</i>
140	<i>M/s E.I.D. Parry (India) Ltd., Sankili, Srikakulam, Andhra Pradesh</i>	<i>Validation of ethanol production from sugar syrup</i>
141	<i>M/s Tamil Nadu cooperative sugar federation, Nandanam, Chennai</i>	<i>Technical Feasibility report</i>
142	<i>M/s Bajaj Hindusthan Sugar Ltd., Sugar Unit - Budhana, Muzaffarnagar, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
143	<i>M/s Uttam Sugar mills Ltd., Unit - Shermau, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
144	<i>M/s Simbhaoli Sugar Ltd., Unit- Brijnathpur, Hapur, U.P.</i>	<i>Validation of ETP adequacy report</i>
145	<i>M/s Simbhaoli Sugar Ltd., Unit- Brijnathpur, Hapur, U.P.</i>	<i>Validation of ZLD system of distillery unit</i>
146	<i>M/s Mawana Sugar Mills Ltd, Unit – Mawana, Meerut, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
147	<i>M/s Dhampur Sugar Mills, Unit - Rajpura, Sambhal, U.P.</i>	<i>Validation of ETP adequacy report</i>
148	<i>M/s Dhampur Sugar Mills, Unit - Rajpura, Sambhal, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
149	<i>M/s DCM Shriram Ltd., Sugar Unit-Loni, Hardoi, U.P.</i>	<i>Milling performance evaluation</i>
150	<i>M/s Dalmia Bharat Sugar & Industries Ltd., Unit- Jawahapur, Sitapur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
151	<i>M/s HPCL Biofuels, Unit- Lauria, West Champaran, Bihar</i>	<i>Validation of B-Hy Molasses diversion process</i>
152	<i>M/s HPCL Biofuels, Unit- Lauria, West Champaran, Bihar</i>	<i>Validation of ethanol production from sugar syrup</i>
153	<i>M/s Dhampur Bio Organic Ltd, Unit- Asmoli, Sambhal, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
154	<i>M/s Dhampur Bio Organic Ltd, Unit- Asmoli, Sambhal, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
155	<i>M/s Balrampur Chini Mills Ltd., Sugar Unit- Balarampur, Balrampur, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
156	<i>M/s DCM Shriram Limited, Sugar Unit – Ajbapur, Lakhimpur Kheri, U.P.</i>	<i>Validation of ETP adequacy report</i>
157	<i>M/s Shervani Sugar Syndicate Ltd., Kasganj, U.P.</i>	<i>Validation of ETP adequacy report</i>
158	<i>M/s Saraswati Sugar Mills Ltd., Yamunanagar, Haryana</i>	<i>ETP adequacy assessment report</i>
159	<i>M/s Dhampur Bio-organics Ltd., Sugar Unit- Meeraganj, Bareilly U.P</i>	<i>Validation of B-Hy Molasses diversion process</i>
160	<i>M/s Simbhaoli Sugar Mills Ltd., Unit - Simbhaoli, Ghaziabad, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>

161	<i>M/s The Ganga Kisan Sahkari Chini Mills Ltd, Sugar Unit – Muzaffarnagar, U.P.</i>	<i>Check up cacne quality</i>
162	<i>M/s Magadh Sugar & Energy Ltd., Unit- Narkatiaganj, West Champaran, Bihar</i>	<i>Validation of ethanol production from B-hy Molasses</i>
163	<i>M/s The Kallakuruchi Sugar Mills Ltd., Kallakuruchi, Tamil Nadu</i>	<i>Validation of ETP adequacy report</i>
164	<i>M/s The Kallakuruchi Sugar Mills Ltd., Kallakuruchi, Tamil Nadu</i>	<i>Validation of ETP adequacy report distillery unit</i>
165	<i>M/s D. S. 7 M. R. Krishnamurthy Coop. Sugar Mills Ltd., Cuddalore, Tamil Nadu</i>	<i>Validation of ETP adequacy report</i>
166	<i>M/s D. S. 7 M. R. Krishnamurthy Coop. Sugar Mills Ltd., Cuddalore, Tamil Nadu</i>	<i>Validation of ETP adequacy report distillery unit</i>
167	<i>M/s The Kisan Sahkari Chini Mills Ltd. Distillery Unit- Kaimganj, Farrukhabad, U.P.</i>	<i>Validation of ethanol production from B-hy Molasses</i>
168	<i>M/s The Kisan Sahkari Chini Mills Ltd. Distillery Unit- Kaimganj, Farrukhabad, U.P.</i>	<i>Validation of ethanol production from sugar syrup</i>
169	<i>M/s Trualt Bioenergy Ltd., Unit- 1, Distillery Division Kulali Cross, Mudhol, Karnataka</i>	<i>General Check up of distillery division</i>
170	<i>M/s Trualt Bioenergy Ltd., Unit- 2, Distillery Division Vishal Nagar, Hipparagi Mygur, Jamkhandi, Karnataka</i>	<i>General Check up of distillery division</i>
171	<i>M/s Trualt Bioenergy Ltd., Unit- 3, Kallapur SK, Bagalkot, Karnataka</i>	<i>General Check up of distillery division</i>
172	<i>M/s Kareli Sugar Mills Pvt. Ltd., Unit- Kareli, Narsinghpur, MP</i>	<i>Modification cum expansion for balancing of sugar unit</i>
173	<i>M/s The Kisan Sahkari Chini Mills Ltd. Distillery Unit- Kaimganj, Farrukhabad, U.P.</i>	<i>Revalidation of B-Hy molasses diversion process</i>
174	<i>M/s Dhampur Bio Organics, Unit- Mansurpur, Muzaffarnagar, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
175	<i>M/s Sri Someshwar Sahkari Karkhane Niyamit, Siddasamudar, Karnataka</i>	<i>DPR for expansion of plant from 2500 to 4000 TCD</i>
176	<i>M/s Mawana Sugar Mills Ltd, Unit – Mawana, Meerut, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
177	<i>M/s U.P. Co.operative Sugar Factories Federation Ltd., Lucknow, U.P.</i>	<i>Technical upgradation/modernization of satha & sultanpur unit</i>
178	<i>M/s Wave Distillery & Breweries Ltd., Ambedpura, Aligarh, U.P.</i>	<i>ETP adequacy assessment report</i>
179	<i>M/s The Kaithal Cooperative Sugar Mills Ltd, Unit- Kaithal, Dist.- Kaithal, Haryana</i>	<i>Plant expansion project</i>
180	<i>M/s Simbhaoli Sugar Mills Ltd., Unit- Simbhaoli, Gaziabad, U.P.</i>	<i>Validation of ETP system</i>

181	<i>M/s Parle Biscuits Pvt. Ltd., Unit- Parsendi, Baharaich, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>
182	<i>M/s Upper Doab Sugar Mills Ltd., Unit of Sri Shadi Lal enterprises, Shamli, U.P.</i>	<i>ETP validation of sugar unit</i>
183	<i>M/s Upper Doab Sugar Mills Ltd., Unit of Sri Shadi Lal enterprises, Shamli, U.P.</i>	<i>ETP validation of distillery unit</i>
184	<i>M/s Indian Sucrose Ltd., Mukerian, Distt.- Hoshiarpur, Punjab</i>	<i>General check up to minimize the steam consumption of the plant</i>
185	<i>M/s Gobind Sugar Mills, Aira (A Division of Zuari Industries), Lakhimpur Kheri, U.P.</i>	<i>Validation of syrup diversion process</i>
186	<i>M/s Gobind Sugar Mills, Aira (A Division of Zuari Industries), Lakhimpur Kheri, U.P.</i>	<i>validation of ethanol production from B-hy Molasses</i>
187	<i>M/s Simbhaoli Sugar Ltd., Unit- Brijnathpur, Hapur, U.P.</i>	<i>Validation of B-Hy Molasses diversion process</i>

In addition to above, 115 units,(70 Nos. Sugar and 45 Nos. Distilleries) were visited by the institute experts on behalf of Central Pollution Control Board for third party inspection of their Effluent Treatment Plants.

❖ ANALYTICAL SERVICES:

The institute has an “**Analytical Laboratory**” equipped with precision & latest equipment so as to facilitate analysis of sugar, ethanol, and other intermediate products as per ICUMSA and other prescribed standard protocols. The laboratory has NABL and BIS accreditation and analytical services are extended at very nominal rates to the industry. During the year, Sugar, Molasses, Effluent, Alcohol based hand sanitizers and other samples received from the following units were analyzed for the various parameters such as Pol%, Sucrose%, Moisture%, RS%, Colour (IU), Unfermentable Sugar, Fermentable Sugar & TRS, BOD, COD, DO and microbial count etc.:

Sr. No.	Factory/Unit
1	<i>M/s Kisan Sahkari Chini Mills Ltd., Sampurna Nagar, Lakhimpur Kheri, U.P.</i>
2	<i>M/s The Kisan Sahkari Chini Mills Ltd., Gajraula, Hasanpur, Amroha, U.P.</i>
3	<i>M/s Balrampur Chini Mills Ltd., Unit – Akbarpur, U.P.</i>
4	<i>M/s Avadh Sugar Energy Ltd., Unit - Seohara, Bijnor, U.P.</i>
5	<i>M/s Dalmia Bharat Sugar & Industries Ltd., Unit – Jawaharpur, Sitapur, U.P.</i>
6	<i>M/s Magadh Sugar & Energy Ltd., Sidhwalia, Gopalganj, Bihar</i>
7	<i>M/s The Seksaria Biswan Sugar Factory Ltd., Biswan, Sitapur, U.P.</i>
8	<i>M/s Dhampur Sugar Mills LTD., Unit – Asmoli, Sambhal, U.P.</i>
9	<i>M/s Dhampur Sugar Mills LTD., Unit – Meerganj, Bareilly, U.P.</i>
10	<i>M/s Dhampur Sugar Mills LTD., Unit – Mansoorpur, Muzaffarnagar, U.P.</i>
11	<i>M/s LH Sugar Factory Ltd., Pilibhit, U.P.</i>
12	<i>M/s Triveni Sugar & Engineering & Ind. Ltd., Unit – Sabitgarh, Bulanshahr, U.P.</i>
13	<i>M/s Wave Industries Pvt. Ltd., Bulanshahr, U.P.</i>
14	<i>M/s Triveni Sugar & Engineering & Ind. Ltd., Unit – Raninangal, Moradabad, U.P.</i>
15	<i>M/s Majhaulia Sugar Industries Pvt. Ltd., Majhaulia, W. Champaran, Bihar</i>
16	<i>M/s Kisan Co-operative Sugar Factory Ltd., Sarsawa, Saharanpur, U.P.</i>
17	<i>M/s Triveni Sugar & Engineering & Ind. Ltd., Unit – Khatauli, Muzaffarnagar, U.P.</i>

18	<i>M/s Govind Sugar Mills Ltd., Unit- Aira, Lakhimpur Kheri, U.P.</i>
19	<i>M/s Triveni Engineering & Ind. Ltd., Unit – Sabitgarh, Bulandshahr, U.P.</i>
20	<i>M/s Rasi Nutr Foods India Pvt. Ltd., Tamilnadu</i>
21	<i>M/s Kisan Sahkari Chini Mills Ltd., Unit – Kaimganj, Farrukhabad, U.P.</i>
22	<i>M/s The Kisan Sahkari Chini Mills Ltd., Unit – Sathiaon, Azamgarh, U.P.</i>
23	<i>M/s Maa Mahamaya Sahkari Shakahar Karkhana, Chhattisgarh</i>
24	<i>M/s Rana Sugar Sugars Ltd., Shahabad, Rampur, U.P.</i>
25	<i>M/s Balrampur Chini Mills Ltd., Unit – Balrampur, U.P.</i>
26	<i>M/s ISGEC Heavy Engineering Ltd., Noida, U.P.</i>
27	<i>M/s Novel Sugar Ltd., Barkhera, Pilibhit, U.P.</i>
28	<i>Dalmia Bharat Sugar & Ind. Ltd., Unit – Nigohi, Shahjahanpur, U.P.</i>
29	<i>Magadh Sugar and Energy Ltd., (Unit - Bharat sugar Mills), Gopalganj, Bihar</i>
30	<i>UP State Corporation, Mohiuddin, Meerut, U.P.</i>
31	<i>Wave Sugar Ltd., Unit – Bijnor, U.P.</i>
32	<i>Wave Sugar Ltd., Unit – Dhanaura, U.P.</i>
33	<i>Govind Sugar Mills Ltd., Unit – Aira, Shahjahanpur, U.P.</i>
34	<i>Kisan Sahkari Chini Mills Ltd., Najibabad, Bijnor, U.P.</i>
35	<i>Kisan Sahkari Chini Mills Ltd., Tilhar, Shahjahanpur, U.P.</i>
36	<i>KSC Mills., Anoopsahar, Bulandsahar, U.P.</i>
37	<i>Lords Distillery, Sadiyabad, Gazipur, U.P.</i>
38	<i>Triveni Engineering Ind. Ltd. Unit – Deoband, Saharanpur, U.P.</i>
39	<i>Magadh Sugars & Energy Ltd., (Bharat Sugar Mills Sidhwalia), Gopalganj, Bihar</i>
40	<i>Rana Sugars Ltd., Belwara, Muradabad, U.P.</i>
41	<i>PBS Food (Sugar) Pvt. Ltd., Chandanpur, U.P.</i>

42	<i>Govind Sugar Mills Ltd., Unit – Aira, Lakhimpur Kheri, U.P.</i>
43	<i>Avadh Sugar & Energy Ltd., Unit – Seohara, Bijnor, U.P.</i>
44	<i>Dalmia Bharat Sugar & Industries Ltd., Unit – Jawaharpur, Sitapur, U.P.</i>
45	<i>Triveni Engineering & Ind. Ltd., Unit – Sabitgarh, Bulandshahr, U.P.</i>
46	<i>Rasi Nutr Foods India Pvt. Ltd., Bhavani taluk, Tamilnadu</i>
47	<i>Kisan Sahkari Chini Mills Ltd., Unit – Kaimganj, Farrukhabad, U.P.</i>
48	<i>The Kisan Sahkari Chini Mills Ltd., Unit – Sathiaon, Azamgarh, U.P.</i>
49	<i>Maa Mahamaya Sahkari Shakahar Karkhana, Jagarnathpur, Chhattisgarh</i>
50	<i>M/s Uttam Sugar Mills Ltd., Sugar Unit – Khaikheri, Muzaffarnagar, U.P.</i>
51	<i>M/s Kisan Sahkari Chini Mills Ltd., Sultanpur, U.P.</i>
52	<i>M/s Kisan Sahkari Chini Mills Ltd., Unit – Ghosi, Mau, U.P.</i>
53	<i>M/s Ramala Cooperative Sugar Mills Ltd., Ramala Bagpat, UP.</i>
54	<i>M/s The Ganga Kisan Sahkari Chini Mills Ltd., Unit -Morna, Muzaffarnagar, U.P.</i>
55	<i>M/s Kisan Sahkari Chini Mills Ltd., Unit – Sultanpur, U.P.</i>
56	<i>M/s Uttam Sugar Mills Ltd., Sugar Unit - Barkatpur, Bijnor, U.P.</i>
57	<i>M/s Magadh Sugar and Energy Ltd., (Unit - Bharat sugar Mills), Gopalganj, Bihar</i>
58	<i>M/s Balrampur Chini Mills Ltd., Unit – Akbarpur, Ambedkar Nagar, U.P.</i>
59	<i>M/s Dhampur Bio Organics Ltd., Unit – Asmoli, Sambhal, U.P.</i>
60	<i>M/s Dhampur Bio Organics Ltd., Unit – Meerganj, Bareilly, U.P.</i>
61	<i>M/s Dhampur Bio Organics Ltd., Unit –Mansoorpur, Muzaffarnagar, U.P.</i>
62	<i>M/s Bajaj Hindusthan Ltd., Unit – Kinauni, Meerut, U.P.</i>
63	<i>M/s Avadh Sugar & Energy Ltd., Sugar Unit – Seohara, Bijnor, U.P.</i>
64	<i>M/s Triveni Engineering & Ind. Ltd., Unit – Khatauli, Muzaffarnagar, U.P.</i>
65	<i>M/s Bajaj Hindusthan Sugar Ltd., Unit – Kundarkhi, Gonda, U.P</i>

66	M/s Triveni Engineering & Ind. Ltd., Unit –Sabitgarh, Bulandshahr, U.P.
67	M/s Ugar Sugar Works Ltd., Ugar, Karnataka
68	M/s Magadh Sugar & Energy Ltd., Unit – New Swadeshi Sugar Mills Ltd., Bihar
69	M/s The Ganga KisanSahakari Chini Mills Ltd, Unit- Morna, Muzaffarnagar, U.P.
70	M/s Dhampur Bio Organics Ltd, Unit -Mansupur, Muzaffarnagar, U.P.
71	M/s Kisan Sahkari Chini Mills Ltd, Unit- Semikhera, Bareilly, U.P.
72	M/s The Kisan Sahkari Chini Mills Ltd, Unit- Kaimganj, Farrukhabad, U.P.
73	M/s Magadh Sugar & Energy Ltd, Unit- Narkatiaganj, West Champaran, Bihar
74	M/s Bajaj Hindustan Sugar Ltd, Unit- Gangnauli, Saharanpur, U.P.
75	M/s The KisanSahkari Chini Mills Ltd., Unit-Mahmudabad (Oudh), U.P.
76	M/s Doon Valley Distillery, Dehradun, U.K.
77	M/s Magadh Sugar & Energy Ltd., Unit- New Swadeshi, West Champaran, Bihar
78	M/s HPCL Biofuels Ltd., Unit- Sugauli, East Champaran, Bihar
79	M/s The Kisan Sahkari Chini mills Ltd., Saharanpur U.P.
80	M/s KSCM Ltd., Unit- Powayan, Shahjahanpur, U.P.
81	M/s HPCL Bio-Fuels, Unit- Lauriya, West Champaran, Bihar
82	M/s Wave Sugars Industries Ltd., Unit- Bijnor, U.P.
83	M/s The Nakodar Coop. Sugar Mills Ltd., Unit- Nakodar, Jalandhar, Punjab
84	M/s The KSCM Ltd., Unit- Sathiaon, Azamgarh, U.P.
85	M/s The SeksariaBiswan Sugar Factory, Sitapur, U.P.
86	M/s Dhampur Biofuels Ltd, Sugar Unit- Asmoli, Sambhal, U.P.
87	M/s Dhampur Biofuels Ltd., Sugar Unit- Meerganj, Bareilly, U.P
88	M/s Triveni Industries Ltd., Sugar Unit – Khatauli, Muzaffarnagar, U.P.
89	M/s Triveni Engineering & Industries Ltd., Sugar Unit- Chandanpur, Amroha, U.P.

90	M/s Balrampur Chini Mills Ltd., Sugar Unit – Akbarpur, Ambedkarnagar, U.P.
91	M/s Bajaj Hindusthan Sugar Ltd., Sugar Unit – Maqsoodapur, Shahjahanpur, U.P.
92	M/s Triveni Engineering & Industries Ltd., Sugar Unit- Sabitgarh, Bulandshahar, U.P.
93	M/s LH Sugar Factory Ltd., Sugar Unit- Pilibhit, Pilibhit, U.P.
94	M/s Magadh Sugar & Ind. Ltd., Sidhawalia, (Unit of Bharat Sugar Mills), Gopalganj, Bihar
95	M/s Avadh Sugar & Energy Ltd., Sugar Unit – Seohara, Bijnor, U.P.
96	M/s Magadh Sugar & Energy Ltd., Sugar Unit- Narkatiaganj, West Champaran, Bihar
97	M/s Kisan Sahkari Chini Mills Ltd, Unit- Sultanpur, U.P.
98	M/s Magadh Sugar Works & Energy Ltd., Unit- Sidhawalia, Gopalganj, Bihar
99	M/s Triveni Engineering & Industries Ltd, Unit- Raninangal, Moradabad, U.P.
100	M/s Dhampuri District Cooperative Sugars Mills Ltd., Dhampuri, Tamil Nadu
101	M/s Shri ShantTukaramSahkariSakkarKarkhana, Pune, Maharashtra
102	M/s Magadh Sugar & Energy Ltd., Unit- Hasanpur, Samastipur, Bihar
103	M/s GM Sugar & Energy Ltd., Khangur, Karnataka
104	M/s Avadh Sugar Energy Ltd., Unit- Rosa, Sahjahapur, U.P.
105	M/s Balrampur Chini Mills Ltd., Unit- Balrampur, Distt.- Balrampur, U.P.
106	M/s Gobind Sugars Mills Ltd., Unit- Aira Estate, Lakhimpur Kheri, U.P.
107	M/s Rana Sugar Mills Ltd., Moradabad, U.P.

In addition to above, requests were received for carrying out analysis of GCV of bagasse and slop etc. and the analysis was carried out in the Extension Division of the institute.

❖ ABOUT THE DIVISIONS:

❖ SUGAR TECHNOLOGY DIVISION:

Sugar Technology Division is one of the most important divisions of the Institute, Beside participation in teaching is actively engaged in development to innovative process techniques and new products through enhanced Institute industry interaction and research on continuing basis. Many eminent technologists served in this division and developed processes and techniques which have been adopted by the sugar industry globally. The Division is equipped with most advanced instruments to carry out analytical and research work as per ICUMSA, AOAC and other standard procedures. The division during the year remained engaged in development of innovative process techniques and process house equipment, so as to ensure higher technical efficiency result in gin better quality sugar at lower cost.

During the year division was also involved in conducting various customized training programme as per industry requirement and for delegates from other countries.

As regards R&D work, the following projects were taken up by the division during the year.

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

The study was made initially to compare analytical results obtained by polarizing at 589 nm and 880 nm wave length (NIR) for sugarcane juice, B heavy molasses and sugar samples by applying different doses of carrez reagent (non- lead clarificant), basic lead sub-acetate and without any chemical. Appreciable difference in pol reading was observed at different doses of carrez reagents and while comparing the pol readings obtained using lead sub-acetate in sugar cane juice samples. The study was also carried-out without using any chemical reagent on sugarcane juice samples but polarization readings was found out of range at 589 um & 880mm wavelengths. Further trials of carrez reagent and non-lead clarificants shall be made in different sugar house intermediates. The results obtained so far presented during 33rd session of ICUMSA at Veinna, Austria.

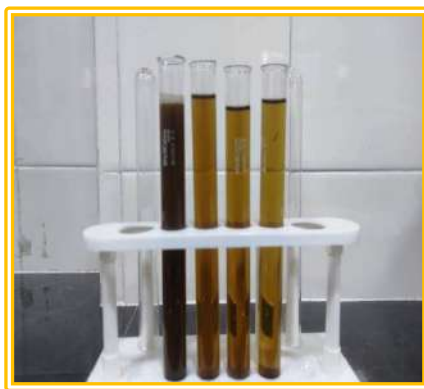
2. Assessment of suitability of B Heavy molasses for different parameter to be used as edible molasses.

The main aim of the study was to find the feasibility of use of intermediate molasses as a edible molasses being fit for human consumption. The intermediate molasses, B-heavy molasses, obtained from different sugar factories was clarified to limited extent by exercising chemical and mechanical treatment in Sugar Technology Laboratory. 02 No's of edible molasses sample from market and 14 nos. intermediate molasses sample were collected from plantation white and raw sugar factories. These were analyzed for Fe, Mn, Mg, Ca, K, TRS %, RS%, brix %, pol

%, total bacterial count and UFS%, in different divisions of the institute. Few samples of B heavy molasses were centrifuged to remove the suspended impurities and were analysed for various other parameters such as Ash & SO₂ content, sludge, odour, pesticide residue, lead, arsenic, tin, mercury contaminants and toxin etc. Conclusion shall be drawn after completion of the analytical results.

3. Use of Sodium Metabisulfite for Sugar Cane juice clarification.

Trials of liquid and solid sodium meta bisulfate (Guljaz Crystasulf) were conducted in sugar technology laboratory at different doses of milk of lime i.e 1.0% 1.2%, 1.4%, 1.6% V/v applied to raw juice after heating. The juice was further neutralized by applying solid and liquid crystasulf (SMBS) it different sets. Treated juice further heated to 102-103°C and application of flocculant was also carried out as in carried out in conventional process. Various quality parameters like pH, brix %, pol %, purity, RS%/100 bx, colour (IU) were observed. The result obtained by using liquid sodium metabisulfite were observed to be better in terms of transmittance, colour, turbidity & mud removal as compared to solid meta bisulfate. The Laborating trials were also conducted at the site of the two commercial sugar factories which included similar results.



4. Preservation of B heavy molasses upon storage.

The collaborative studies were taken up with two reported for engaged in production of specialty chemical & enzymes.

- i. In the study taken up units M/s Suzalken, Hyderabad, four set of samples of B heavy molasses (blank & treated) were stored in custom made molasses tanks. Two nos. of B heavy molasses samples were obtained from double sulphitation process, while other two samples were from defecation process. Two enzymes, DT-35 / DT-35 A were employed for dosing in B heavy molasses sample @ 30 ppm for first 15 days and @ 15 ppm thereafter. Parameters such as brix%, pol%, purity, viscosity, RS%, TRS%, TFS%, pH and VFA were determined fortnightly.

During the storage period application of enzymes was observed to be affected in reducing rate of determination, particularly, after six months.

- ii. For the study taken up with M/S Catalysts, Noida, three sets of B heavy molasses samples (blank & treated) of double sulphitation process were stored in custom made molasses tank. Two enzymes EPA-1, EPA-2 were employed for dosing the said molasses samples @ 20 ppm. Analysis of various parameters such as brix%, pol%, purity, viscosity, RS%, TRS%, TFS%, pH and VFA was carried out fortnightly. Water jacketed molasses tanks were also used for the study to meet out the storage requirement as per standard practice. During the six months of storage period no appreciable change was observed in various analytical parameters, although the determination was lesser in treated samples.



5. Use of Membrane Technology for juice concentration.

Based on the collaborative study taken up with M/s Hydranautics at M/s Balrampur chini Mills Ltd., Unit- Kumbhi, Shahjahanpur a research paper on the topic “Clear juice concentration with the help of reverse osmosis” presented on STAI Annual convention 2022 held at Goa. The preliminary studies indicate possibilities for introducing the technology for partial concentration of juice and particularly in sugar units going for expansion. Now the division has entered into an agreement with M/s Ion Exchange (India) Ltd. is conduct pilot plant studies for partial concentration of clear juice at the rate of some sugar factory. The pilot plant is being manufactured & trials shall be taken up during crushing season 2023-24.



6. Production of Invert syrup and sugar syrup with low G.I. value.

Trials on production of medium invert sugar syrup directly from sugarcane as well as from raw sugar were carried out at laboratory level. The process involved in situ purification of sugarcane juice/ raw sugar melt without addition of any clarifying agents. Different techniques of high level filtration and inversion were successfully tried and optimization of processing parameters was made to produce sugar syrup having invert sugar content around 50-55%. Sample of such invert syrups were analysed for quality parameters such as brix, purity, TRS, colour etc. and shelf life periodically. The study shall be extended on different sugarcane varieties in future.



The so produced medium invert liquid sugar was divided in two groups in order to produce low GI sugar. For the purpose, Monk Fruit extract (98% purity) & Stevia extract (99% purity) were selected to be dosed to the sugar to produce low GI sugar.

The prepared Low GI liquid sugar samples were kept at three different temperature (@ 15°C, 32°C and 36°C) to observe changes such as microbial growth, crystal formation etc. besides taking up regular analysis such as determination of colour, Ph, moisture and ash. It is pertinent to mention that no specific changes were observed in the samples kept at different temperature. No microbial growth or any type of crystal formation was observed however the Stevia sample of liquid sugar kept at 15°C showed some phase separation, which upon reheating disappeared. To further calculate the GI value of the produced sugar a mathematical approach was opted

OTHER IMPORTANT ON-GOING ACTIVITIES IN DIVISION

A) Revision/Formulation of Bureau of Indian Standards Specifications for:

- a) Code for Hygienic Conditions for Sugar factories
- b) Layout Plan for Sugar factory Laboratories
- c) Glass bottles for Sugar Standards
- d) Candy Sugar (Misri)

- e) Palm Sugar /Jaggery
- f) Bura
- g) Low Sulphur Sugar
- h) Brown Sugar
- i) Liquid Sugar

B) Formulation of Standard Specifications for Maple Syrup for FSSAI.

❖ PREPARATION & SALE OF SUGAR STANDARDS GRADES:

The Bureau of Sugar Standards which works under Sugar Technology Division is responsible for preparation and sale of sugar standard grades every year. Procurement of the sugar standard grades is mandatory for all sugar factories in India to identify the grade of sugar produced and mark them accordingly for sale in Indian market. Thus, it facilitates quality control at the end of sugar factories and facilitates consumer protection.

Meeting of the Committee of Experts constituted by the Govt. of India under the Chairmanship of Director, National Sugar Institute for approval of Sugar Standards Grades for the season 2022-23 was held on 23rd September 2022. Meeting was attended by representatives from Bureau of Indian Standards, National Federation of Cooperative Sugar Factories Limited (NFCSF), Sugar Technologists Association of India (STAI), Indian Institute of Sugarcane Research and Indian Institute of Toxicological Research, Lucknow. The distribution of Standards commenced from 1st October, 2022. The details of sales of sugar standard grades during the financial year 2022-23 are as under:

S. No.	Grade	No. of Sugar Standard grades sold
1.	L-31	104
2.	M-31	158
3.	S-31	178
4.	SS-31	92
5.	L-30	74
6.	M-30	215
7.	S-30	249
TOTAL		1070



❖ SUGAR ENGINEERING DIVISION:

Sugar Engineering Division of the Institute is involved in teaching, research and consultancy to the sugar and allied industry. It renders special assistance for developing co-generation units through the Co-gen cells constituted for the purpose. The division remained actively involved in introducing newer techniques for reducing moisture % bagasse, so as to enhance efficiency of bagasse-based co-generation units.

Sugar Engineering division during the year remained actively involved in conducting expert lectures, and customized training programmes as per sugar industry requirement. Customized training programs for personnel of Sugar factories from abroad i.e. Nigeria & Indonesia were also conducted by the division. Several Comprehensive Training Courses were also organized for the delegates of U.P. Cooperative sugar factories.

Staff of the division also rendered its services for validating the effluent treatment system installed in sugar factories and molasses-based distilleries for ZLD and air pollution, advisory visits for capacity verification of plants and performance assessment of bio-mass based power plant and on many other issues.

The division also rendered its services for preparation of DPR's for setting up new sugar plants and ethanol units, expansion and modernization for existing plants besides preparing feasibility report etc. for various projects.

The division during the year also worked on the following problem:

1. Improvement in the drive systems of preparatory devices and mills

Sugar factories, due to various reasons like expansion, maintenance of spare motors etc. use twin motors for the drive at the preparatory devices. These motors are generally SRIM type motors. In the case of twin motors, if both are not of same capacity, one tries to override the other and the net result is reduction in the efficiency of the whole system. Also, SRIM motor drives, due to the involvement of 5-15 % slip, consume more power as compared to a drive with soft starter.

A system has been designed to use with AC-VFD which will save power as well as maintain the Preparatory index throughout the season. A prototype has been prepared using the design and testing done. The results are encouraging. A part of the system is also applied in the Experimental Sugar Factory of the institute which gave desired results.

2. Based on the R&D work & studies carried out in the division, 5 research papers on various topics on mills, energy conservation and bio-energy were submitted for publication in various journals and proceedings of national and international seminars/conferences.

Besides staff of the division also actively participated in rendering advice on setting up of a centralized laboratory at West Kenya Sugar Company Ltd. Kenya, presented research papers

in accredited training program for CPCB and recertification of ISO 9001:2015 standard for the Institute etc.



❖ ORGANIC CHEMISTRY DIVISION:

The aim of the Organic Chemistry Division is to achieve excellence in both fundamental and applied research. Its goal is to generate new knowledge that benefits the sugar industry and to create value-added products using by-products and waste materials, thereby promoting sustainability within the industry. In addition to conducting classes in regular courses, the division strives to promote and intensify international collaboration in these areas. It also remains actively engaged in both standard and customized training programs organized by the institute.

The division also participates in rendering technical consultancy on “Good Laboratory Practices” and analysis of sugar & sugar house products as per ICUMSA & other standard methods. Organic Chemistry division during this year, also participated in many such programs & presented findings of R&D works carried out in the division during this year in seminar/conferences.

The division's staff was also involved in the supervision of the institute's NABL & BIS accredited Analytical Laboratory. Their responsibilities included analysis of various products, by-products, and waste waters generated in the processing house of the sugar factory.

The primary focus of the Organic Chemistry Division's research remained as to develop and investigate innovative strategies for utilizing sugarcane-based biomass as a raw material in the production of value-added products. With a view to benefiting the sugar industry, the division was actively engaged in various research activities (mentioned below) aimed at exploring the feasibility of these approaches.

1. A study to synthesize practical substitute of 5-HMF (Hydroxy methyl furfural) from sugar cane bagasse cellulose in a bio-refinery approach.

HMF is a key intermediate between carbohydrate chemistry and mineral oil based industrial chemistry and has a wide range of potential application for furan-based product. CMF, an organic compound and a congener of HMF, has attracted significant interest as a bio-molecule platform for synthesizing monomers, bio-fuels, and valuable chemical intermediates used in pharmaceuticals and agrochemicals. It can also be derived from sugarcane bagasse cellulose. In this context, efforts were initiated to develop a bio-refinery approach or method that enables the chemical synthesis of CMF.

Two stage pre-treatment process was developed in this study. In the first stage, pentose syrup from hemicellulose component of sugarcane bagasse (SB) was separated. In the second stage, lignin was extracted from sugarcane bagasse as a value-added by-product. The pre-treated sugarcane bagasse was used as a raw material for CMF production. Further work on cost economics & inability of the approach is underway.

2. Development of a technique for production of Solid Alcohol.

Solid alcohol, also known as "alcohol block," is a fuel source that offers several advantages. It is safe to use, portable, cost-effective, environmentally friendly, and possesses characteristics such as easy ignition, a consistent flame temperature, and minimal deviation in calorific value. Certain solid alcohol products available on the market exhibit poor storage stability, as they tend to become deliquescent over time, resulting in liquid oozing out. Additionally, some of these products generate black particles when ignited, causing dust pollution. Moreover, some solid alcohol variants are resistant to combustion, while others produce excessive residue after burning. To eliminate and improve the aforementioned drawbacks of solid alcohol, the division developed a method involving the utilization of stearic acid, industrial alcohol, phenolphthalein, and sodium hydroxide. Following the experimental results, the products were examined for hardness, flame stability, combustion time, and other relevant factors.



3. One pot-efficient synthesis of alkyl levulinates (Als) using sugarcane molasses.

Alkyl levulinates (Als) are valuable chemicals and serve as intermediates with extensive potential for various industrial applications. They can act as substitutes for existing chemicals produced through petrochemical processes. Moreover, Als can be obtained in significant yields and selectivities from readily available by-products of sugarcane, such as molasses. Molasses, which is a key by-product obtained during the refining process of sugarcane and sugar beets into sugars, serves as an inexpensive and renewable feedstock for the production of important platform chemicals like levulinic acid, hydroxymethyl furfural, and furfuryl alcohol. Historically, sugarcane molasses has primarily been utilized for large-scale commercial production of various value-added products through processes such as microbial fermentation, resulting in bioethanol, yeast, and organic acids.

However, the development of feasible biorefinery pathways for effectively converting molasses into usable products and platform chemicals remains a challenging task. In this context, sugarcane molasses, which is an affordable and sugar-rich feedstock containing glucose, fructose,

and sucrose, can be used in direct alcoholysis reactions to produce methyl levulinate, which belongs to the class of alkyl levulinates. The process developed employs methanol as a reagent/reaction medium, along with very dilute sulphuric acid as a homogeneous catalyst, in combination with metal salts. The ongoing research includes verifying the reproducibility, aiming to improve the yield of the desired substance, and conducting additional research to confirm the economic viability of its production.

4. Synthesis of Vanillin from fractionated sweet sorghum bagasse lignin.

Lignin is a renewable non-petrochemical and a highly appealing raw material for the manufacturing of sustainable fuels, aromatic chemicals and other value-added products in nature. Currently, the full potential of the entire value chain of sweet sorghum bagasse (SSB) is not being fully utilized, including the utilization of its bagasse. Despite SSB being a carbon rich material, there is a lack of exploration regarding its potential for thermos-chemical conversion into various value-added products by implementing bio-refinery approach. It has been observed that the success in vanillin synthesis seems to be largely dependent on the source of lignin. The study was taken up with a view to implement an efficient strategy to de-polymerize the SSB derived lignin to access vanillin. Process to obtain the vanillin from SSB lignin was successfully developed on the laboratory scale and the product characterization was made using TLC & FTIR techniques. The ongoing work aims to optimize the process in order to obtain the highest possible yield of vanillin from SSB lignin.

5. Synthesis of Silica Nanoparticles from sugarcane bagasse fly ash.

Organic Chemistry Department during the year also undertook a project entitled “**Synthesis of silica nanoparticles from sugarcane bagasse fly ash**”. The sugar industry generates significant quantities of bagasse fly ash as a waste & keeping this in view efforts were made to produce silica nano particles from it as to convert it into resource.

Raw sugarcane bagasse fly ash (SBFA) obtained by burning of sugarcane bagasse contains lot of impurities especially inorganic salts and carbon species. Using SBFA as a precursor for synthesis of silica nanoparticles provides way to solve waste problem of fly ash pollution in the sugar industries with the development of a value- added products.

For this invention, pre-treatment procedure was performed to remove excess of inorganic salts, organic compounds, and low solubility elements through washing and to eliminate particles having large size by sieving. Thereafter, silicon was extracted from Sugarcane bagasse fly ash (SBFA) by reaction with sodium hydroxide (NaOH) under heating in muffle furnace at 400°C, melted sodium hydroxide increases silicon purity, liberating elements which can be in the structure of fly ash, making them more soluble. The procedure of extraction generates silicon in the form of sodium silicate, which was solubilised in double distilled deionised water by refluxing then, mixture was filtered.

In this study, the formation of SiO_2NP 's is based on hydrolysis viz. production of silanol groups and condensation viz. production of siloxane, reaction using sulfuric acid in a biphasic medium in the presence of Hexacyltrimethyl ammonium bromide (HCTAB).

The silica particles were generated from the solution by adding sulphuric acid, maintaining acidic condition at pH 4 which ensured almost the complete precipitation of silica from sodium silicate.

The study thus has led to the development of technology for low-cost production of silica nano particles for various practical applications such as nano-fertilizer, pollution treatment, nano composite materials etc.



❖ **BIOCHEMISTRY DIVISION:**

The Biochemistry Division participates in teaching in Post Graduate Diploma Course in Industrial Fermentation and Alcohol Technology (DIFAT), Associate ship of National Sugar Institute (Sugar Technology) & other courses covering various aspects of alcohol production & environment. It renders technical advice / consultancy and undertakes research projects on various topics related to sugar and alcohol industry. Biochemistry division has produced highest no. of Ph.D.'s in the institute and has always been recognized for its innovative approach. Students from all over the country enroll themselves for carrying out dissertation, project or research work.

During the year the division remained actively engaged in evaluation of performance of Effluent Treatment Plants in sugar factories & distilleries situated in the Ganga basin, besides participating in various short-duration training program, seminars/webinars & conferences. The division has a most modern laboratory equipped with HPLC, GC, Alcoyzer, Lypholizer, Pressure Reactor, Laminar flow, Incubators, UV-VIS spectrophotometer and high precision microscopes etc. to carryout research & analytical work. The division also utilizes “**Dual Feed Stock based Nano Ethanol Unit**” and “**Nano Brewery**” for imparting “hands on” training to the students of alcohol technology & others courses. As far as research work is concerned, following R&D work was taken up by the division during the year.

1. Study for assessment of shelf life of cane syrup and alcohol production.

Cane syrup study for shelf-life was under taken so as to assess its deterioration upon storage. For the purpose during the last year syrup was from two different factories was collected. One syrup sample was collected from M/s Dalmia Bharat Sugars Ltd.- Jawaharpur – unit where the factory was producing raw refined sugar. The syrup so collected was having pH-6.2, °Brix 72, and TRS as 64.5 %. Another sample was collected from Experimental Sugar Factory of NSI Kanpur having pH-7.0, °Brix 75, and TRS as 56.9%.

Initial observation indicated that storing syrup was not to be a problem if pH is maintained above neutral with brix to be 75 + before storing. During year, fresh cane syrup samples were 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 Ltd., Unit –Ajbapur, and stored at room temperature. The same were tested to validate the results and to compare with results obtained earlier. It was observed that the sample with low °brix started deteriorating but the sample with higher brix of 72° brix showed no appreciable deterioration as reflected value of TRS %.

The study shall be taken further in collaboration with commercial sugar units during the crushing season 2023-24.

2. Comparative study of five varieties of sweet sorghum for production of ethanol yield.

Five sweet sorghum varieties CSH-22SS, SSV-84, SSV-74, Phule Vasundhara and RIVCSH-28 provided by ICAR- Indian Institute of Millets Research, Hyderabad were sown during August, 2022 at the institute and were harvested during December, 2022 and January, 2023. At harvest, sweet sorghum juice was tested in Biochemistry division for evaluation for ethanol yield of each variety as and when juice was received from the Agriculture chemistry division.

Out of five sweet sorghum varieties evaluated in field trials, Phule Vasundhara recorded highest average stalk yield of 48.1 t/ha followed by RVICSH 28 and SSV 74 which recorded stalk yields of 42.8 t/ha and 42.4 t/ha respectively. Maximum Ethanol yield was evaluated as 55.01 L/T of ICSSH-28 variety followed by SSV74 (48.73 L/T) & CSH22SS (45.13 L/T). ICSSH28 yielded 2337.9 l/ha being highest ethanol yield followed by SSV74 with 2071.0 l/ha & then CSH22SS with 1782.6 l/ha. Phule Vasundhara was first in stalk yield but as regards ethanol yield it stood fourth with 1741.2 L/ha. SSV-84 yielded 1122.7 L/ha being lowest ethanol yield. The same five sweet sorghum varieties will be evaluated again under sub-tropical conditions for ethanol yield during Kharif season 2023.

3. Study of Sugar beet lines for assessment of ethanol production-

Six sugar beet germplasm lines, viz., IISR Comp 1, LS 6, LKC HB, LKC 2020, LKC LB, LKC 2006 were procured from IISR Lucknow in October and were sown by the Agriculture Chemistry division at the institute. Due to adverse climatic conditions, out of six germplasm lines only three (LS 6, IISR Comp1 & LKC 2020) could germinate and harvested in the month of April. The same were evaluated for ethanol production in the Bio-chemistry division utilizing the nano ethanol unit available in the institute. Maximum ethanol yield was evaluated as 100.2 liter/ton of LS-6 variety followed by 97.5 liter/Ton (IISR Comp) and 91.5 liter/ton in LKC2020. Based on the studies carried out, an article is also being prepared for presentation in some conference.



4. Study of spent wash powder for its characteristics and to evaluate its effect on germination of various seeds- For this study dry spent wash powder was procured from M/s Raj Process, Pune. In laboratory the powder was tried with different concentration treatments along with control on various seeds like Moong, chick pea, rajma, maize etc. No germination was seen in above 3% concentration of dry spent wash powder. The same was tried in the pot experiment also. No germination was seen in pot also above 3% concentration. The trial will be repeated again to validate the results.

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❖ AGRICULTURE CHEMISTRY DIVISION:

Sugarcane is the basic raw material used not only for production of sugar but now for bio ethanol also in India. As such its quantitative and qualitative development is necessary for bio-economy of the sugar industry.

The division continuously strives for vertical growth of cane cultivation, trials of high yielding and high sugared varieties, farm mechanization and other measures for enhancing the sugarcane productivity. The department besides participating in teaching subjects like sugarcane agriculture, sugarcane productivity and maturity management along with sugar chemistry to the students of various courses, renders technical advice/consultancy and undertakes research projects on various topics related to sugar industry. It also manages a farm for producing sugarcane required for Experiment Sugar Factory of the Institute and conducting farm trials on Sugar beet and Sweet sorghum. During the year, the division worked on the following projects.

1. To study the yield and ethanol production potential of sweet sorghum in central

U.P:- Five sweet sorghum varieties were grown at the Institute during August, 2022 and harvested during December, 2022 and January, 2023. The season was quite unusual with heavy rains throughout the crop growth period which severely affected the crop growth. The sweet sorghum varieties were crushed by laboratory crusher on different dates according to maturity and extracted juice was later sent to Biochemistry division for further analysis. Out of five sweet sorghum varieties evaluated, Phule Vasundhara recorded highest average stalk yield of 48.1 t/ha followed by RVICSH 28 and SSV 74 which recorded stalk yields of 42.8 t/ha and 42.4 t/ha respectively. These two varieties also recorded a highest brix of 17.3% and were also promising for juice extraction (>60%) under laboratory conditions. The quality parameters especially the Brix (%) and TRS (%) of the sweet sorghum grown in main field were observed to be much better compared to that grown at the other places in institute premises. The most probable reason for this appeared to be the prevailing salinity in the main field which is known to affect the sugar quality parameters. The project has been taken up in collaboration with ICAR- Indian Institute of Millets Research.

2. Experimental trial to assess yield and ethanol potential of different tropical sugar

beet varieties: - A trial was conducted to determine the yield and ethanol potential of six sugar beet varieties. Six sugar beet varieties (LKC HB, LKC LB, LKC 2006, LKC 2020, IISR Comp. I, LS 6) were sown during the October, 2022. Out of six sugar beet varieties, LS 6, IISR Comp. 1 and LKC 2020 showed good physical attributes while LKC HB, LKC LB and LKC 2006 failed to germinate. The data with repeat to yield and ethanol potential of sugar beet varieties is under compilation.



Other activities:

The division under took following activities additionally:

1. Consultancy to sugar factories on cane management & improving the sugar recovery.
2. Vetting of irrigation plans for utilizing treated effluents from sugar factories.
3. Testing of soil samples received from sugar factories.
4. Participation in customized training programs, seminars/webinars and conferences etc.

❖ PHYSICAL CHEMISTRY DIVISION:

The prime functions of Physical Chemistry division are teaching, research, analysis of sugar & sugar house products and consultancy to the sugar factories. The division is engaged in extensive research aimed to develop fundamental understanding and to solve complex problem in physico-chemical aspects of sugar manufacture particularly in clarification process with special focus on color development phenomenon during processing and upon storage of sugar in godowns. The division is also involved in imparting teaching of physical chemistry subject to the students pursuing their courses in Sugar Technology, Alcohol Technology, Environment Science and Quality Control along with participation in the various training programs conducted by the institute. Physical part of chemistry mainly involves the clarification process particularly "Colour" and Physico-chemical aspect" of reactions taking place in clarification process. Apart from this Physical Chemistry division also gives preliminary idea about the chemical kinetics, phase change and electro-chemical aspects of clarification process.

Expanding its horizons, now the Physical Chemistry Division is exploring methodologies based on phytoremediation principle for purification of condensate and waste waters. All this aimed at developing techno economic processes for treatment of effluent for use as irrigation water meeting the CPCB guidelines and also for purifying condensates to use them in place of fresh water or to have their quality conforming to potable water.

The division has a state-of-the-art research laboratory furnished with sophisticated instruments and equipment to carry out analysis as per ICUMSA prescribed procedures and extends its support for analysis of various sugar samples received from sugar factories and elsewhere for determination of colour and conductivity etc. The division also participates in collaborative studies for validating newer processes and analysis techniques/procedures. The division during the year also took part in conducting technical audit of sugar factories and imparting knowledge to sugar industry personnel on standard analytical procedures through various training programs conducted by the institute.

The following research studies have been taken up/ carried out by the division during this period

1. Studies on production of activated bio-char from sweet sorghum bagasse and its application-

Physical Chemistry Department undertook the project entitled "**Department of activated biochar from sweet sorghum bagasse and assessment of de-colorization efficiency on sugar syrup or melt**". The removal of colorants coming from cane or color developed during the process has always been a big challenge for sugar industry. To remove these coloring matter from sugar syrup/melt, department worked on possible use of bagasse based biochar (activated carbon) developed from bagasse using ortho phosphoric acid as an activating agent via controlled

pyrolysis. For this, dried and finely grinded sweet sorghum bagasse was pyrolyzed at different temperatures in the step to 50°C from 550°C to 700°C with different impregnating reagent ratio for the optimization of concentration of activating agent i.e ortho phosphoric acid to check the best activity of biochar. Thereafter to optimize the most suitable dose for decolorization of sugar syrup/melt of 65° brix, different quantities of produced biochar was added to sugar aliquot in a fixed reaction condition. The sugar de-colourisation was observed by analysing the effectiveness for percentage colour removal from sugar syrup/melt liquor, and change in pH for the same was also observed.

From the optimization of effective colour removal using above mentioned biochar, it was found that it was most effective with the one prepared at 550°C, giving highest percentage of colour removal (70%-71%) from sugar melt liquor. For the assessment of relative efficiency of prepared activated biochar, percentage colour removal by obtained biochar was compared with the percentage colour removal of the sugar syrup/melt with commercially available activated carbon (E. Merck, India Ltd.) and it was found that almost 1/4th of PAC was used to give same percentage of color removal observed in the case of activated biochar.



2. Treatment of sugar factory wastewaters (effluent) by innovative method-

The treatment of effluent (wastewater) from sugar factory is always challenging, both in respect of treatment as well as cost effectiveness. As such, Physical Chemistry Division worked on developing an innovative technique which was completely eco-friendly and cost effective too. This technique has four tier treatment system i.e., Primary Treatment (Innovative bio filter), Secondary Treatment (Bioremediation), Tertiary Treatment (Multi Grade Filter and Activated Charcoal Filter), Final Treatment (Reverse Osmosis), depending upon the requirements of output.

In primary treatment the filter comprises layers of gravels, sand, vermiculite, soil and some aquatic plants at the top with high survival rate and long growing period in waste water. Secondary treatment works on the principle of Bioremediation for which aquatic plant **water**

hyacinth is used. It has high potential to absorb heavy metals and other impurities present in the waste water.

The effluent is allowed for the primary treatment with the retention time of 24hrs, the output gets 70-75% reduction in both COD and BOD. Received output is subjected for the secondary treatment with the retention of 24hrs, units removal of COD and BOD to be extent of 75-90% of total load present in the raw effluent. Depending upon the requirement, whether good quality or simple disposal, the treated water samples are further passed through Multi Grade Filter and Activated Charcoal Filter. If this treated water is yet to be purified to the level of potable water it is passed through the R.O. and the water obtained meets the requirement of potable water. The system resulted in over 99% reduction in BOD & COD values. More trials are prepared to be carried out to work out the economics of the system.



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❖ INSTRUMENTATION DIVISION:

Instrumentation division in the Institute was started with a motive to develop competent Instrumentation Engineers with high academic credentials and to make the division recognized by learning community, teaching community and sugar and allied Industry. The objective of this department is to catechize the students of Diploma in Industrial Instrumentation and Process Control (DIPC) and other courses run by the Institute in the multivisionary area of instrumentation covering various areas of Electronics, Measurements, Process Control and Automation specifically related to the sugar & allied Industry and update them with the latest technology and techniques. The students get exposure to Industrial Instrumentation and Process Automation so as to take up responsibilities in various sugar and allied industries as Instrumentation Engineers.

Further, the division also plays a momentous role in recognizing the latest technology to help the industry to adopt and optimize the process, reduce the human intervention and increase the man machine interaction by the way of better utilization of SCADA and DCS. The division is also helps in the maintenance and operation of Experimental Sugar Factory.

In tune with the latest development and keeping pace with the rapidly evolving technology specialized laboratory has been established with a view to strengthen teaching learning process. The division took up the process of upgrading the laboratory facilities for the students of the various courses by way of adding various live modules, calibration facilities especially in the field of Pressure, Temperature and Vacuum with the help of Pneumatic Dead Weight Tester, Vacuum Calibrator, and Dry Block Calibrator and Instruments.

To demonstrate the concepts of various control schemes and Programming through ladder logic, Practical live models based on PLC, SCADA and pneumatics have also been developed for better understanding of the students of various courses. IT Cell has also been maintained by the Instrumentation Division of the institute.



During the year, the division remained involved in teaching to students of various courses of the Institute. Various expert lectures were also given during various training programmes of conducted by the institute. A setup to monitor and auto control the milk of lime Baume by measuring the weight of milk of lime was implemented at Uttam Sugar Mills Limited and based on observations a paper in titled “***Automization of Milk of Lime addition by weight method***” was published in Indian Sugar Journal. Maintenance and calibration of various Instruments from commercial factories as well as from the Experimental Sugar factory was carried out during the year. Various practical trainer kits were got modified in order to give the insight of the wiring connections to the students. The division was also actively involved in various surprise inspections of Effluent Treatment Plant as per CPCB guidelines and in validation of B-heavy diversion process in sugar & ethanol units.

❖ DESIGN & DEVELOPMENT DIVISION:

Designing is the backbone of Engineering and understanding the fabrication drawing of any equipment is the primary requirement of engineering/Industry. This division has been established with the objective to teach and train the students on designing and development of drawings of various equipments and machinery in theory and practical classes respectively on the subject “Equipment Design and Drawing” of various equipments and machinery used in sugar and allied industry.

Besides teaching and training, this division develops designs and drawings of various equipments of sugar factory on demand from factory on payment basis. Presently the division has around 150 designs of various equipments of various capacities including 700 drawing on hard tracings and soft copies on auto CAD. Looking to the growing concerns about the environment and installation of Effluent Treatment Plant, the division has taken up preparation of darning of various equipment used & also for the general layout of different treatment system. In general, the division during the year remained involved in:

- Teaching and training the students of various PG Diploma & Certificate courses in designing and drawings of equipment used in sugar industry.
- Development of general arrangement and fabrication drawings of sugar & allied industry equipments.
- Advisory and consultancy to sugar factories in the India and abroad on designing, operation, co-generation, energy conservation, & water conservation & waste water management etc.

The division also participated in various training programs conducted by the institute during the year. It was involved in development of infrastructure to enable better teaching & training of the student about design aspect.

❖ EXPERIMENTAL SUGAR FACTORY:

The 100 TCD vacuum pan sugar factory of the institute is one of its own kind in any of the sugar institute across the globe and provides first hand on the job training to the students. It is also utilized to conduct pilot plants trials of the research being conducted at the Institute. The factory is thus operated during the season for imparting training to the students as well as for carrying out various experiments with respect to innovation at processing stage and on the design features of process equipment.

The factory is equipped with five mill tandem having AC VFD drives preceded by Leveler, Cutter & Shredder. The process house is adapting Double Sulphitation process for manufacturing of Plantation White Sugar and is equipped with Juice Weighing Scale, Tubular & Direct Contact Heaters, Plate type heat exchanger, SRTC, one vapour cell plus Quadruple Effect Evaporators, Low Head Batch type Pans with mechanical circulator, Crystallizers, fully automatic Batch & Continuous Centrifugal Machines etc. to facilitate required knowledge to the students. The factory is also equipped with a nano-refinery for providing exposer to the students. The Phospho-flotation based sugar refinery has a unique feature of having techniques of secondary de-colourization by both Ion-exchange resins & powdered active carbon during the year, following project was also undertaken at the experimental sugar factory.

A study on the efficiency and other performance parameters of existing Electric Drives for cane preparatory devices and design and development of an improved drive for the application

The sugarcane preparation is one of the most important processes during sugar manufacturing and consumes around 25-30% of the total power consumption in a sugar factory. The machines for sugarcane preparation are high inertial machines which demand a high starting torque.

Conventionally, slip ring induction motors (SRIMs) are used as a prime mover in such applications in sugar mills. These drives have shortcomings of huge slip power loss, high drop in the rated speed, less flexibility for realizing optimum knife/hammer tip speed, low power factor and un-equal load sharing. Of late, only at a few factories in the country, 2-level inverter based variable frequency drives (VFDs) have been installed, for the application. These VFDs, though had addressed the issues in the conventional drives, but it has drawbacks of high total harmonic distortion in the input current and the inverter output voltage, high dV/dt stress on the inverter switches and high common mode voltage.

An Open-End Winding Induction Motor (OEWIM) drive, which is an improved drive, has been proposed and studied which addresses the mentioned issues in the conventional and the recently

introduced 2-level inverter based VFDs for sugarcane preparatory devices. A prototype is also developed and the experimental results are obtained to validate the simulation results.



❖ SURVEY & INFORMATION DIVISION:

This division of the institute acts as a coordinator between the industry, ministry, other organizations and the institute. Any technical query, result for analysis and technical services on any specific area are routed through Survey & Information Division. This division looks after the work of development, conducts advisory board meeting, responds the ministry on technical issues and caters to the to the demand of technical data submission. This division also keeps the records of consultancy visits to sugar and allied industries and other services viz. analytical services provided by different divisions or through Analytical Laboratory of the institute. This division enables all the divisions to function in an integrated manner, each one helping and influencing the other. The division also publishes:

- a. Annual Report of the Institute.
- b. Quarterly “**NSI NEWS LETTER**”
- c. Quarterly Sugar Journal “**SHARKARA**”
- d. Yearly sugarcane and sugar related statistics with technical efficiency parameters obtained by Indian sugar factories.
- e. Various other publications/information brochure as deem necessary in respect of the activities of the institute.

During the year, the technical staff of the division also took part in teaching, customized training programmes and consultancy services etc. being extended by the institute. The technical staff of the division also contributed significantly in conducting R & D work for developing alternate process for juice clarification and to assess possibilities of use of intermediate molasses as nutritive edible molasses. The division also played a pivotal role in finalization and signing of MoU’s with various national & international organization of repute.

❖ ADVISORY & EXTENSION DIVISION:

The Institute has Advisory & Extension Division to render its technical services for trouble shooting advisory on various problems related to lower sugar recovery, inferior sugar quality, higher steam and power consumptions etc. and on Expansion and Balancing, General Checkup, Fuel-Power-Steam Balancing etc. The staff of this division also extended services in conducting validation of ETP's of sugar unit & distilleries on behalf of Central Pollution Control Board. It also participated in validation of sugar & ethanol unit for diversion of various feed stocks for ethanol production. Staff also participated in teaching & other customized training programmes.

The details of services provided are as follows:

1. Consultancy from concept to commissioning in respect of a new sugar factory/ distillery/cogeneration unit etc.
2. Preparation of Detail Project Reports, Technical Feasibility Reports, Techno Economic Viability Reports, Environmental Impact Assessment Reports for Sugar, Cogeneration & Ethanol Projects and their Technical Appraisal.
3. Energy Conservation
4. Water Conservation and Effluent Treatment
5. Enhancing recovery of Sugar and its quality.
6. Reducing loss of Sugar during processing.
7. Steam Economy in the processing house.
8. Improving capacity utilization etc.
9. Deterioration of sugar upon storage
10. Decomposition of molasses upon storage.
11. Problems associated with non-achievement of optimum efficiency at a particular unit operation.
12. Performance assessment of biomass-based co-generation units.
13. Assessment of adequacy and validation of Effluent Treatment Plants of sugar units & Ethanol units.
14. Validation for Ethanol Production, No Increase in Pollution Load.
15. Modernization cum Expansion & Balancing.
16. General Checkup of Plant Efficiency.
17. Quality Control Audits.

In addition to above, the division renders technical advice on various other issues referred by the sugar factories, distilleries and other allied industries as well as conducts training programme, organizes seminars and other activities. The division also has a Model Room of 'Plant & Machinery of Sugar Unit, wherein models of different equipment are displayed. The division also renders services for determination of calorific value of fuels on payments basis.

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❖ ADMINISTRATION DIVISION:

The administration division plays a pivotal role in smooth functioning of the organization. It broadly comprises of various sections viz., Establishment, Accounts, Stores Purchase Section, Dispatch Section, Office Store, Central Store, Chemical Store, Farm Store, Confidential Section, Legal Section and Rajbhasha Vibhag etc.

The Establishment Section is responsible for various establishment matters including regulating Service issues/requests of the employees. Assigned work includes processing of recruitment/appointment/promotion/MACP/pension matters, Recruitment Rules, various Monthly/Quarterly/Annual reports related to the Establishment & Administration etc.

The Accounts Section is responsible for all account related aspects and is responsible for examination and processing of all such matters related to Institute including making payment of salaries and other dues to the staff. The section also processes bills related to payments to various agencies/ service providers/ stationary/ instruments & equipment's/ machinery providers etc. It also handles audit matters and deduction/payment of various taxes including Income-tax. As well, it prepares proposal for Budget Estimates and Revised Estimates (Non-Plan) for its onward submission to the Ministry.

Stores Purchase Section takes care of various purchases and procurements. Assigned work includes preparation and issuing of Tender Notices / Advertisements / Documents / Correspondences relating to procurement etc.

Dispatch Section as its name indicates is responsible for ensuring dispatch of dak from all Divisions and Sections of the Institute. Office Store, Central Store, Chemical Store and Farm Store are responsible for storing the items related to them and issuing such items to the Divisions/Sections placing demands for the same. Any procured material/goods are first received by Stores. The Stores is responsible for ensuring that the supplied goods/material is in accordance with the purchase order.

The confidential section handles matters related ACRs/ APARs of Group 'B' and 'C' Staff and Integrity certificate of Group 'C' MTS/Group 'D' Staff. Besides this, it also provides administrative support to the Office of Sr. Administrative Officer, who is also Central Public Information Officer in disposing of RTI related matters.

During the year the division made arduous efforts for framing/revising recruitment rules and filling up of various vacant posts. After a lot of efforts of the institute as well as of the ministry, proposal for restructuring of the institute has been finalized by Department of Expenditure. Various Technical posts like Professor of Sugar Technology, Professor of Chemical Engineering, Junior Scientific Officer (Environmental Engineering) have been created. On the other hand, Administrative posts like Deputy Registrar & Welfare-cum-Security officer have also been created to cater the need of institute in the present scenario.

❖ RESEARCH PAPERS/PRESENTATIONS:

1. A paper entitled “**Hybrid Sulphitation Cum Re-Crystallization Process for Production of Superior Quality White Sugar**” by Narendra Mohan, V. P. Srivastava, S Mohan & Ashish Kumar published in the proceedings of seminar organized by The Deccan Sugar Technologists’ Association (India) seminar in collaboration with Vishwaraj Sugar Industries Ltd.
2. A research paper entitled “**Artificial Sweeteners – A Threat to Sugar Consumption**” by Sneha Agarwal & Narendra Mohan published in the proceedings of 80th Annual Convention and International Sugar Expo 2022 of Sugar Technologists’ Association of India (STAI).
3. A research paper entitled “**A Study to Synthesize Practical Substitute of 5-HMF from Sugarcane Bagasse Cellulose: A Biorefinery Approach to Access Furanic Biofuels and Value-Added Products**” by Narendra Mohan, Vishnu Prabhakar Srivastava, Chitra Yadav & Mamta Shukla published in the proceedings of 80th Annual Convention and International Sugar Expo 2022 of Sugar Technologists’ Association of India (STAI).
4. A research paper entitled “**HACCP Implementation for Jaggery Processing**” by Ashok Kumar Garg, Anushka Akash Kanodia & Shruti Shukla published in the proceedings of 80th Annual Convention and International Sugar Expo 2022 of Sugar Technologists’ Association of India (STAI).
5. A research paper entitled “**Preliminary Trials on Partial Cane Juice Concentration Through Reverse Osmosis Technology**” by Narendra Mohan, Ashok Kumar Garg, Anurag Verma & Priya Bajpai published in the proceedings of 80th Annual Convention and International Sugar Expo 2022 of Sugar Technologists’ Association of India (STAI).
6. A research paper entitled “**MECHANICAL VAPOUR RECOMPRESSION – FUTURE TOOL FOR STEAM ECONOMY**” by Narendra Mohan, Mahendra Kumar Yadav & Amresh Pratap Singh published in the proceedings of 80th Annual Convention and International Sugar Expo 2022 of Sugar Technologists’ Association of India (STAI).
7. A research paper namely “**Bio Ethanol – Saviour of Indian Sugar Industry**” by Narendra Mohan presented in XXXI Congress of the International Society of Sugar Cane Technologists (ISSCT) held from 20-23 February 2023 at the Hyderabad International Convention Centre, Hyderabad, India.
8. A research paper namely “**Importance of Diversification & Integrations in Sugar Industry**” by Narendra Mohan & Anushka Akash Kanodia presented in XXXI Congress of the

International Society of Sugar Cane Technologists (ISSCT) held from 20-23 February 2023 at the Hyderabad International Convention Centre, Hyderabad, India.

9. A research paper namely **“A Bio-refinery Method for Production of Chloromethyl-Furfural (CMF) and Vanillin with Simultaneous Fraction of Pentose Syrup and Lignin from Sugar Cane Bagasse”** by Narendra Mohan, Vishnu Prabhakar Srivastava, Chitra Yadav, Mamta Shukla for presented in XXXI Congress of the International Society of Sugar Cane Technologists (ISSCT) held from 20-23 February 2023 at the Hyderabad International Convention Centre, Hyderabad, India.
10. A research paper entitled **“Novel Steps for Evaporator Configuration to Reduce Steam Demand by Use of Mechanical Vapour Recompressor”** by Narendra Mohan, Mahendra Kumar Yadav & Amresh Pratap Singh presented during the National Seminar **“Modelling of Indian Sugar Industry in Diversification Era”** at National Sugar Institute, Kanpur on 29th June 2022.
11. A research paper entitled **“Carbonation & Phosphatation Process: A Practical Approach”** by Narendra Mohan, Mahendra Yadav & Amresh Pratap Singh presented during the National Seminar **“Modelling of Indian Sugar Industry in Diversification Era”** at National Sugar Institute, Kanpur on 29th June 2022.
12. A research paper entitled **“Diversification in Indian Sugar Industry: A Sustainable Sugar-Ethanol Model”** by Narendra Mohan & Anoop Kumar Kanaujia presented during the National Seminar **“Modelling of Indian Sugar Industry in Diversification Era”** at National Sugar Institute, Kanpur on 29th June 2022.
13. A research paper entitled **“Synthesis of Silica Nanoparticles from Sugarcane Bagasse Fly Ash”** by Shalini Kumari, Vishnu Prabhakar Srivastava and Narendra Mohan presented in 80th Annual Convention and International Sugar Expo 2022 of Sugar Technologists’ Association of India (STAI).
14. A research paper entitled **“An overview of B-heavy molasses diversion for Boosting Ethanol Production”** by Narendra Mohan, Ananthalakshmi Ranganathan & Vivek Pratap Singh presented in the Annual Convention - 2022 of The South Indian Sugarcane & Sugar Technologists’ Association (SISSTA).
15. A research paper entitled **“Production of Activated Bio-Char from Sugar Cane Bagasse and its Application in De-colourising Sugar Melt”** by Narendra Mohan, Sudhanshu Mohan & Shalini Kumari published in International Journal of Science and Research (IJSR), ISSN:2319-7064, SJIF (2022): 7.942.

16. A research paper entitled **“Use of Energy of Condensing Steam”** by Sanjay Chauhan and D. Swain presented in the convention - 2022 of The South Indian Sugarcane & Sugar Technologists' Association (SISSTA).
17. A research paper entitled **“Indian Sugar Industry: Atmanirbhar Sugar – Ethanol Model”** by Narendra Mohan and Anoop Kumar Kanaujia presented in the 67th Annual Convention - 2022 of the Deccan Sugar Technologist's Association (DSTA).
18. A research paper entitled **“Analysis of Harmonics due to Electrical Drives at Milling Tandem”** by Vinay Kumar and D. Swain, presented in the Annual Convention-2022 of The Deccan Sugar Technologists' Association (DSTA).
19. A paper entitled **“Comparative Study of Different Sugar Beet Varieties and Their Economic Sustainability for Ethanol Production in India”** by Dr. Seema Paroha, D Swain & Dr. Ashok Kumar, published in 7th IAPSIT International Sugar Conference & Sugar Tech Expo / Suagarcon-2022 organized at the Indian Institute of Sugarcane Research, Lucknow.
20. A paper entitled **“Myths About Sugar Consumption: Facts & Way Forward”** by Narendra Mohan presented in 7th IAPSIT International Sugar Conference & Sugar Tech Expo/ Suagarcon-2022 organized at the Indian Institute of Sugarcane Research, Lucknow.
21. A paper entitled **“Advent of Artificial Sweeteners- Is It A Threat to Sugar Consumption?”** by Sneha Agarwal & Narendra Mohan published in **“SHARKARA”** (July – September 2022), VOLUME: 54, NO. 02, ISBN: 978-93-5445-372-4.
22. A paper entitled **“Sugar Dust Explosion – Occurrence, Remedies and Prevention”** by Sanjay Chauhan & D Swain published in 7th IAPSIT International Sugar Conference & Sugar Tech Expo/ Suagarcon-2022 organized at the Indian Institute of Sugarcane Research, Lucknow, India.
23. A paper entitled **“Vanillin Synthesis from Sugarcane Bagasse Lignin in a Bio-refinery Concept”** published in 7th IAPSIT International Sugar Conference & Sugar Tech Expo/ Suagarcon-2022 organized at the Indian Institute of Sugarcane Research, Lucknow, India.
24. A research paper entitled **“Bagasse Based Value-Added Products: Looking Beyond Boundaries”** by Narendra Mohan, published in Indian Sugar Journal, October – 2022.
25. A research paper entitled **“Sugar Industry-Harnessing the Unexploited Potential”** by Narendra Mohan presented in 10th International Conference on Sugar and Integrated Industries held in Luxor, Egypt, 11-16 February 2023.

26. A research paper entitled **“Conservation of Energy in Sugar Industry”** by Prof. D Swain presented in 10th International Conference on Sugar and Integrated Industries to be held in Luxor, Egypt, 11-16 February 2023.
27. A research paper entitled **“Healthier Sugar: Possibilities and Future Prospects”** by Narendra Mohan, to be presented in International Journal of Engineering Research & Technology (IJERT), ISSN:2278-0181, Vol.11 Issue 11, November-2022.
28. A research paper entitled **“Exploiting Sugarcane Value Chain – Indian Experience”** by Narendra Mohan to be presented in 95th SASTA Congress to be held at Durban, South Africa from 15th – 17th August 2023.
29. A research paper entitled **“Classification of Indian Sugars – Then & Now”** by Narendra Mohan published in Indian Sugar Vol.- LXXIII, December 2022.
30. A research paper entitled **“Sugar Beet: A Potential Crop for Production of Biofuel and other Value-Added Products”** by Sharad Babu, Lokesh Babar, Ashok Kumar & Narendra Mohan published in **“SHARKARA – October -December 2022”**.
31. A research paper entitled **“An Improved Electric Drive for Sugarcane Preparatory Devices”** by Vinay Kumar, D Swain, Narendra Mohan to be presented in 95th SASTA Congress to be held at Durban, South Africa from 15th – 17th August 2023.
32. A research paper entitled **“Measure to Reduce Consumption of Process Chemicals in Sugar Factories”** by S. K. Trivedi & Narendra Mohan, published in Co-operative Sugar journal of National Federation of Cooperative Sugar Factories Limited.
33. A research paper entitled **“Augmentation of Alcohol Based Hand Sanitizer Production Capacities in India- A Success Story”** by Narendra Mohan & Vishnu Prabahakar Srivastava, published in SHARKARA (January – March 2023) of National Sugar Institute, Kanpur.
34. A research paper entitled **“Problems and Challenges for Sugarcane Farmers in Northern India / Sub-Tropical India- A case study”** by Anshika Pandey, Sharad Babu, Lokesh Babar, Ashok Kumar and Narendra Mohan published in Indian Sugar Journal, February 2023.

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❖ PATENTS:

1. National Sugar Institute, Kanpur got patent for developing “**Non –Ionic Surfactant from Sugarcane Bagasse**”. The surfactant having good surface activity and bio-degradable properties has applications in personal care products, cosmetics and in production of soaps and detergents.
2. National Sugar Institute, Kanpur got another patent for developing technology for “**Electrolytic Clarification of Sugarcane Juice**” using the conducting polymer electrode. The technology has been developed by Dr. Sudhanshu Mohan, Junior Scientific Officer of Physical Chemistry division. He developed novel electrode and used special type of cell, having a thin layer of poly pyrrole on the surface of graphite.



3. During the year a patent application was also filed for “**Innovative process for production of Silica Nano-Particles (SiNPs) from Sugarcane Bagasse Fly Ash (SBFA)**”.

INFRASTRUCTURE DEVELOPMENT, ACADEMIC & EXTENSION ACTIVITIES

1. The newly constructed “**Training cum Convention Centre- Sharkara Saudh**” at National Sugar Institute, Kanpur was inaugurated on 8th June 2022 by Sadhvi Niranjana Jyoti, Hon’ble Minister of State, Ministry of Consumer Affairs, Food & Public Distribution and Rural Development, being the Chief Guest. Mrs. Neelima Katiyar, Hon’ble Member of Legislative Assembly was also present during the occasion as Distinguished Guest.

The Centre has all required infrastructure to organize training programs, seminars and conferences on hybrid mode and thus it would be possible to connect overseas participants in any such program. Hon’ble Minister also carried out tree plantation in the Centre premises as a mark of concern towards growing levels of pollution & need for environment protection.



On this occasion, executive heads of various sugar companies were felicitated for their exemplary contribution in growth & development of the Indian sugar industry, particular, for making ethanol blending program a success.

2. Director, National Sugar Institute, Kanpur inaugurated the newly constructed library for girl students at Girl’s Hostel of the Institute.



The library has computers with wi-fi facility to enable students accessing books and journals online. Dr. (Mrs.) R. Ananthalakshmi, Hostel Warden (girls) extended thanks to institute administration for the facility which would help the girl students (girls) extended thanks to institute administration for the facility which would help the girl students

3. Renovated Dining Hall of Hostel No. 2 of the National Sugar Institute, Kanpur was inaugurated by Ms. Margaret Gangte, Director (Sugar Administration), Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution on 18th October 2022. The mess and dining hall has been provided all required facilities to provide safe food under hygienic condition to the students.



4. Renovated Laboratory for "**Alcohol Technology**" course was inaugurated on 27th March 2023 by Shri Narendra Mohan, Director, NSI and Ms. Jyotsna Gupta, Deputy Secretary (Administration) Government of India. The laboratory will cope-up with the requirement considering no. of seats has been increased in Alcohol Technology course.



❖ FOUNDATION DAY CELEBRATED:

National Sugar Institute, Kanpur celebrated “87th Foundation Day” and felicitated “Progressive Sugarcane Farmers” and “Ex- Institute Officials” on 4th October 2022. Prof. Vinay Pathak, Vice Chancellor, CSJM University and Dr. Sushil Solomon, Ex. Vice Chancellor, CSA University of Agriculture and Technology graced the occasion. Director, NSI lauded the role of sugarcane farmers in sugarcane productivity enhancement.



Prof. Vinay Pathak, Vice Chancellor, CSJM University stressed upon better interaction between various organizations and industry so as to evolve cost effective technology. He congratulated the institute for the exemplary work being carried out to make Indian sugar industry self-sustainable. Dr. Susheel Solomon, Ex-vice Chancellor, CSA university of Agri & Technology called upon various stake holders of sugar industry to enhance productivity from farm to factory.

❖ WORKSHOP ON MEDITATION:

A “Meditation Workshop” was organized at National Sugar Institute, Kanpur by “Heartfulness” organization on 29th November 2022. On this occasion, a book “The Wisdom Bridge” written by Mr. Kamlesh D. Patel “Daaji” of Heartfulness organization was released by the Director, NSI, Kanpur containing nine principles which are considered important references for parents, parents-to-be, grandparents and caregivers to create fulfilling and happy lives.

During the meditation workshop, the members of the organization informed the staff and students about the mission and vision of the organization and how by practicing the principles the quality of life can be improved by all segments of the society belonging to different age groups as well. They also provided answers to various queries raised by the students and the staff during the interactions.



❖ 54th ADVISORY BOARD MEETING:

The 54th Meeting of the Advisory Board of the National Sugar Institute, Kanpur was held under the Chairmanship of Joint Secretary (Sugar & Admin.) on 17th May 2022. The advisory board reviewed the academic, research, consultancy & other activities of the institute & measures for improving them further were discussed.

Important issues related to restructuring of the institute, development of infrastructural facilities and for enhancing institute-industry interaction were discussed. The members expressed their satisfaction over measurable enhancement in all around activities resulting in significant increase in revenue earnings. The advisory board also discussed the matter related to restructuring of the institute and revival of posts which have been considered under deemed abolished category.

Member unanimously opined for early restructuring of the posts, revival of deemed abolished posts and creation of new posts, particularly, in alcohol technology division so as to satisfy the AICTE norms and provide quality services.



MEETING OF EXPERT COMMITTEE TO FINALIZE SUGAR STANDARDS:

Meeting of the “**Expert Committee for Sugar Standards**” constituted by the Bureau of Indian Standards, Ministry of Consumer Affairs, Food & Public Distribution (Government of India) was held on 23rd September 2022, at the National Sugar Institute under the Chairmanship of Shri Narendra Mohan, Director, NSI, Kanpur.

The Expert Committee finalized the sugar standards for the sugar season 2022-23 commencing from 1st October 2022. The meeting was attended by representatives from the Ministry of Consumer Affairs, Food & Public Distribution, Indian Sugar Mills Association, The Sugar Technologists Association of India and Bureau of Sugar Standards etc.

The committee also decided to introduce new standard in 32 colour series keeping in view the improvement in quality of sugar in the country over the years. NSI, Kanpur collected hundreds of sugar samples from various states and the analysis indicated necessity of introducing new grade for superior quality sugar. This will help both the producers and buyers, particularly, the industrial users of sugar who procure about 65% of the total sugar and aspire for very good sugar quality.

❖ ENTRANCE EXAMINATION:

Entrance Examination-2022 for admission to various courses conducted by National Sugar Institute, Kanpur was organized on 26th June 2022 at various centers across the country through online mode.



As the sugar industry performing good & lot of ethanol capacity building factory place, higher nos. of application were received for seeking admission in sugar engineering and alcohol technology courses.

❖ SEMINARS:

1. One day National Seminar on “**Modelling of Indian Sugar Industry in Diversification Era**” organized jointly by National sugar Institute, Kanpur and U.P. Sugar Mills Association was inaugurated on 29th June 2022, by Shri Laxmi Narayan Chaudhary, Hon’ble Minister for Sugarcane Development & Sugar Industries, Government of Uttar Pradesh.

Shri Narendra Mohan, Director, National Sugar Institute in his key note address advised industry personnel to develop an “**out of box thinking**” to change the conventional model of sugar factories producing sugar to one having multiple products. From ethanol to green hydrogen and from sugar to dietary fibre, from fuel to eco-friendly cutlery, the sugar industry provides enormous opportunities for diversification. While it is necessary to diversify to improve economic sustainability, it also important to develop a robust self-sustainable model for ensuring availability of raw material and other infrastructural facilities and thus the capacities of sugar and other integrated units should be carefully planned, he said.



Experts discussed various models for sacrificing sugar and also producing value added products from by-products of sugar factories with simultaneous balancing of plant & machinery and also having fuel-steam-power balance.

2. National Sugar Institute, Kanpur organized one day National seminar on “**Safety Protocols for Sugar Industry**” on 18th January 2023. Deputy Director (Medical) and Head Ministry of Labour and Employment, Kanpur, Dr. Arkaprabhu Sau, while addressing on risk and hazards, highlighted physical, chemical, biological, mechanical and psychological risk factors which prevailed in sugar industry. Director, NSI laid emphasis on “**Safety First**” to avoid any loss of man and material. Large no. of delegates from various sugar

producing states joined the seminar. Presentations were made on safety protocols to be implemented.



❖ TRAINING PROGRAMMES:

1. No. of short duration training programmes were organized for the in service personnel of U.P. Cooperative Sugar Factories Federation Ltd., during the years so as to refresh & upgrade their knowledge.
 - i. Two weeks training programme on **“Quality & Chemical Control”** for the technical staff of sugar factories of U.P. Cooperative Sugar Factories Federation Ltd., was organized at National Sugar Institute, Kanpur. The training programme was attended by 40 personnel from 20 sugar factories of the federation.



Inaugurating the training programme, Shri Narendra Mohan, Director, National Sugar Institute called upon the participants to take advantage of theoretical & practical

training to be imparted for enriching their knowledge about the analytical procedures to be followed in sugar industry as per the recommendations of International Commission for Uniform Methods of Sugar Analysis.

- ii. Another training of a week's duration program was organized for the staff of Uttar Pradesh Cooperative Sugar Factories on the topic "**Automation & Instrumentation**" wherein they were educated on latest developments with respect to automation can feed control, juice flow stabilization, pH control, boiler drum level control and auto feed control in pans etc.
 - iii. Training program was also organized for the pan boiler staff of Uttar Pradesh Cooperative Sugar Factories on the topic "**Advancements in Sugar Crystallization & Centrifugation**". While they were imparted knowledge on standard operating procedures for maximising the sugar yield with better sugar quality, insight to latest equipment viz vertical continuous pan, mechanical circulators & auto control was also given.
2. Short duration training program was conducted for the officials of Udupi Chamber of Commerce & Industry (Incorporated), Karnataka on "**Models of Ethanol Production**". The participants were provided an overview of production of ethanol from various feed stocks, usual ethanol plant capacities, market supply-demand scenario and probable project cost.



3. One-week training program on "**Chemical & Quality Control Techniques**" for officials of M/s Wave Sugar Industries Ltd. was commenced from 27th June 2022 at the National Sugar Institute, Kanpur. Theoretical as well as practical training was being imparted to the participants with focus on calculation of sugar recovery while undertaking diversion of sugar.
4. Two days Online training programme on "**Effluent Treatment Plant Operation & Analysis of Effluent**" was organized on 11th& 12th October 2022. The training programme was meant for the benefit of sugar and alcohol industry and the delegates were apprised about the targets

envisaged for reducing fresh water consumption and subsequently controlling the effluent discharge as per Central Pollution Control Board guidelines. More than 80 delegates from states of U.P., Bihar, Himanchal Pradesh, Tamil Nadu, Karnataka and Maharashtra participated in the programme.



7. National Sugar Institute, Kanpur organized one-week training programme for the Excise Chemical Examiners of Bihar State on standard protocols for analysis of alcohols and molasses at the institute. The training was considered essential by the state government after the hooch tragedy in Bihar.



8. Training program for the technical officers of PT PG Rajawali Group of Sugar Factories, Indonesia was organized at National Sugar Institute, Kanpur during the second week of March 2023. The program was attended by twenty senior officers including Director (Operations) and Heads of Production, Engineering and Quality Control of the overseas company. Know-how was imparted to the participants on energy conservation, efficiency improvement, quality control and on producing value added products to enhance income streams for making

the sugar units viable. During the training program, apart from theoretical training, practical exposure was also provided to the participants in a nearby sugar factory.



❖ EXECUTIVE DEVELOPMENT PROGRAMME:

Secretary (Food & Public Distribution), Government of India, Shri Sudhanshu Pandey, inaugurated "**Executive Development Program**" organized from 23rd to 25th August 2022 by National Sugar Institute, Kanpur. He called upon delegates for adopting best practices for improving farm and factory productivities to reduce cost of production and improve viability. Joint Secretary (Sugar) Government of India, Shri Subhodh Kumar Singh also addressed and stressed upon converting so called "**Waste to Resource**" and for utilization of by products in a better manner.



During the program, lecture on important topics related to project management, energy conservation, water & effluent management, latest development in sugar & ethanol production were delivered by the eminent experts from institute & other organizations.

❖ EXPERT LECTURES:

Expert lectures for the benefit of students of Sugar Technology (ANSI-ST), Sugar Engineering (ANSI-SE), Diploma in Quality Control and Environment Science (DQCES) and Alcohol Technology (DIFAT) were delivered by Shri G.B. Yadav, General Manager (Production), M/s Dalmia Bharat Sugars Ltd, Shri Shivesh Singh, General Manager (Corporate-Technical), M/s Balrampur Chini Mills Ltd., Shri Govind Mishra, Consultant (Alcohol Technology), Shri Shanti Kumar Pandey, Renowned Sugar Technologist, Shri H.S Shukla, Vice President, Radico Khaitan Ltd. and Shri PP Mishra, Advisor, M/s Dhampur Bio-organics Ltd. on the various topics during the year.



❖ INTERNATIONAL CONFERENCE ORGANIZED:

10th international conference on “**Sugar & Integrated industries**” was organized jointly by National Sugar Institute, Kanpur and Assiut University, Egypt from 12th-14th February 2023 at Luxor, Egypt.



The conference was attended by more than 250 delegates from India, Egypt, America, France, Germany, Nigeria, Austria, Brazil and other countries. Director, NSI Kanpur addressing the meet as the Conference Chairman discussed the changes in business model to be practiced by the sugar

industry. He stressed on innovations and added that only innovative process and products can make sugar industry competitive, viable and sustainable. Shri D. Swain, Professor Sugar Engineering also delivered a lecture on conservation of energy in sugar industry.

❖ DELEGATION FROM FIJI:

Four-member delegation from Fiji headed by Ms. Reshmi Kumari, Director, Planning, Policy & Research, Ministry of Sugar Industry visited National Sugar Institute on 19th October 2022. The delegation which also included Chief Executive Officer, Fiji Sugar Corporation and Chairman, Sugar Research Institute of Fiji visited institute to explore possibilities of seeking National Sugar Institute assistance in modernization and development of the sugar industry in Fiji.

Director NSI, Prof. Narendra Mohan while welcoming the delegates, presented the activities of the institute and briefed the delegates from Fiji about recent developments in Indian Sugar Industry for making it financially sustainable.



❖ VISIT OF OFFICIALS OF DEPARTMENT OF FOOD & PUBLIC DISTRIBUTION:

Fifteen Assistant Section Officers of Department of Food & Public Distribution visited National Sugar Institute, Kanpur for undertaking field exposure on 28th March 2023. During the interactive sessions and visit to various divisions, knowledge was imparted to them about sugar and ethanol production, by-product utilization and way forward to make sugar industry economically & environmentally sustainable.

The visiting officer also visited various laboratories to see R&D work being carried out particularly with respect to production of value added products from the by-products and waste of the sugar industry. They also observed working of Experimental Sugar Factory, Specialty Sugar Division, Nano Ethanol Unit, Micro-Brewery and Bureau of Sugar Standards. The officers were

also taken to the Agriculture Chemistry division to brief them about sugarcane varieties and various issues related with sugarcane production in the country.



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❖ AWARDS/ RECOGNITIONS:

1. Director National Sugar Institute, Kanpur, and Shri Vinay Kumar Assistant Professor Sugar Engineering, were conferred "**JP Mukharji Gold Medal**" for their paper "**Electric Drives for Cane Preparation- A Critical Review of Conventional System and Recent Developments**" adjudged as the best paper in the Engineering Section during the 51th Annual Convention of SISSTA at Tirupati.



2. Director, National Sugar Institute, Kanpur, conferred "**Noel Deerr Gold Medal**" by Shri Sudhanshu Pandey, Secretary (Food & Public Distribution) for paper on development of innovative technology for purification of sugar factory condensate for their reuse in place of fresh water during the 80th Annual Convention of The Sugar Technologists' Association of India (STAI) held on 28th – 29th July 2022 at Dr. Shyama Prasad Mukherjee Indoor Stadium, Goa.



- Director, National Sugar Institute, Kanpur was conferred **"National Cogeneration Award"** by Shri Nitin Gadkariji, Hon'ble Minister of Road Transport & Highways, Government of India for his contribution in converting sugar factories into **"Hub of Bio-energy"** in the presence of Shri Sharad Pawarji, Hon'ble Member of Parliament.



- Shri Narendra Mohan, Director, National Sugar Institute, Kanpur received First Prize for the paper on **"Bio-ethanol from sugar industry- the tool for survival"** during the 67th Annual Convention of DSTA on 18th September 2022, at Pune, in the presence of Shri Sharad Pawarji and Sugar Commissioner (Maharashtra). Director, National Sugar Institute, Kanpur also address to the delegates wherein he focused on **"Sugar Industry @2047"**.



- Shri Narendra Mohan, Director, National Sugar Institute, Kanpur was conferred **"Excellence Award"** for his exemplary contribution in Ethanol Blending Program, for converting sugar factories into hub of bio-energy and other value-added products which

has benefitted both, the millers and the farmers. The award was given to him by Mr. Parshottam Rupala, Union Cabinet Minister of Fisheries, Animal Husbandry and Dairying & Mr. Kailash Choudhary, Union Minister of State for Agriculture and Farmer Welfare, Govt. of India at New Delhi, during the workshop organised at NAS centre, New Delhi.

6. Director National Sugar Institute, Kanpur was conferred with **“Excellence Award”** for exemplary contribution in development of sugar and ethanol production technology during the International Conference, SUGARCON 2022, organized by International Association of Professionals in Sugar and Associated Technologies at Indian Institute of Sugarcane Research, Lucknow during 16th - 19th October 2022.



7. Shri Narendra Mohan, Director, National Sugar Institute, Kanpur was conferred **"Bharatiya Sugar- Overall Outstanding Performance- Institute of the Year Award"** at Pune on 8th September 2022.



Shri Vikram Singh Shinde, President, Bharatiya Sugar praised the efforts made by the Director in making sugar industry as hub for bio energy and also producing value added products from by-products waste from the sugar industry.

8. Director National Sugar Institute, Kanpur conferred **“Excellence Award”** during the XXXI Congress of International Society of Sugar Cane Technologists held at Hyderabad from 20th -23rd February 2023. The award was given by Dr. Jean Claud Autrey, General Secretary, and International Society of Sugar Cane Technologists.



9. हिंदी महोत्सव के दौरान राष्ट्रीय शर्करा संस्थान को राजभाषा नीति के उत्कृष्ट कार्यान्वयन के लिए दिनांक 13 मार्च 2023 को **“प्रथम पुरुस्कार”**, सचिव (खाद्य एवं सार्वजनिक वितरण) भारत सरकार द्वारा प्रदान किया गया। यह पुरुष्कार संस्थान को वर्ष २०२२-२३ के दौरान उत्कर्ष कार्य हेतु दिया गया।



10. Director, National Sugar Institute, Kanpur was honored for his exemplary contribution to sugar industry by **“UP Sugar Mills Association”** on the occasion of 120 years of sugar industry in Uttar Pradesh. Shri C B Patodia, President, UP Sugar Mills Association lauded

the extraordinary efforts made by him in providing technical inputs in policy making and also in developing many value added products and innovative technologies.



❖ MEMORANDUM OF UNDERSTANDING:

1. Prof. Narendra Mohan, Director, National Sugar Institute, Kanpur exchanged the Memorandum of Understanding with Indonesian Ambassador in India for conducting training programmes and providing consultancy to Indonesian Sugar Industry in the presence of Foreign Ministers of the two countries, Dr. S Jaishankar, India and H.E. Ms. Retno Marsudi, Indonesia on 17th June 2022. As per the MoU, National Sugar Institute, Kanpur shall help the Indonesian Sugar Institute in development of technology related to sugar & ethanol production, power generation, environment and quality control. National Sugar Institute, Kanpur shall also conduct faculty development programmes and other customized training programmes, so that, Indonesian institute can develop its capabilities to provide competent manpower to the sugar and allied industry.



2. National Sugar Institute, Kanpur on 1st November 2022, signed a Memorandum of Understanding (MoU) with **M/s Ion Exchange (India) Ltd., Mumbai** to conduct laboratory and pilot plant trials jointly at the site of some sugar factories on concentration of sugarcane juice using “**Reverse Osmosis Technology**”.

❖ राजभाषा :

निदेशक महोदय की अध्यक्षता में राजभाषा कार्यान्वयन की तिमाही बैठकों का समय से आयोजन करते हुए वार्षिक कार्यक्रम के अनुरूप निर्धारित लक्ष्य की प्राप्ति के लिए संस्थान द्वारा निरंतर प्रयास किए गए। संस्थान के अधिकारियों व कर्मचारियों को राजभाषा संबंधी नीतियों से अवगत कराते हुये उन्हें राजभाषा हिन्दी के प्रति विशेष जागरूक करने हेतु संस्थान द्वारा चार कार्यशालाओं का विधिवत् आयोजन किया गया ।

प्रशिक्षण कार्यक्रम:

राजभाषा अनुभाग, भारत सरकार द्वारा चलाये जा रहे हिन्दी टंकण / शब्द संसाधन प्रशिक्षण कार्यक्रमों में समूह "ग" के कार्मिकों को प्रशिक्षण हेतु विशेष बल दिया गया, परिणामस्वरूप संस्थान के एमटीएस वर्ग के कार्मिक भी इससे लाभान्वित हो रहे हैं।

हिन्दी पखवाड़ा व हिन्दी दिवस समारोह का आयोजन:

भारत सरकार द्वारा गुजरात के सूरत में आयोजित द्वितीय राजभाषा सम्मेलन में संस्थान के नामित अधिकारियों ने भी भाग लिया तथा गृह मंत्रालय, राजभाषा विभाग के निदेशानुसार संस्थान में 16 सितम्बर से 30 सितंबर 2022 तक हिन्दी पखवाड़े का आयोजन किया गया। पखवाड़े के दौरान हिन्दी निबंध, व्याख्यान, सामान्य ज्ञान प्रश्नोत्तरी तथा हिन्दी टिप्पण आलेखन प्रतियोगिताएं आयोजित की गयीं। इन प्रतियोगिताओं में संस्थान के अधिकारियों/ कर्मचारियों ने बढ़-चढ़कर भागीदारी की। संस्थान के द्वारा विद्यार्थियों के लिए भी निबंध व व्याख्यान प्रतियोगिताएं आयोजित की गयीं। हिन्दी दिवस समारोह में इन प्रतियोगिताओं में शामिल अधिकारियों/ कर्मचारियों को तथा विद्यार्थियों को क्रमशः 49 व 16 नकद पुरस्कार प्रदान किए गए।

प्रतियोगिताओं के अतिरिक्त 02 अधिकारियों को हिंदी में डिक्टेशन देने के लिए पुरस्कार स्वरूप प्रोत्साहन भत्ता, हिंदी में डिक्टेशन लेने के लिए 03 आशुलिपिकों को पुरस्कार स्वरूप प्रोत्साहन भत्ता, एक टंकक को पुरस्कार स्वरूप प्रोत्साहन भत्ता तथा सरकारी कामकाज मूल रूप से हिंदी में करने के लिए 10 अधिकारियों/ कर्मचारियों को भी नकद पुरस्कार प्रदान किए गए। साथ ही संस्थान में वर्ष भर राजभाषा के प्रति समर्पण भाव से अपना योगदान देने वाले अधिकारियों व कर्मचारियों को भी सम्मानित किया गया।

1. हिंदी टिप्पण -आलेखन प्रतियोगिता (कर्मचारी/अधिकारी)

क्र.	प्रतिभागी	पदनाम	स्थान
1	सर्वश्री संतोष कु. त्रिपाठी	प्र.श्रे.लि.	प्रथम
2	आशीष कुमार	वरि.तक.सहा.	द्वितीय
3	दया शंकर मिश्र	आशुलिपिक	तृतीय
4	राजीव कुमार	प्र.श्रे.लि.	सांत्वना
5	उमेश चंद्र पांडेय	प्र.श्रे.लि.	सांत्वना
6	हेमंत कुशवाहा	अ.श्रे.लि.	सांत्वना
7	अजय कुमार	अ.श्रे.लि.	सांत्वना
8	शरद बाबू	वरि.तक.सहा.	सांत्वना

2. हिंदी निबंध (कर्मचारी/अधिकारी)

क्र.	प्रतिभागी	पदनाम	स्थान
1	सर्वश्री रंजन कुमार	अ.श्रे.लि.	प्रथम
2	अखिलेश कु.पांडेय	मु.अभिकल्पक	द्वितीय
3	उमाशंकर	प्र.श्रे.लि.	तृतीय

3. हिंदी निबंध (मल्टी टास्किंग स्टाफ)

क्र.	प्रतिभागी	पदनाम	स्थान
1	सुश्री मेघा चौधरी	म.टा.स्टाफ	प्रथम
2	सर्वश्री अरूण कु.विश्वकर्मा	म.टा.स्टाफ	द्वितीय
3	अभिषेक कुमार	म.टा.स्टाफ	तृतीय
4	मनीष कुमार सिंह	म.टा.स्टाफ	सांत्वना
5	उदय कुमार	म.टा.स्टाफ	सांत्वना
6	सुनील तिवारी	म.टा.स्टाफ	सांत्वना

4. हिंदी टंकण

क्र.	प्रतिभागी	पदनाम	स्थान
1	सुश्री रश्मि यादव	आशुलिपिक	प्रथम
2	सर्वश्री सुभाष कु.पटेल	म.टा.स्टाफ	द्वितीय
3	अभिषेक कुमार सिंह	म.टा.स्टाफ	तृतीय
4	अरुण कुमार विश्वकर्मा	म.टा.स्टाफ	सांत्वना
5	श्री हेमंत कुशवाहा	अ.श्रे.लि.	सांत्वना
6	उदय कुमार राम	अ.श्रे.लि.	सांत्वना
7	श्री अखिलेश कु.पांडेय	मु.अभिकल्पक	सांत्वना

5. हिंदी व्याख्यान

क्र.	प्रतिभागी	पदनाम	स्थान
1	सर्वश्री संतोष कुमार त्रिपाठी	प्र.श्रे.लि.	प्रथम
2	रमाकांत	आशुलिपिक	द्वितीय
3	दया शंकर मिश्र	आशुलिपिक	तृतीय
4	अखिलेश कु. पांडेय	मु.अभिकल्पक	सांत्वना
5	आशीष कुमार	वरि.तक.सहायक	सांत्वना
6	तेजपाल वर्मा	वरि.तक.सहायक	सांत्वना
7	दुर्गा प्रसाद	अ.श्रे.लि.	सांत्वना

8 उमेश चंद्र पांडेय प्र.श्रे.लि. सांत्वना

6. हिंदी सामान्य ज्ञान

क्र.	प्रतिभागी	पदनाम	स्थान
1	सर्वश्री रंजन कुमार	अ.श्रे.लि.	प्रथम
2	मोतीलाल	अ.श्रे.लि.	द्वितीय
3	अखिलेश कु.वर्मा	वरि.लेखाकार	तृतीय
4	सुश्री रश्मी यादव	आशुलिपिक	तृतीय
5	रमाकांत	आशुलिपिक	सांत्वना
6	उदय कु. राम	अ.श्रे.लि.	सांत्वना
7	अजीत कुमार	स्टोरकीपर	सांत्वना
8	नागमनी कुमार	अ.श्रे.लि.	सांत्वना
9	संदीप कु.यादव	अ.श्रे.लि.	सांत्वना

7. हिंदी सामान्य ज्ञान (मल्टी टास्किंग स्टाफ)

क्र.	प्रतिभागी	पदनाम	स्थान
1	सर्वश्री सुनील तिवारी	म.टा.स्टाफ	प्रथम
2	सुश्री मेघा चौधरी	म.टा.स्टाफ	द्वितीय
3	मनीष कु.सिंह	म.टा.स्टाफ	द्वितीय
4	उदय कुमार	म.टा.स्टाफ	द्वितीय
5	अभिषेक सिंह	म.टा.स्टाफ	तृतीय
6	रूपेश कुमार	म.टा.स्टाफ	सांत्वना
7	विकास ठुकराल	म.टा.स्टाफ	सांत्वना

8. हिंदी निबंध (विद्यार्थी वर्ग)

क्र.	प्रतिभागी	पाठ्यक्रम/वर्ष	स्थान
1	सर्वश्री विकास गुप्ता	शर्करा तक.-II	प्रथम
2	आदित्य कुमार	शर्करा अभि.-I	द्वितीय
3	विपुल कुमार	शर्करा तक.-II	द्वितीय
4	विशाल कुमार	शर्करा तक.-II	सांत्वना
5	हरीश कुमार	शर्करा तक.-II	सांत्वना
6	सचिन कु. शर्मा	शर्करा तक.-II	सांत्वना
7	अतुल राठौर	शर्करा तक.-II	सांत्वना
8	प्रांजुल मिश्रा	शर्करा तक.-II	सांत्वना

9. हिंदी व्याख्यान (विद्यार्थी वर्ग)

क्र.	प्रतिभागी	पाठ्यक्रम/वर्ष	स्थान
1	सर्वश्री प्रशांत सिंह सोलंकी	शर्करा तक.-I	प्रथम
2	भास्कर चौहान	शर्करा तक.-II	द्वितीय
3	विशाल रावत	DIFAT-I	तृतीय
4	अनमोल राजपूत	शर्करा तक.-II	सांत्वना
5	अर्जन गुप्ता	शर्करा तक.-II	सांत्वना
6	किशन पाल	शर्करा तक.-II	सांत्वना
7	हर्षित त्रिवेदी	शर्करा तक.-II	सांत्वना
8	हर्ष मिश्रा	शर्करा तक.-II	सांत्वना

- ❖ यह हर्ष एवं गर्व का विषय है कि हिंदी महोत्सव के दौरान राष्ट्रीय शर्करा संस्थान को राजभाषा नीति के उत्कृष्ट कार्यान्वयन के लिए दिनांक 13 मार्च 2023 को “प्रथम पुरुस्कार”, सचिव (खाद्य एवं सार्वजनिक वितरण) भारत सरकार द्वारा प्रदान किया गया।

❖ OTHER ACTIVITIES OF THE INSTITUTE:

5. Departmental Canteen at the institute is now using eco-friendly & 100% bio-compostable crockery made of sugarcane bagasse. As per the new arrangements effective from 1st April, 2022, while the food products are being served in the utensils made of sugarcane bagasse, the beverages are being served in the earthen pots.



6. Director, National Sugar Institute, Kanpur attended a Symposium on **“Bagasse Drying”** which was organized by M/s Seksaria Biswan Sugars Ltd. at Lucknow as Chief Guest on 8th May 2022. Discussions on design features and ROI of such systems and brainstorming on reasons for inhibition in adopting such systems were made during the symposium.



7. On the occasion of Dr. BR Ambedkar Jayanti, National Sugar Institute, Kanpur paid tributes to the son of soil who spread the message of equality and right to education. Dr. BR Ambedkar was an Indian jurist, politician, philosopher, anthropologist, historian, and economist who was a key architect of the Indian Constitution.



8. Field exposure was given to the students of ANSI - Sugar Technology and Sugarcane Productivity & Maturity Management courses at the institute farm. Students learnt the importance of seed treatment and methods of planting.



During the autumn planting of sugarcane at farm of National Sugar Institute, Kanpur, young and enthusiastic students of Sugarcane Productivity & Maturity Management Course did planting of sugarcane seeds of Co 15023, CoLk 14201 and CoS 13235 with their own hands to learn details of various methods of planting and seed treatment.

9. Karnataka State officials and members of Governing Council of S. Nijlingappa Sugar Institute visited institute, to seek support of National Sugar Institute, Kanpur in training of in-service personnel and modernization of sugar factories and allied industries. The team discussed in details about the measures taken by the sugar factories in sub-tropical region for enhancing their sugarcane productivities and use of information technology in post harvest sugarcane management.



10. **“Orientation Programme”** was organized for the new students admitted during academic session 2022-23 at National Sugar Institute, Kanpur on 24th August 2022. Director, Education In-charge, Controller of Examination & Hostel Wardens addressed and briefed the students about hostels rules, academic calendar and discipline to be followed.



11. **“National Technology Day”** was celebrated at the National Sugar Institute, Kanpur on 11th May 2022. Director NSI highlighted the technological advancement in the Indian sugar Industry during the post-independence era.

12. **“NATIONAL SCIENCE DAY-2023”** was celebrated at the National Sugar Institute, Kanpur, on the theme **“Global Science for Global Well Being”** on 28th February 2023. Lectures were delivered by the institute faculty related to theme of the occasion highlighting the role of science in development and in various spheres of daily life. Students of various courses also expressed their views on the occasion.



13. **“World Earth Day 2022”** was celebrated on 22th April 2022 at National Sugar Institute, Kanpur on the theme **“Invest in our Planet”**. Director called upon the staff and students for carrying out vigorous efforts and creating more awareness about the dire need to protect our environment. On this special day, emphasis should be made on the reasons for increasing environmental problems, including over population, loss of biodiversity, depleting ozone layer which all results in rising pollution, he said.



National Sugar Institute, Kanpur has also taken up the task of replacing the existing process of sugar production with a more environment friendly process which would also lead to superior quality sugar, informed Shri Ashok Garg, Assistant Professor of Sugar Technology. On this occasion tree plantation was also carried out in the institute premises in which staff and students of the institute participated enthusiastically.

14. **“World Environment Day -2022”** was celebrated at the institute on 5th June 2020. Director, NSI addressed on possibilities of **“Green Hydrogen”** from sugar industry as the future fuel.

Tree plantation drive was jointly conducted with Jyoti Mahila Samiti followed by distribution of saplings and cloth bags.



15. National Sugar Institute, Kanpur, celebrated the occasion of “**Indian Constitution Day**” by taking pride in our constitution and abiding by it on 26th November 2022. Preamble to the Indian Constitution read by Officers and Staff of NSI, Kanpur.

16. “**World Biofuel Day**” was organized at National Sugar Institute, Kanpur on 10th August 2022. Various technical aspects like bio-energy, bio-ethanol, bio-electricity, CBG and Green Hydrogen from sugar industry were discussed in length.



17. राष्ट्रीय शर्करा संस्थान द्वारा दिनांक २१ जून २०२२ को “**अंतरराष्ट्रीय योग दिवस- 2022**” का आयोजन किया गया जिसमें संस्थान के अधिकारियों एवं कर्मचारियों ने बढ़-चढ़ कर भाग लिया ।



18. National Sugar Institute, Kanpur organized educational tours for the students of Post Graduate Diploma Course of Associateship of National Sugar Institute in Sugar Engineering (ANSI-SE), Post Graduate Diploma Course in Industrial Fermentation and Alcohol Technology (DIFAT), Post Graduate Diploma Course in Sugarcane Productivity & Maturity Management (DSPMM) and Post Graduate Diploma Course in Instrumentation & Process Control in various sugar factories, distilleries & allied industries situated in different states to learn about sugarcane management, process techniques, ethanol manufacturing process, raw & refined sugar manufacturing process, engineering techniques, etc.



19. National Sugar Institute, Kanpur conducted an online meeting on 16th July 2022, to help Kenya in training manpower to serve the Kenyan Sugar Industry. Matter discussed between officials of National Sugar Institute, Kanpur and Great Lakes University, Kenya. Prof. Hazel Miseda Mumbo, Vice Chancellor, Great Lakes University sought NSI assistance for conducting training programmes for the purpose. The two organizations agreed in-principle to sign a MoU for taking the matter forward.



20. Director, National Sugar Institute, Kanpur addressed Business Meet organized by Cogeneration Association of India at Lucknow on the topic **"Sugar Factories- The Future Innovative Energy Hub"** on 16th July 2022 and suggested various models for boosting ethanol, power and Compressed Biogas production.



21. National Sugar Institute, Kanpur and ICAR-Central Tuber Crop Research Institute, Thiruvananthapuram agreed in principle to work together for production of ethanol from Cassava. Director's and experts from the two institutes had discussions on the matter through video conferencing.

During the meeting Director, National Sugar Institute, highlighted the importance of developing feed stocks other than those available from sugar industry to cope up with future blending requirements. The two institute's agreed in-principle to conduct trials at the nano

ethanol unit available in National Sugar Institute to optimize the technology and work out cost economics.



22. आज़ादी के अमृत महोत्सव के तत्वाधान में स्वतंत्रता दिवस की पूर्व संध्या पर राष्ट्रीय शर्करा संस्थान, कानपुर में शिक्षकों, अधिकारियों एवं छात्रों द्वारा तिरंगा यात्रा निकाली गयी। छात्रों द्वारा "भारत माता की जय" एवं "वन्देमातरम्" के गगनभेदी नारों ने सब में जोश भर दिया।



साथ ही, राष्ट्रीय शर्करा संस्थान, कानपुर में स्वतंत्रता दिवस पूरे उत्साह के साथ मनाया गया। संस्थान द्वारा "स्वच्छता मिशन" के अंतर्गत लगन से कार्य करने वाले सफाई कर्मियों को पुरुस्कृत किया गया। साथ ही शर्करा प्रौद्योगिकी विभाग को "सबसे स्वच्छ विभाग" होने की "स्वच्छता ट्रॉफी" प्रदान की गयी।

एक सांस्कृतिक कार्यक्रम का भी आयोजन किया गया जिसमें डॉ. शालिनी वेद त्रिपाठी, सुश्री अलका मिश्रा, मुकेश श्रीवास्तव ने अपनी गजल एवं कविताओं से संस्थान कर्मियों एवं छात्रों में जोश भर दिया।



23. National Sugar Institute, Kanpur and ICAR-Indian Institute of Maize Research, Ludhiana to work jointly to assess the potential of ethanol production from different maize varieties. Director, ICAR-Indian Institute of Maize Research, Ludhiana, visited NSI, Kanpur to discuss & take the matter forward.



24. A team of National Sugar Institute, Kanpur led by Prof. Narendra Mohan, Director visited ICAR-Indian Institute of Millets Research, Hyderabad. Future planning with timelines discussed for promoting production of bio-ethanol from "**Sweet Sorghum**". While details of trials conducted at the institute were discussed, it was also decided to conduct trials at the farmer's field as solo crop and also as intercrop with the sugarcane. Matter related to exploiting entire sweet sorghum value chain for making the crop attractive to industry and farmers was also discussed.



25. राष्ट्रीय शर्करा संस्थान में “शिक्षक दिवस” समारोह, छात्रों की क्रिया-कलाप परिषद द्वारा आयोजित किया गया। समारोह में संस्थान के छात्रों की वैज्ञानिक समिति के उपाध्यक्ष ने संस्थान के शिक्षकों के प्रति अपना आभार व्यक्त करते हुए उनसे जीवनपर्यंत पथ-प्रदर्शक की भूमिका का निर्वहन करने का अनुरोध किया। छात्रों की क्रिया-कलाप परिषद द्वारा इस अवसर पर जहाँ संस्थान के वरिष्ठ शिक्षकों का सम्मान किया गया वहीं छात्र और शिक्षकों के बीच में बेहतर समन्वय स्थापित करने हेतु कई प्रतियोगितायें भी आयोजित की गयीं।



26. For the newer students of National Sugar Institute, a fresher’s party “FRESHO - 2022” was organized on 11th September 2022, by the senior students of the institute. The programme was inaugurated by Shri Narendra Mohan, Director of the institute by lighting the lamp. During the colourful programme spectacular performance in singing, dancing and drama were given by the students. Arvind Kumar & Sonam Prajapati were adjudged as Mr and Ms Fresher respectively.



27. Students of B. Tech. & M. Tech. (Food Technology) courses of Integral University, Lucknow visited National Sugar Institute, Kanpur to get first hand knowledge of recent trends in sugarcane farming, processing and production of value-added products from by-products using innovative technologies. The students also discussed production of sector specific sugar and particularly for bakery, beverage and confectionary sector.



28. Students of M.Sc. (Chemistry) of Brahmanand College, Students of M.Sc. and B.Sc. courses from BND College, Kanpur, Students of B. Pharm, II-year, Krishna Institute of Pharmacy and Sciences visited National Sugar Institute, Kanpur and also attended an interactive session addressed by Director, NSI and other faculty of the institute. The students were also provided information about the various courses being conducted by the institute and employment prospects in sugar and allied industries by the Education In-charge and Placement Officer of the institute.



29. राष्ट्रीय आविष्कार अभियान 2022-23 के अन्तर्गत बेसिक शिक्षा विभाग कानपुर नगर द्वारा विकास खण्ड बिल्हौर स्थित विभिन्न विद्यालयों के छात्र-छात्राओं ने राष्ट्रीय शर्करा संस्थान में विज्ञान-शैक्षिक भ्रमण किया।



30. संस्थान में "विश्वकर्मा जयंती" दिनांक १७ सितम्बर २०२२ को संस्थान के यन्त्र एवं प्रायोगिक शर्करा प्रयोगशाला में मनाई गयी। संस्थान के निदेशक एवं अन्य कर्मियों और छात्र-छात्राओं ने इस अवसर हवन एवं भगवान् विश्वकर्मा की आरती समारोह में भाग लिया।

31. Director, National Sugar Institute, Kanpur addressed "**Green Sugar Summit**" organized by Confederation of Indian Industry (CII) on 19th Sept. 2022, at New Delhi. He discussed various aspects of clean and green processing for production of sugar suiting to domestic and international markets. Director also discussed various routes for production of renewable, clean and green energy and its potential.



32. To impart training to the students of Alcohol Technology course, Operation of **“Nano Grain Based Ethanol Unit”** commenced at National Sugar Institute, Kanpur on 20th September 2022. The unit has been integrated with existing **“Molasses Based Ethanol Unit”**, so now the unit can produce ethanol from juice, syrup and molasses or from grains viz. rice and maize etc.



33. Operation of **“Micro Brewery”** commenced on 16th September 2022, at National Sugar Institute, Kanpur. A 200 liter/day capacity brewery is operated during every academic session to impart practical knowledge to the students of Industrial Fermentation & Alcohol Technology Course viz. about design feature of plant & machinery and process parameters. Practical training was imparted to the students about production of different beer qualities with respect of taste and alcohol concentration.



34. "Annual Sports -2022" were organized at National Sugar Institute, Kanpur in September 2022. Inauguration of the meet was made by Shri Narendra Mohan, Director at the Gymnasium of the institute. Various indoor and outdoor events in different categories were organized in which students participated enthusiastically. In the team events ANSI (Sugar Engineering) final year team lifted the championship in cricket and volleyball. Students, both boys and girls participated enthusiastically in various events and many of the finishes in the athletics were nail bite.



35. Director National Sugar Institute, Kanpur, addressed technical officers of M/s Balrampur Chini Mills Ltd. on the topic "**Business Model for Sugar-Ethanol Balance**" during the Training Programme organized by the institute at Lucknow on 10th October 2022. Interactions was also made by institute experts on "**Use of MVR's for reducing steam consumption**", "**Causes of sugar dust formation and prevention of explosion**" and on "**Automation Trends & Future Requirements**". During the interactive session, institute experts provided solutions to various issues raised by the factory officials.



36. A “Millet’s Corner” has been created in the departmental canteen of National Sugar Institute, Kanpur, where millets (jowar, bajra and ragi) based products viz. cookies, puffs and multi-grain flour have been provided for sale to the staff and students.



37. To commemorate the 147th birth anniversary of Sardar Vallabhbhai Patel on “Rashtriya Ekta Diwas”, “Run for Unity” was organized by National Sugar Institute, Kanpur.



Floral tributes were paid to the “**Iron Man**” of the country and “**Rashtriya Ekta Diwas Pledge**” was administered to the staff and students.

38. राष्ट्रीय शर्करा संस्थान कानपुर की ओर से दिनांक 1 नवंबर 2022 को परिसर में निशुल्क स्वास्थ्य शिवर का आयोजन, अपोलो स्पेक्ट्रा हॉस्पिटल कानपुर के द्वारा कराया गया। शिविर का छात्र - छात्राओं, शिक्षकों, कर्मचारियों, के अलावा संस्थान के आसपास के निवासियों ने भी लाभ उठाया।



39. A team of Ministry Officials under the leadership of Shri Dharendra Kumar, Director, Department of Food & Public Distribution visited National Sugar Institute, Kanpur on 13th May 2022, to observe the status of “**Swachhta Activities**”. The team also felicitated multi-tasking staff for the good work carried out by them in maintaining cleanliness in and in around the institute premises.



40. National Sugar Institute, Kanpur continued its “**Swachhata Campaign**” on 3rd January 2023. Focusing of one personal hygiene, distribution of toothpaste, toothbrush, bath soap and towels was made by institute to the students of junior classes at Ram Krishna Mission. The students were also educated on importance of personal hygiene.



41. "Swachhata Pakhwada" was organized at National Sugar institute, Kanpur from 16th-28th February 2023 to create awareness amongst students. During the Pakhwada students of primary school were made aware about the importance of "Personal Hygiene" and distribution of tooth brush, tooth paste and soaps etc. by the institute.



Institute also organized **"Tree plantation" & conducted "Essay Competition"** for the students of institute under the Swachhata Pakhwada activities.

42. National Sugar Institute, Kanpur developed cheaper technology for producing **"Solid Alcohol"**. This will enable the use of solid form of alcohol in place of petroleum products, viz. **"paraffin"** in the occasions viz. catering trade, tourism and field work for heating and warming purposes.



43. National Sugar Institute, Kanpur helped M/s Wave Sugar Industries Ltd., Unit – Dhanaura Mandi to conceptualize and operate their Integrated Sugar Refinery with 30% on cane steam consumption using **"Mechanical Vapour Recompression System"** & other modifications.



44. Director, National Sugar Institute, Kanpur, delivered lecture on the topic **"Towards Self Reliance for Sustainability of Indian Sugar Industry- Re-orienting towards Health & Energy"** on 2nd February 2023 at Belagavi organized by M/s Shiv Shakti Sugars Ltd. under the auspices of KLE Group, and presented views on production of **"Healthier Sugars"**, **"Green Energy"** and other **"Value Added Products"**.



45. Statue of **Swami Vivekananda** was unveiled at National Sugar Institute, Kanpur by Swami Atmashradhananda, Head, Ramkrishna Mission Ashram, Kanpur on 7th February 2023. Teachings of Swami Vivekananda have also been displayed around the statue to spread them among the students and staff.



46. Director National Sugar Institute, Kanpur & other faculty members of the institute attended the XXXI- ISSCT Congress at Hyderabad which was participated by over 500 delegates from 38 countries.



Director, NSI presented paper on **"Bio-ethanol- The Savior of Indian Sugar Industry"** on 20th February 2023 & addressed Plenary Session of XXXI ISSCT Congress was held at Hyderabad on the topic **"Importance of Diversification & Integrations in Indian Sugar Industry"**

47. National Sugar Institute, Kanpur organized a brain storming session to celebrate **"Women's Week"** under the theme **"Innovation and technology"** for gender equality on 6th March, 2023. Members of **"Jyoti Mahila Samiti"** and **"Khushhal Betiyan, Khushhal Samaaj"** were felicitated for their extraordinary work for helping the girls of weaker sections and making them self-dependable.



48. Director, NSI, Kanpur, attended function organized by Regional Agmark Laboratory as Chief Guest on the occasion of **"International Consumer Rights Day"** on 15th March 2023. He addressed the delegates in **"Safe Food – From Farm to Fork"** and highlighted importance of specification of sugar recommendation by various apex organization viz-BIS, FSSAI & Codex Alimentarius.



49. Republic Day was celebrated at National Sugar Institute, Kanpur. On this day, awards were given to the winners of competitions held during **"Swachhta Pakhwara"**, **"Vigilance"**

Awareness Week" and "Hindi Pakhwara". Director, NSI took the guard of honor and addressed the staff and students. Wherein called upon for making unified effort to make institute an institute of global eminence. He advised the students to prove their worth in future and to contribute in making Indian Sugar Industry, self-sustainable.



Statue of "**Goddess of Knowledge-Maa Saraswati**" was also unveiled at the institute on this occasion.