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NATIONAL SUGAR INSTITUTE

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It contains……

From Director's Desk...

India is now a sugar surplus country and during the current sugar season 2022-23, the sugar production is likely to 33.0 million metric tons after diversion of about 4.3 million metric tons of sugar for ethanol production. However, during the sugar season 2023-24, because of the drought conditions in the several parts of Maharashtra and Karnataka, the sugarcane production is likely to be adversely affected and which is a matter of concern. The sugar prices ruling in the global and domestic markets are good and hence sugar-ethanol balance is going to become crucial looking to the relative economics of various models of sugar & ethanol production.

I again reiterate, the future of the sugar industry globally, lies in development of Agri-business Complexes or to Bio-refineries producing bio-electricity, bio-ethanol, bio-gas/bio-CNG, bio-manure, bio-degradable cutlery/tableware, bagasse based particle board, green hydrogen and bio-food etc. The industry is also required to address the environmental issues and now when most the sugar units are going to have attached distilleries, this aspect assumes greater significance.

Institute was full of activities during the period with the commencement of academic session 2023-24. Teaching being at the top of agenda, other activities related to research & development and consultancy continued and no. of papers presented in various conferences, seminars and conventions. Institute staff and research fellows bringing laurels been conferred prestigious Noel Deerr Gold Medal, BansiDhar Gold Medal, DSTA Medal and STAI Silver Medal for their exemplary research work.

Campus recruitments give a measure of the health of the sugar industry and its confidence in the institute with respect to the quality of students. It has remained the first choice of sugar & distillation companies and machinery manufacturers. By September 2023, out of the total students available, more than 60% got placements in reputed companies at attractive pay packages.Preparation & sale of sugar standards is also a major activity of the institute and with the approval of the standards by the Expert Committee, the sale of sugar standards shall also commence from 1st October 2023.

Best wishes for New Sugar Season 2023-24.

(Narendra Mohan)
Director

❖ OUR PROVISIONS

❖ ACADEMIC COUNCIL MEET:

Meeting of Academic Council of the institute was held on 5th July, 2023 under the Chairmanship of Director, NSI to discuss about changes in course structures considering New Education Policy, on reviewing structure of few courses to suit sugar industry requirements and for ensuring filling of seats. Matter regarding "Challenge Evaluation" was also discussed and a policy was formulated.

❖ WORKSHOP ON INTELLECTUAL PROPERTY RIGHTS:

To commemorate "**National Intellectual Property Festival**", a workshop on "**Intellectual Property Rights**" was organized at National Sugar Institute, Kanpur on 7th July, 2023. Chairman & Managing Director, National Research Development Corporation, Director, NSI, other experts from Department of Scientific & Industrial Research and Patent Office etc. addressed the delegates on importance of IPR's and commercialization of developed technologies. The workshop was attended by scientists & experts from other institutes and universities.

❖ EXECUTIVE DEVELOPMENT PROGRAMME:

Executive Development Programme was organized by National Sugar Institute, Kanpur on virtual platform from 12th to 14th July, 2023. Experts discussed about **"Ethics & Values in Organization", "Sugar Industry- Beyond Sugar", "Models of Ethanol Production" and on "Ethanol from Maize".** The programme was attended by about 150 executives including those from overseas companies. Director, National Sugar Institute, Kanpur Prof. Narendra Mohan addressed the Execuitive Development Programme and discussed enoromous possibilities available in sugar industry. He said one had to look beyond sugar and green energy as the by products from sugar industry and even other possibilities of production of many such value added products, sugar industry should integrate with other industries.

❖ ORIENTATION PROGRAMME:

"Orientation Programme" was organized for the new entrants admitted during academic session 2023-24 at National Sugar Institute, Kanpur on 8th August 2023. The programme was graced by Shri Alok Saxena, Executive Director, M/s Gobind Sugar Mills, Aira, Lakhimpur Kheri. Director NSI, Education In-charge, Controller of Examination & Hostel Wardens addressed and briefed the students about hostel rules, academic calendar and discipline to be followed.

❖ EXPERT LECTURES & INTRACTIVE SESSION:

Expert lectures for the benefit of students of Sugar Technology ANSI (ST) and Alcohol Technology (DIFAT) were delivered by two alumni of National Sugar Institute, Kanpur who have made their marks in the sugar industry, Mr. Amit Negi, General Manager (Production) and Mr. Narendra Rawat, Manager Distillery, M/s. Dalmia Bharat Sugar & Ind. Ltd., Unit – Nigohi, District – Shahjahanpur, U.P.at the institute on 9th August 2023.

The marathon sessions, each of about two hours duration provided valuable insights to the students about raw- refined sugar & ethanol production from different feed stocks.

a. Mr. K Jagadeesh, Sugar Technologist delivered lecture at National Sugar Institute, Kanpur on 11th August 2023. He conducted two sessions of almost five hours for the benefit of Sugar Technology students on the topics related to "**Good Laboratory Practices**" and "**Chemical & Quality Control**".

b. National Sugar Institute, Kanpur organized an interactive session conducted by Dr. (Mrs.) Divya Chaudhary, Director, Jagran Institute of Management. She addressed final year students of various courses at the institute on 24th August 2023 on "**Personality Development**" **&** "**How to Prepare for Interviews**".

❖ WORLD BIOFUEL DAY:

"World Biofuel Day" was celebrated at National Sugar Institute, Kanpur on 10th August 2023. Various technical aspects of production of bio-energy from various sources available in the sugar industry were also discussed. Faculty members also discussed opportunities and challenges in production of CBG from press mud and other agro-waste. Economics of various models of bio-energy production in sugar industry was also discussed. Director discussed about the possibilities of production of green hydrogen in the sugar industry.

❖ NATIONAL NUTRITION WEEK:

National Sugar Institute, Kanpur celebrated **"National Nutrition Week"**, during which a Cooking Competition on the theme **"Eat Right, Be Bright"** was organised by the Cultural Society of National Sugar Institute, Kanpur on 2nd September 2023 at the dining hall of the training centre of the institute. Students and research scholars exhibited their cooking skills in preparing millets and sweeteners based dishes. Dr. Seema Jaiswal & Ms. Kanak Gupta, both Nutritionist acted as judges & distributed prizes.

❖ RESEARCH WORK:

1. **Studies on Sweet Sorghum Bagasse (SSB) value addition:** The experiment related to fractionation of individual component of the SSB (cellulose, hemicellulose, lignin) and analysis of CMF has been attempted. Along with the experimental work, literature survey related to CMF (SSB) was also been carried out. The purification of 5-Chloromethyl furfural (CMF) synthesized from sweet sorghum bagasse derived cellulose has been completed and the isolated yields using toluene is abourt 15% & with chloroform as 35%.

2. **Cane juice syrup study for shelf-life and production of alcohol:** Syrup Samples were collected from three different factories i.e; M/s Dalmia Bharat Sugar & Ind. Ltd., Unit – Jawaharpur, M/s Dalmia Bharat Sugar & Ind. Ltd. Unit - Nigohi, & M/s DCM Shriram Ind. Ltd., Unit – Ajbapur. After recording initial parameters like obrix, pol, purity, TRS etc. the samples were kept at room temperature to assess the shelf life of the syrup. It was observed that after six month of storage, the results obtained indicate hardly one unit TRS drop in samples with higher brix (75.30 & 73.20 initially recorded) and drop of almost 4 unit TRS in both the samples with lower 0brix 710 & 650 (initially recorded).

3. **Comparative study on polarization by using lead, non-lead, clarificants and NIR polarimetry:** The study involved measuring polarization at 589 nm & 880 nm wavelength using both lead & Carrez reagents. While using the Carrez reagent at 880 nm for three samples of B heavy, an average decrease of 0.38 unit in pol % & 3.44 units in purity was observed. However, at 589 nm the polarization was not within the acceptable range in case of using Carrez reagent. Additionally, the colour (IU) of B heavy molasses was also analyzed after using both clarificants. The colour reduction in three samples was significantly higher i.e. 67.03% in case of using lead sub acetate, however colour reduction was only 23.88% while clarification was done by Carrez reagent. Data compilation related to study on polarization by using lead & non-lead clarificants on B-Heavy molasses from different organization is under progress. Study on cane juice samples shall be carried out in October month on availability of matured cane from farm.

4. **Production of Invert syrup directly from sugarcane juice and Raw sugar:** 2 batches of medium invert sugar were prepared from raw sugar (271 IU). One batch was dosed with monk fruit extract (98% pure) while the other batch was dosed with Stevia extract (99 % pure). Quarterly analysis of parameters such as Brix%, Pol%, Purity, RS%, TRS%, Color (IU) is being carried out. The liquid sugar samples are kept at 3 different temperatures (@ 15 ^{0}C, 28 ^{0}C and 32 ^{0}C) to observe changes such as microbial growth, crystal formation etc. No specific changes are seen in the samples kept at different temperatures in five months, neither microbial growth nor any type of crystal formation is observed in the

stevia sample of liquid sugar kept at 28 ^{0}C and monk sample kept at 15 ^{0}C formed a hazy, which upon reheating disappear.

5. **Shelf life study of press mud:** Ten press mud samples from sugar factories situated in UP, Bihar, Haryana and Chhattisgarh were collected and stored keeping almost the environment as exists at the factory front. 10 Raw + 10 Treated sample of press mud of each factory are being analyzed for parameters, such as, pH, total solids (moisture content), ash content, total volatile solids (TVS), lignin and total convertible volatile solids (TCVS) on monthly basis. As observed that degradation (Fungal Growth) is occurring after six month of storage in both raw as well as treated press mud samples. Other observation being:

- pH of the raw press mud was observed to be in the range of 6.49 – 7.31 while that for PM stab (treated sample) was observed to be in the range of 4.72 – 6.62.
- The total solids for raw press mud and treated press mud were in the range of 88.7 – 90.2 % and 22.4 – 26.3% respectively.
- The ash content of the stored raw and treated press mud samples were in the range of 29.48 – 36.75 % and 5.22 – 8.23% respectively.

6. **Shelf life study of Vitamin-A fortified sugar:** Vitamin A fortified raw sugar samples (amorphous sugar) prepared by co-crystallization process and dosing vitamin A @ 15.5 – 16.8 µg/g of vitamin A per gm of sugar is being analyzed for vitamin A content on monthly basis using vitamin A analyzer to observe the reduction of vitamin A content over the storage since May 2023. The observation was indicated % reduction in vitamin A content of sugar over five months of storage to be about 27 %.

7. **Comparative study of the activated bio-char from sugar cane bagasse and Sweet Sorghum bagasse in de-colorization of sugar melt [Extended to Effluent]:** Physical Chemistry department has already worked on decolourization of sugar melt using activated bio-char from sugar cane and Sweet Sorghum bagasse. Now this is extended to the treatment Sugar Factory Effluent (later to the Distillery effluent also). To undertake this problem,

preliminary trials have been done which have shown the reduction of COD to about ¼th to the initial value, monitoring for other parameters is going on.




8. **Conversion of wastewater into Potable water through Bioremediation Technique:** On the basis of the results obtained after the treatment of both effluent and the condensate, the innovative technique developed on laboratory scale proved to be efficient enough to treat condensate and effluent for getting portable quality water. The technique not only gives good quality water at the end but also ensures appreciable removal of impurities at each stage of treatment.

9. **Essential Oil Extraction from Sugarcane Molasses:** A trial of Hydro-distillation with different ratio is being conducted to analyse the various characteristics of the extracted essential oil. Study shall also be made about their chemical composition and evaluation of its antioxidant and antibacterial activities.

❖ RESEARCH PAPERS:

1. A research paper entitled **"Bio-refinery Approach for the Production of Vanillin from Sweet Sorghum Bagasse"** by Narendra Mohan, Chitra Yadav & Mamta Shukla published in Annual Convention of The South Indian Sugarcane & Sugar Technologists' Association (SISSTA).

2. A research paper entitled **"Target E20-Sustainability"** by Dr. Seema Paroha, Ashok Kumar and D Swain published in 81st Annual Convention of Sugar Technologists' Association of India (STAI).

3. A research paper entitled **"Advent of Effective Bio Additive Treatment Methodology for Preservation of B-Heavy Molasses"** by Narendra Mohan, Mr. Srikanteshwara, Anushka Akash Kanodia and Shruti Shukla published in 81st Annual Convention of Sugar Technologists' Association of India (STAI).

4. A research paper entitled **"Sweet Sorghum: A Wonder Crop"** by Shalini Kumari, Mamta Shukla, Shruti Shukla and Himanshu Mishra published in 81st Annual Convention of Sugar Technologists' Association of India (STAI).

5. A research paper entitled **"Comparative Study of Activated Biochar from Sugarcane Bagasse and Sweet Sorghum Bagasse in Dec-colorisation of Sugar Melt"** by Shalini Kumari, Sudhanshu Mohan and Narendra Mohan, published in 81st Annual Convention of Sugar Technologists' Association of India (STAI).

6. A research paper entitled **"Biofuel Roadmap-Role of Indian Sugar Industry"** by Narendra Mohan, published in **"Sharkara"** [APRIL-JUNE 2023, VOLUME: 55, NO. 01].

7. A research paper entitled **"A Study of B Heavy Molasses to be used as Edible Molasses"** by Narendra Mohan, Ashok Garg, V.P. Singh & M.P. Singh sent for publication in International Conference of National Sugar Institute, Kanpur during 11th -12th October 2023.

8. A research paper entitled **"Study of Nutrition & Therapeutic Aspects of Spirulina & Basil for Production of A Nutrition & Healthier Sugar"** by Narendra Mohan & Rajesh Singh sent for publication in International Conference of National Sugar Institute, Kanpur during 11th -12th October 2023.

9. A research paper entitled **"Bioremediation based Innovative Technique for Treatment of Wastewaters from Sugar Industry"** by Neelam Chaturvedi, Sudhanshu Mohan & Narendra Mohan sent for publication in International Conference of National Sugar Institute, Kanpur during 11th -12th October 2023.

10. A research paper entitled **"Use of Alternate Clarifying Agents for Cane Juice Clarification"** by Narendra Mohan & Mohit Kumar sent for publication in International Conference of National Sugar Institute, Kanpur during 11th -12th October 2023.

11. A research paper entitled **"Sweet Sorghum for Biofuel Production in Sub Tropical India"** by AV Umakanth, Ashok Kumar, Ananthalakshmi Ranganathan, Seema Paroha and D Swain sent or publication in International Conference of National Sugar Institute, Kanpur during 11th -12th October 2023.

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❖ MoU SIGNED:

1. National Sugar Institute, Kanpur signed MoU with CSJM University, Kanpur on 21st July 2023, for lateral entry of pass out of Diploma in Quality Control & Environment Science course in M.Sc. (Environment Science & Technology) II Year, conducted by University. Students thus to get Master's degree and then they can take further research programmes too.

2. National Sugar Institute, Kanpur signed MoU with M/s PT PG Rajwali, Indonesia in a ceremony organized at Surabaya, Indonesia on 24th July 2023 for providing training to the technical manpower & consultancy for efficiency enhancement and modernization of their sugar units.

❖ SALE OF SUGAR STANDARDS:

Sale of sugar standard grades commenced from 1st October 2022 for the sugar season 2022-23. Standard grades can be procured online also. Institute has been sale out 1096 samples to the 239 sugar factories up to September, 2023. The details are available on our website *http://www.nsi.gov.in*

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❖ OUR ADVISORY:

Besides conducting teaching and training programmes, carrying out research in relevant field, another main functions of the institute are:

1. To function as a **"Think-tank"** to sugar and allied industry for proposing modernization and trouble free functioning of the process on advisory basis / through Extension Services.
2. To formulate strategies and promotes measures for expansion of capacities, energy conservation, co-product utilization etc. for sugar and allied industries.
3. To assist Govt. of India through technical contribution in policy formulation and control of Sugar Industry.
4. To render assistance to various government organizations in implementation of policies, validations and on associated matters.
5. To extend human resource management services to various government and private organizations.

❖ CONSULTANCY:

Requests for availing consultancy services of the institute were received and also provided to various sugar factories ethanol & other allied units on various technical matters relating to diversion of B Heavy molasses/syrup, validation of ETP's, preparation of DPR's, validation of no increase in pollution loads in ethanol units upon enhancement in capacity and to conduct technical audit etc.

Sr. No.	***Factory Name***
1	*M/s Shri Sangam Sahkari Sakkare Karkhane Niyamit, Belgavi, Karnataka*
2	*M/s Balrampur Chini Mills Ltd., Gularia, Lakhimpur, U.P.*
3	*M/s U. P. Sugar Mills Cogen Association, Lucknow, U.P.*
4	*M/s Dalmia Bharat Sugar Mills Ltd., Unit - Jawaharpur, Sitapur, U.P.*
5	*M/s Bajaj Hindustan Sugar Ltd., Unit - Budhana, Muzaffarnagar, U.P.*
6	*M/s Bajaj Hindustan Sugar Mills Ltd., Unit - Khambhar Khera, Lakhimpur Kheri, U.P.*
7	*M/s Madhuvan Sugars Pvt. Ltd., Kalaburgi, Karnataka*
8	*M/s Avadh Sugar & Engineering Ltd., Unit – Hargaon, Sitapur, U.P.*
9	*M/s Dhampur Bio-organics Limited, Unit – Meerganj, Bareilly, U.P.*

10	*M/s Dhampur Bio-organics Limited, Unit – Asmoli, Sambhal, U.P.*
11	*M/s Kisan Sahkari Chini Mills Ltd., Sneh Road, Najibabad, Bijnor, U.P.*
12	*M/s Indian Potash Limited, Distillery Unit – Muzaffarnagar, U.P.*
13	*M/s Dalmia Bharat Sugar & Industries Ltd., Distillery Unit -Nigohi, Shahjahanpur, U.P.*
14	*M/s DCM Shriram Ltd., Distillery Unit – Ajbapur, Lakhimpur, U.P.*
15	*M/s Triveni Engineering Ind. Ltd., Unit – Ramkola, Kushinagar, U.P.*
16	*UP State Sugar Corporation Ltd., Lucknow, U.P.*
18	*Sir Shadi Lal Distillery & Chemical Works, Muzaffarnagar, U.P.*

❖ ANALYTICAL SERVICES:

Besides analysis of sugar & sugar house products, ethanol and effluents etc., Institute offers testing of Ethyl Alcohol based Sanitizer in its sophisticated, most modern NABL accredited analytical laboratory and other laboratories of the institute. Testing of bagasse for determination of GCV and lime for various constituents also taken up during the period. Analytical services were rendered to following:

Sr. No.	***Factory Name***
1	*M/s Bisalpur Kisan Sahkari Chini Mills Ltd., Bisalpur, U.P.*
2	*M/s The Ganga Kisan Sahkari Chini Mills Ltd., Unit – Morna, Muzaffarnagar, U.P.*
3	*M/s Sravasti Kisan Sahkari Chini Mills Ltd., Unit – Nanpara, Bahraich, U.P.*
4	*M/s Kisan Sahkari Chini Mills Ltd., Sathiaon, Azamgarh, U.P.*
5	*M/s Triveni Engineering & Ind. Ltd., Unit – Khatauli, Muzaffarnagar, U.P.*
6	*M/s Kisan Sahkari Chini Mills Ltd., Sampurna Nagar, Lakhimpur Kheri, U.P.*
7	*M/s HPCL Biofuels Ltd., Unit – Lauria, W. Champaran, Bihar*
8	*M/s Dhampur Sugar Mills Ltd., Unit - Dhampur, Bijnor, U.P.*

9	*M/s Govind Sugar Mill, Aira Estate, Lakhimpur Kheri, U.P.*
10	*M/s H.P.C.L. Biofuels Ltd., Unit - Sugauli, Bihar*
11	*M/s White Gold Agro Products, Assam*
12	*M/s The Kisan Sahkari Chini Mills Ltd., Kaimganj, Farrukhabad, U.P.*
13	*M/s Triveni Engineering & Industries Ltd., Deoband, Saharanpur, U.P.*
15	*M/s Rudra Bilas Kisan Sahkari Chini Mills Ltd., Bilaspur, Rampur, U.P.*
17	*M/s Magadh Sugar & Energy (Bharat Sugar Mill), Gopalganj, Bihar*
18	*M/s Gobind Sugar Mill, Aira Unit of Zuari Industries Limited, Lakhimpur Kheri, U.P.*

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❖ OUR OTHER ACTIVITIES:

1. Session on "**Sahaj Yog**" was conducted for the benefit of staff at the National Sugar Institute, Kanpur on 3rd July 2023. Such sessions to be conducted regularly now for staff and students regularly as measure for stress relieving to lead a peaceful and meaningful life.

2. Team led by Director, NSI, Kanpur visited a Sugar Unit -PT PG Rajwali, Malang, Indonesia to advice on reducing sugar losses during processing, energy conservation and quality control on 25th July 2023.

3. Students of M.Sc. (Food Technology), Central Food Toxological Research Institute, Mysuru visited the National Sugar Institute, Kanpur to get insight of sugar production and quality. Theory & practical classes were conducted for them besides giving exposure about unit operation in Experimental Sugar Factory.

4. Officials of M/s Dhampur Sugar Mills Ltd., Mr. Anant Pandey, Chief Executive Officer and Mr. Ishaan Goel, General Manager, visited the National Sugar Institute, Kanpur on 3rd August 2023, to discuss modalities for technology transfer for producing value-added products from by-products of the sugar industry.

5. Named after one of the Ex-Director of the institute and a renowned Sugar Engineer, Late N. R. Khariawala, Indoor Sports Complex inaugurated by Prof. Narendra Mohan Director, NSI, Kanpur on 6th August, 2023 after renovation. It has facilities for gymnasium and other indoor sports including badminton and table tennis.

6. National Sugar Institute, Kanpur celebrated 77th Independence Day on 15th August 2023.

The Council of Students Activities organized a colourful cultural programme showcasing Indian traditional dances, patriotic songs and variety of other events performed by the students. Tiranga Yatra also organized on the eve of the Independence Day at National Sugar Institute, Kanpur.

7. राष्ट्रीय शर्करा संस्थान में **"शिक्षक दिवस"** समारोह, का आयोजन दिनांक 5 सितम्बर 2023 को 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-छात्रों की क्रियाकलाप 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।

8. Director National Sugar Institute, Kanpur along-with team of NSI conferred Noel Deerr Gold Medal, Bansi Dhar Gold Medal and STAI Silver Medal by Secretary (F&PD) for developing innovative process techniques and value added products from waste of sugar industry during the Annual Convention of STAI held on 6th-8th September 2023 at Travancore International Convention Centre, Kerala.

9. Director and other scientists of ICAR- Indian Institute of Sugarcane Research, Lucknow visited National Sugar Institute, Kanpur on 13th September 2023 and discussed about, working jointly on developing low cost technology for producing 2G ethanol from bagasse and other crop residues.

10. राष्ट्रीय शर्करा संस्थान मे "विश्वकर्मा पूजा" दिनांक 17 सितम्बर 2023 को आयोजन सोल्लास संपन्न हुआ । इस अवसर पर दुनिया के पहले शिल्पकार एवं वास्तुकार को नमन किया गया। संस्थान के निदेशक एवं अन्य कर्मियों और छात्र-छात्राओं ने इस अवसर हवन एवं भगवान् विश्वकर्मा की आरती समारोह मे भाग लिया गया।

11. Director, National Sugar Institute, Kanpur felicitated at the Conference on Integrated Strategy for Green Renewable Energy held at Pune by Shri Sharad Pawar, Hon'ble Member of Parliament in the presence of Shri Dinesh Jagdale, Joint Secretary, Ministry of New & Renewable Energy, Government of India on 18th September 2023 for his exemplary work on developing green energy from sugar industry.

12. During the first phase of campus recruitment drive conducted by the institute, 90 students got employment in reputed machinery manufacturing, sugar and alcohol companies. Reputed organizations like Balrampur Chini Mills Ltd., Mawana Sugar Works, EID Parry Ltd, Wave Sugar Industries Ltd, ISGEC Ltd, Chandigarh Distillers and Bottlers Ltd, Magadh Sugar and Energy Ltd and ADS Spirit etc. recruited the students from various streams.

13. Prof. Narendra Mohan, Director NSI, Kanpur conferred **"Technical Excellence Award"** while Mr Anup Kanaujia, Assistant Professor got second best paper prize during the Annual Convention of Deccan Sugar Technologists Association held at Pune on 24th September 2023.

14. Director NSI, Kanpur visited M/s Pagnism Innovations Pvt. Ltd., Sangli on 26th September 2023 and saw the encouraging results achieved during initial pilot plant scale trials for producing green hydrogen from compressed bio-gas. National Sugar Institute to work further with M/s Pagnism Innovations Pvt. Ltd., for production of green hydrogen in sugar factories.

15. Blood donation camp was organized at the National Sugar Institute, Kanpur on 27th September 2023. Officer, staff and students were participated in the camp and 38 units blood was donated.

16. सरकारी कामकाज में हिंदी को बढ़ावा देने के उद्देश्य से दिनांक 14 सितंबर से 28 सितंबर 2023 तक हिंदी पखवाड़े का आयोजन किया गया। जिसका समापन समारोह दिनांक 29 सितम्बर 2023 को संपन्न हुआ। हिंदी टिप्पण आलेखन, हिंदी आशुलिपि, हिंदी टंकण, हिंदी निबंध, हिंदी व्याख्यान इत्यादि हेतु पुरस्कार प्रदान किए गए।

17. राष्ट्रीय शर्करा संस्थान, कानपुर में 15 सितम्बर से 02 अक्टूबर तक स्वच्छता पखवाड़ा मनाया गया, इसी के उपलक्ष्य में संस्थान ने कई प्राथमिक विद्यालयों, बाजारों, घनी वस्तियों, एवं अन्य स्थानों पर स्वक्षता गतिविधियों को लेकर व् स्पेशल कैंपेन 3.O लांच किया गया एवं स्वच्छता व् पर्यावरण संरक्षण के प्रति जागरूक किया गया।

18. Swachhata oath administered to staff and students at the National Sugar Institute, Kanpur on 26th September 2023. Thereafter, the staff and students launched a campaign to educate people about importance of Swachhata, particularly, personal hygiene. Distribution of cotton bags was also made in the areas of high footfalls to create awareness about plastic pollution.

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❖ HAPPENING IN THE SUGAR INDUSTRY:

Sugar importation would kill sugar industry in Philippines: Lawmaker-
Manila: Negros Occidental 5th District Rep. Emilio Yulo III said that allowing the importation of sugar for industrial users would affect the domestic sugar industry, reports Phil Star. The Sugar Planter's federations are opposing the sugar liberalization process initiated by Finance Secretary Diokno which is considered as a compromise to raise taxes on sugary drinks.

Awareness campaign launched by sugarcane department to encourage farmers in filling online declarations-
Pilibhit, Uttar Pradesh: To ensure smooth supply of sugarcane, an awareness campaign has been initiated by the Sugarcane Department, urging farmers to fill online declarations. Without the declaration, farmers will not be able to supply sugarcane, reports Live Hindustan.

Sugar prices in Bangladesh increase by 60 per cent since Russian-Ukraine war-
A study conducted by the international humanitarian organisation ActionAid reveals that the prices of sugar have increased by 60% in Bangladesh since the outbreak of the Russian-Ukraine war, reports Tbsnews.

भारत और अर्जेंटीना विशेष रूप से जैव प्रौद्योगिकी और कृषि के क्षेत्र में युवा शोधकर्ताओं एवं स्टार्टअप्स के द्विपक्षीय आदानकेंद्रीय मंत्री :प्रदान के लिए सहमत हुए हैं--
भारत और अर्जेंटीना विशेष रूप से जैव प्रौद्योगिकी और कृषि के क्षेत्र में युवा शोधकर्ताओं और स्टार्टअप्स के द्विपक्षीय आदान-प्रदान के लिए सहमत हुए हैं। यह बात आज यहां नई दिल्ली में केंद्रीय विज्ञान एवं प्रौद्योगिकी राज्य मंत्री (स्वतंत्र प्रभार); प्रधानमन्त्री कार्यालय, कार्मिक, लोक शिकायत, पेंशन, परमाणु ऊर्जा और अंतरिक्ष राज्य मंत्री डॉ. जितेंद्र सिंह से अर्जेंटीना में सांता फ़े प्रांत के प्रशसक (गवर्नर) उमर एंजेल पेरोटी ने एक उच्च स्तरीय प्रतिनिधिमंडल के साथ मुलाकात के दौरान कही।

Bihar to study sugarcane industry in Maharashtra-
Patna: Minister of Cooperative, Dr Surendra Yadav, has asked the officials to study the Maharashtra model in which the sugarcane-based industry has flourished, reports Prabhat Khabar. "The officials should visit the villages in Maharashtra and find out which type of sugarcane variety they are growing that contains more juice. We can follow them and set up small businesses based on the sugarcane industry. This will help in generating employment in the state," he said.

ओडिशा में तीन एथेनॉल परियोजनाओं को दी गई मंजूरी-
भुवनेश्वर मुख्य सचिव प्रदीप जेना की अध्यक्षता में राज्य स्तरीय single window clearance authority (SLSWCA) ने 1,250 करोड़ रुपये के तीन अनाज आधारित एथेनॉल प्लांट सहित आठ औद्योगिक परियोजनाओं को मंजूरी दे दी। आपको बता दे कि, अनाज आधारित एथेनॉल के एक अग्रणी निर्माता ने 814.54 करोड़ रुपये के संचयी निवेश के साथ पश्चिमी ओडिशा जिलों में तीन इकाइयां स्थापित करने का प्रस्ताव दिया है।

Ethanol boost: "Petrol to be sold for Rs 15 per litre if..." Nitin Gadkari suggests innovative idea for fuel economy-
Road Transport & Highways Minister Nitin Gadkari on July 4 suggested an innovative idea for fuel economy. While addressing a rally in Rajasthan's Pratapgarh, Gadkari

said, “Farmers of the country will become “Urjadaata”. He said, “I am going to launch new cars in August. These cars will run on Ethanol produced by farmers. 60 per cent ethanol, 40 per cent electricity; on average, petrol will then cost Rs. 15. The imports will reduce, the amount is Rs. 16 lakh crore, and the money will go into farmers’ pockets. We have become the fastest growing economy in the world.”

Sri Lanka: Demand for sugarcane-made products rise, Barista introduces first ever compostable sugarcane coffee lid-

Barista, in its commitment to reducing plastic waste, has introduced compostable sugarcane coffee lids in Sri Lanka. According to Dailymirror.lk, the coffee cup lid alone contributes to 410 kg of plastic waste. With approximately 82,000 Barista cups being consumed monthly, this initiative aims to significantly decrease plastic usage.

Sugarcane cultivation increases in Muzaffarnagar-

Muzaffarnagar, Maharashtra: According to a report by Amar Ujala, farmers in the district are showing a growing interest in cultivating sugarcane due to its promising returns. The district has witnessed a consistent rise in the area dedicated to sugarcane cultivation. Additionally, the average sugarcane production has also increased.

चीनी की तस्करी रोकने के लिए सरकार की BSF के साथ बातचीत-

नई दिल्ली: सरकार-से-सरकार (जी2जी) मार्ग के तहत दस लाख टन चीनी भेजने से भारत के इनकार के बाद बांग्लादेश में चीनी की तस्करी बढ़ गई है। इसके साथ ही भारत द्वारा घरेलू बाजार में आपूर्ति बढ़ाने और कीमतों को नियंत्रण में रखने के लिए पिछले सितंबर निर्यात पर प्रतिबंध लगाने के बाद पड़ोसी देशों में टूटे हुए चावल की तस्करी में भी वृद्धि हुई है। इसी तरह खाद्य और सार्वजनिक वितरण विभाग (डीएफपीडी) ने पिछले साल अक्टूबर में चीनी निर्यात को 'मुक्त' श्रेणी से 'प्रतिबंधित' श्रेणी में स्थानांतरित कर दिया, जो पर्याप्त घरेलू आपूर्ति सुनिश्चित करने के लिए इस साल 30 अक्टूबर तक लागू रहेगा।

UP govt to launch digital crop survey ‘e-Padtal’ to safeguard farmers from crop loss-

Lucknow (Uttar Pradesh) [India], July 10 (ANI): The Chief Minister of Uttar Pradesh, Yogi Adityanath, announced on Friday the launch of a digital crop survey called ‘e-Padtal’ to safeguard farmers from crop loss caused by seasonal fluctuations and give them access to government funds and programmes.

ऑस्ट्रेलियाई चीनी उद्योग से सीखेगा फिजी चीनी उद्योग-

सुवा : फिजी चीनी उद्योग ऑस्ट्रेलियाई चीनी उद्योग के अनुभव और सफलता से सीखने को इच्छुक है। फिजी चीनी उद्योग को खासकर बिजली सह-उत्पादन, एथेनॉल और परिष्कृत चीनी के उत्पादन के क्षेत्रों में विकास करना है।चीनी मंत्री चरणजीत सिंह ने फिजी में ऑस्ट्रेलियाई प्रभारी स्टुअर्ट वाट्स के साथ बैठक की। मंत्री सिंह ने फिजी के चीनी उद्योग के सामने आने वाली प्रमुख चुनौतियों की पहचान की है। उन्होंने कहा की, फिजी चीनी उद्योग के सामने जलवायु परिवर्तन और इसका प्रभाव, श्रमिकों की कमी, उम्रदराज़ उत्पादक और युवाओं के बीच गन्ना खेती में रुचि की कमी आदि चुनौतियां है। उन्होंने वाट्स को फिजी में उनके राजनयिक कार्यभार के लिए बधाई दी और क्षेत्रीय स्तर पर आपसी हितों को आगे बढ़ाने में ऑस्ट्रेलिया के चल रहे द्विपक्षीय सहयोग की सराहना की।उन्होंने कहा कि, फिजी और ऑस्ट्रेलिया विरासत, संस्कृति, बहुजातीय और कृषि से जुड़े मजबूत संबंधों का करीबी इतिहास साझा करते है।

Kenya: Lower sugarcane production leads to ban on sugar production-

The Agriculture and Food Authority (AFA) has issued directives to suspend the sugarcane crushing operations in the country due to a shortage of cane, reports Standard Media. Jude Chesire, AFA Ag Director (sugar directorate) issued the orders after conducting a meeting of the stakeholders.

निर्माण उद्योग को एथेनॉल और मेथनॉल ईंधन का उपयोग करना चाहिएनितिन गडकरी :-

नई दिल्ली: केंद्रीय सड़क परिवहन और राजमार्ग मंत्री नितिन गडकरी ने निर्माण और उपकरण उद्योग को एथेनॉल और मेथनॉल जैसे वैकल्पिक ईंधन का उपयोग करके अपनी ईंधन लागत कम करने सलाह दी। मंत्री गडकरी यहां भारतीय निर्माण और उपकरण निर्माता संघ)ICEMA) के वार्षिक सत्र में बोल रहे थे। मंत्री गडकरी ने हमेशा से एथेनॉल और मेथनॉल जैसे वैकल्पिक ईंधन की इस्तेमाल को बढ़ावा देने की पैरवी की है।

EID Parry plans to position itself in future as bioenergy, food and nutrition company-

EID Parry (India) Ltd., a prominent sugar producer in the South, is mulling to position itself as a leading bioenergy, food, and nutrition company, according to Chairman M.M. Venkatachalam, reports The Hindu. In the latest annual report, Venkatachalam emphasized that this strategic repositioning would delink the company from the cyclicality and tightly regulated nature of the conventional sugar industry. This would empower it to compete and succeed based on the strength of its business model and capabilities.

Egypt floats tender for 50,000 tonnes of raw sugar-

The General Authority for Supply Commodities of Egypt has floated a tender to import 50,000 tonnes of raw sugar from across the world for The Egyptian Sugar & Integrated Industries Company (ESIIC). The interested entities should submit their bids on CIF between 15-30 September 2023 and/or Oct 1-15 and/or Oct 16-31 or an already delivered cargo and GASC will choose between them.

E20 मिश्रण पेट्रोल स्टेशनों में महाराष्ट्र और उत्तर प्रदेश क्रमशः पहले और दूसरे स्थान पर-

लुधियाना : पेट्रोलियम और प्राकृतिक गैस राज्य मंत्री रामेश्वर तेली ने कहा कि, वर्तमान में, 23 जुलाई, 2023 तक देश में कुल मिश्रण 11.77% तक पहुंच गया है और तेल विपणन कंपनियों ने देश भर में 1600 से अधिक खुदरा दुकानों में E20 (20% एथेनॉल मिश्रित पेट्रोल बेचना शुरू कर दिया है। (E20 मिश्रण पेट्रोल स्टेशनों में पंजाब 166 स्टेशनों के साथ देश में तीसरे स्थान पर है। महाराष्ट्र और उत्तर प्रदेश क्रमशः पहले और दूसरे स्थान पर है।

Kazakhstan: Zhetysu sets target to process 80,000 tons of sugar beet in 2023-

aldykorgan: The regional administration has stated that the Aksu-based sugar plan has set a target to process 80,000 tons of sugar beet this year and the region is expected to harvest up to 100,000 tons of sugar beet, reports inform.kz.

Government promotes high-quality jaggery production in district-

Namakkal, Tamil Nadu: Farmers in Namakkal district are being actively encouraged to initiate high-quality mould jaggery (achu vellam) units, with the added incentive of accessing a ₹1 lakh subsidy from the State government to kickstart these centers, according to the hindu.

महाराष्ट्र में एक भी चीनी मिल ऐसी न हो, जो एथेनॉल का उत्पादन न करे-अमित शाह :-

देश में एथेनॉल उत्पादन को बढ़ावा दिया जा रहा है और इसके लिए कई मंत्री भी उद्योगपति को प्रोत्शाहित कर रहे है। केंद्रीय गृह एवं सहकारिता मंत्री अमित शाह भी एथेनॉल उत्पादन को बढ़ावा देने के लिए उद्योग को जागरूक कर रहे है। मंत्री अमित शाह ने रविवार को कहा कि महाराष्ट्र में एक भी चीनी मिल ऐसी नहीं होनी चाहिए जो एथेनॉल का उत्पादन नहीं कर रही हो। वह पुणे में सेंट्रल रजिस्ट्रार ऑफ कोऑपरेटिव सोसाइटीज (CRCS) कार्यालय के डिजिटल पोर्टल को लॉन्च करने के बाद एक कार्यक्रम में बोल रहे थे।

Pakistan government to import sugar at PKR 220 per kg to address looming crisis-

Islamabad, August 31: The Pakistan government has chosen to import 1 million metric tonnes of sugar to replenish the country's reduced supply after being deceived by sugar mill owners about a "sufficient" domestic stock, Geo News reported. The federal government will import sugar at an inflated price of PKR 220 per kilogram, and the burden will be passed on to the population, which is already suffering from inflation and will be forced to pay exorbitant prices, the Geo News said.

Uttar Pradesh: Sugarcane clinic started to empower farmers-

Amroha: Sugarcane farmers in Amroha can now access vital information related to sugarcane cultivation without the need for extensive travel. Information about sugarcane diseases, crop yields, and other relevant details can be readily available to farmers through nearby committees or at the gates of sugar mills. The Sugarcane Department has taken the initiative to open "Sugar Clinics" and "Sugarcane Investment Distribution Centers" across the district, with a total of 11 such centers now operational, reports Amar Ujala.com.

Uttar Pradesh: Sugar mills clear 88.34 per cent of cane dues for ongoing crushing season-

Lucknow: Preparations for the upcoming crushing season in Uttar Pradesh, India have begun, with sugar mills focusing on timely payment of sugarcane dues. According to government data, sugar mills in the state crushed 1,098.82 lakh tonnes of sugarcane in the current season, producing 104.82 lakh tonnes of sugar. As of September 14, 88.34% of the dues have been paid, amounting to Rs. 33,614.11 crore.

Bangladesh: Early harvest of sugarcane in full swing in Dhaka-

DHAKA: Sugarcane cultivators in Bangladesh are celebrating a year of exceptional production, thanks to favorable weather conditions, reported Xinua. The early harvest of sugarcane has been in full swing in Dhaka, with the harvesting season extending from September to March next year.

एथेनॉल नीति के कारण गन्ना भुगतान कम करने में मिली मदद-

नई दिल्ली : केंद्र सरकार ने एथेनॉल मिश्रण कार्यक्रम का बचाव करते हुए कहा है कि, इससे चीनी की कीमतों को स्थिर करने में मदद मिली है, गन्ना बकाया भुगतान पर चिंता कम हुई है और कच्चे तेल के आयात में कटौती करने में मदद मिली है। द हिन्दू बिजनेस लाइन में प्रकाशित खबर के मुताबिक, खाद्य मंत्रालय के एक वरिष्ठ अधिकारी ने कहा, पिछले 12 वर्षों में, गन्ने के क्षेत्रफल में बहुत कम वृद्धि हुई है, जबकि बेहतर किस्म विकसित करने के लिए भारतीय कृषि अनुसंधान परिषद (आईसीएआर) के वैज्ञानिकों की बदौलत इसका उत्पादन काफी बढ़ गया है। उन्होंने कहा कि, चीनी क्षेत्र में अब कोई संकट नहीं है क्योंकि सरकार समान स्तर के रकबे से उत्पन्न अतिरिक्त उत्पादन का प्रबंधन करने में सक्षम है।

ISMA demands hike in ethanol price, sugar MSP-

New Delhi: The Indian Sugar Mills Association (ISMA), the apex body representing the sugar industry, has called for hike in prices of ethanol produced from sugarcane juice/syrup raising it to Rs 69.85 per liter. In addition, ISMA has urged the government to establish a long-term policy and pricing formula for ethanol. These measures, ISMA contends, will incentivize mills to augment their production capacity by approximately 400 crore liters of ethanol by 2025, ultimately achieving a 20% blending ratio with petrol.

Three Kenyan sugar mills apply for exemption from sugarcane crushing ban-

Three private sugar mills in Kenya have applied to the Agriculture Food Authority (AFA) for exemption from a blanket ban on crushing cane, which is in place to allow sugarcane to mature. Chairman of AFA, Cornelly Serem, confirmed that the current suspension on crushing remains in effect, with an anticipated start date for milling set for December this year. "We anticipated that the duration of the moratorium would allow the majority of sugarcane in plantations to reach optimal maturity," Serem explained.

ISMA ने flex fuel vehicles पर 5 प्रतिशत GST लगाने का किया आग्रह-

(नई दिल्ली) इंडियन शुगर मिल्स एसोसिएशन :ISMA) ने ऑटोमोबाइल के लिए ईंधन के रूप में पेट्रोल के साथ एथेनॉल के मिश्रण को अपनाने में तेजी लाने के लिए फ्लेक्स फ्यूल का उपयोग करने वाले वाहनों के लिए भी इलेक्ट्रिक वाहनों के समान 5 प्रतिशत की GST दर की मांग की। फ्लेक्स फ्यूल वेहिकल्स)FFVs) विभिन्न स्तरों पर पेट्रोल और एथेनॉल के मिश्रण का उपयोग करते है। भारत ने E10 (पेट्रोल में 10 प्रतिशत एथेनॉल हासिल कर लिया है और (2025 तक E20 का लक्ष्य रखा है। ISMA ने FFVs पर GST में छूट के लिए सड़क परिवहन और राजमार्ग मंत्रालय को एक अभ्यावेदन दिया है।

Bihar CM Nitish Kumar inaugurates ethanol plant-

Nalanda (Bihar): Chief Minister Nitish Kumar inaugurated the Chandrika Power ethanol plant in the Fatehali village, Biharsharif. The unit, built with a cost of 100 crore rupees, is capable of producing 60,000 litres of ethanol daily. It is expected to benefit farmers and provide employment to people from several surrounding villages.

नितिन गडकरी ने डीजल इंजन वाहनों पर-10% अतिरिक्त कर की रिपोर्ट को खारिज कर दिया-

नई दिल्ली : केंद्रीय मंत्री नितिन गडकरी ने मंगलवार को कहा कि, वह डीजल इंजन वाहनों पर 10 फीसदी अतिरिक्त टैक्स लगाने का प्रस्ताव करने की योजना बना रहे है। 63वें SIAM वार्षिक सम्मेलन में बोलते हुए, गडकरी ने कहा कि वह आज दिन में वित्त मंत्री निर्मला सीतारमण को यह प्रस्ताव देंगे। परिवहन मंत्री ने इसे "प्रदूषण कर" कहा और कहा कि यह देश में डीजल वाहनों के उपयोग को कम करने का एकमात्र तरीका है। बाद में नितिन गडकरी ने डीजल इंजन वाहनों पर-10% अतिरिक्त कर की रिपोर्ट को खारिज कर दिया। गडकरी ने एक्स पर एक स्पष्टीकरण जारी किया जिसमें कहा गया कि ऐसा (पूर्व में ट्विटर) कोई प्रस्ताव वर्तमान में सरकार द्वारा सक्रिय विचाराधीन नहीं है।

केंद्रीय मंत्री हरदीप सिंह पुरी ने एथेनॉल मिश्रण के लिए चीनी उद्योग की सराहना की-

केंद्रीय पेट्रोलियम मंत्री हरदीप सिंह पुरी ने शुक्रवार को कहा कि भारत का ध्यान एथेनॉल मिश्रण बढ़ाने पर है और चीनी उद्योग ने इसमें महत्वपूर्ण भूमिका निभाई है। मंत्री ने यह भी कहा कि सस्टेनेबल एविएशन फ्यूल (SAF) में उद्योग की बड़ी भूमिका है। इंडिया शुगर एंड बायो-एनर्जी कॉन्फ्रेंस में अपने वीडियो संदेश में पुरी ने इंडियन शुगर मिल्स एसोसिएशन (आईएसएमए) और इंटरनेशनल शुगर ऑर्गनाइजेशन (आईएसओ) के प्रयासों की सराहना की। उन्होंने कहा की हमने सतत विकास की खोज में

एक नए युग में प्रवेश किया है, और स्थिरता के लिए देशों का एक साथ आना एक महान कदम है। भारत एथेनॉल मिश्रण के मामले में लगातार मानक बढ़ाने पर केंद्रित है। चीनी उद्योग ने इसमें महत्वपूर्ण भूमिका निभाई है और सस्टेनेबल एविएशन फ्यूल में इसकी बड़ी भूमिका है।

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❖ **RESEARCH ARTICLE:**

BIOFUEL ROADMAP- ROLE OF INDIAN SUGAR INDUSTRY

By

Narendra Mohan
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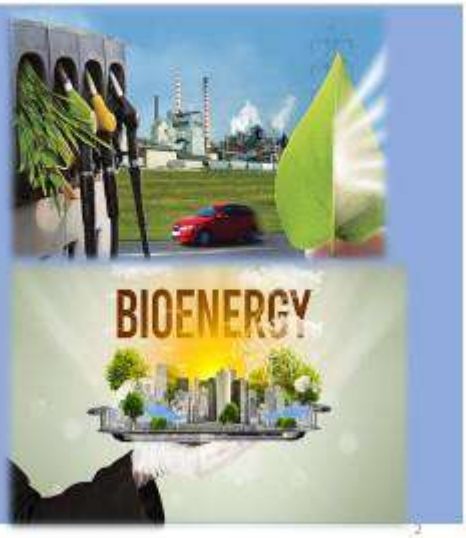
Email: nmagrawal@rediffmail.com

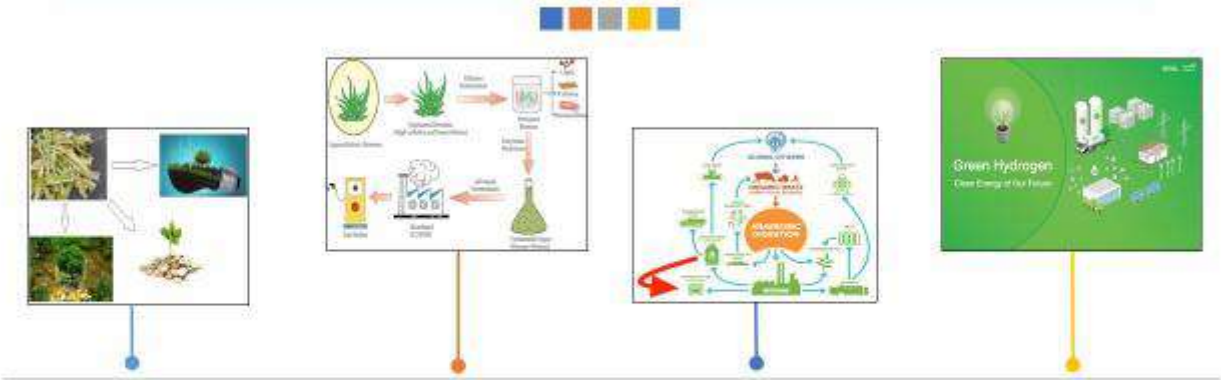
BIOFUELS/BIO-ENERGY & SUGAR INDUSTRY

The Indian sugar industry is faced with a reality that value additions, diversifications and transformations to be vigorously investigated as possible routes to new market and making sugar industry less dependent on single commodity *i.e.* sugar.

The future of the sugar industry, as a whole, lies in development of sugarcane bio-refineries *i.e.* bio-electricity, bio-ethanol, CBG, bio-manure, bio-chemicals and other bio-products *etc.* ***Now production of Green Hydrogen is being seriously investigated.***



BIO-ENERGY: SUGARCANE ENERGY CHAINS



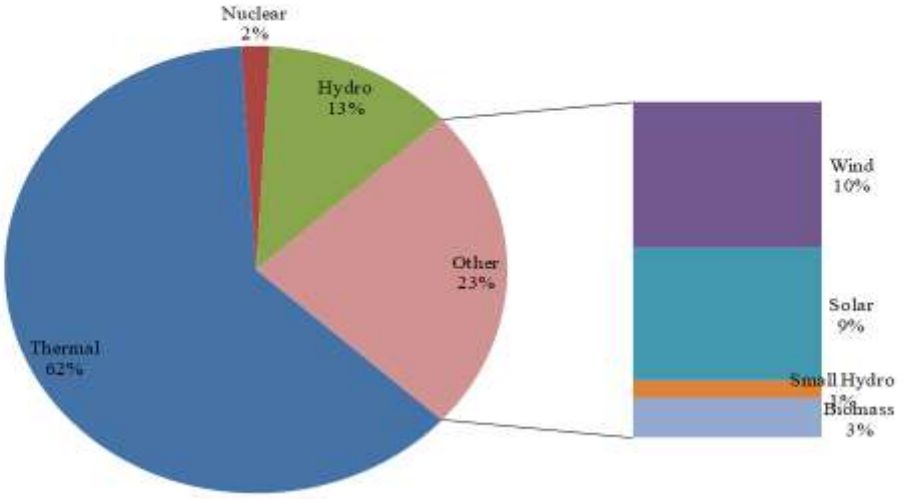
Bagasse for heat & bio-electricity generation.

Juice/Molasses for conversion to bio-ethanol.

Filter Cake and spent wash for conversion to methane/ bio-gas/ CBG

Green Hydrogen

INDIAN ELECTRICITY SECTOR SCENARIO



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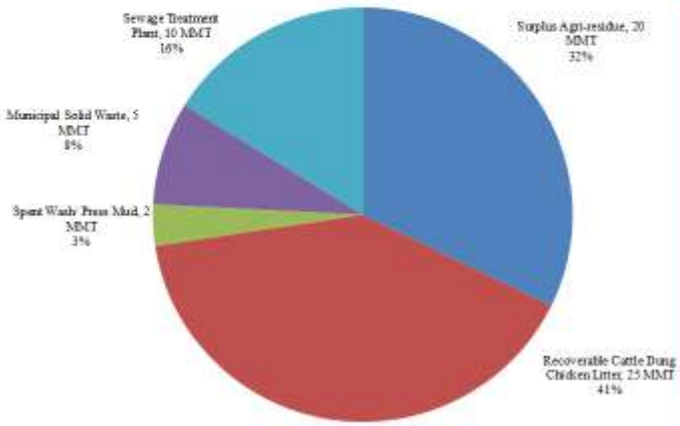
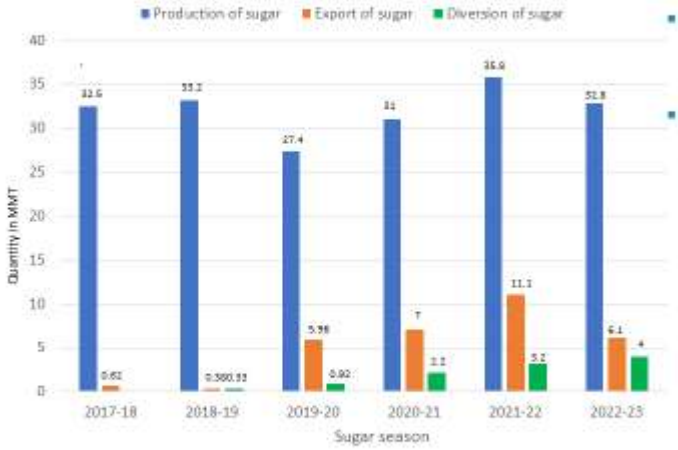
POTENTIAL OF COMPRESSED BIO-GAS (CBG) FROM INDIAN SUGAR INDUSTRY



The total compressed bio-gas potential in the country is estimated to be about 62 million metric tonnes per annum out of which spent wash and filter cake can contribute to the extent of about 2 million metric tonnes.

BIOETHANOL & SUGAR DEMAND-SUPPLY BALANCE



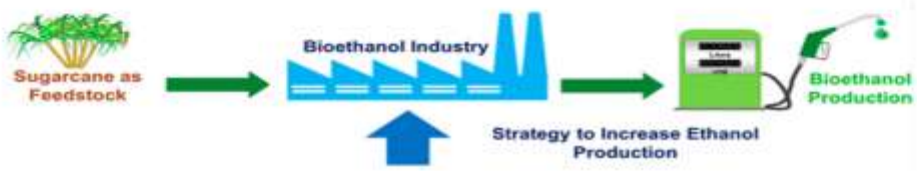
Sugar production, opening balance and internal consumption

- Balancing sugar production to cater for the domestic need (about 27.0 Mt) may be achieved by sacrificing sugar and producing ethanol instead.
- It will have two benefits, first it would balance the demand-supply position of sugar in India, thus stabilizing sugar prices, and secondly it will help boost ethanol production in the country.

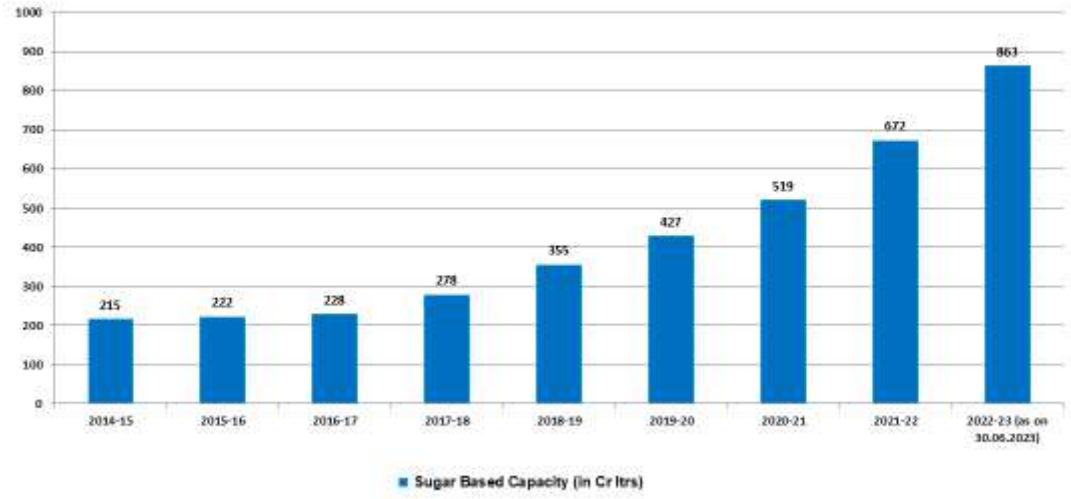
The sugar industry thus has to work on different business models of sacrificing sugar through different routes and adopt the best one under the given conditions

BIOETHANOL - PRODUCTION CAPACITY AND BLENDING

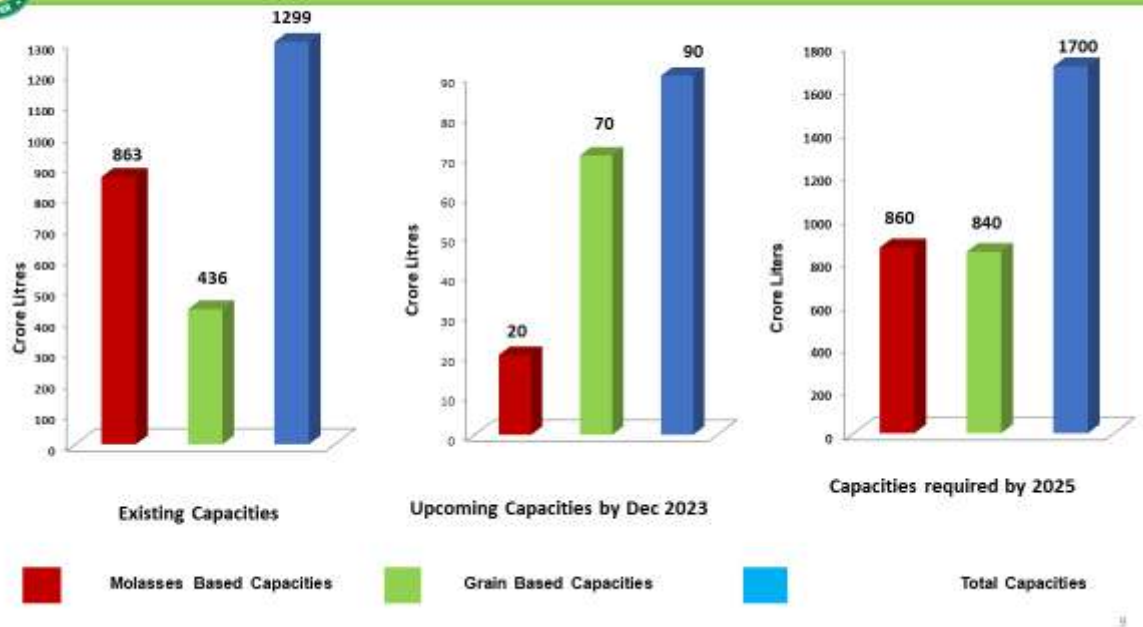
- ✓ The ethanol distillation capacity of molasses-based distilleries was only 2150 ML/year prior to 2014. However, in the last 7 years due to the policy changes made by the government, the capacity of molasses-based distilleries has increased by 4 times and is currently 8600 ML/year (June 2023).
- ✓ The capacity of grain-based distilleries which was 2060 ML/year in 2013 increased to 4300 ML/year. Thus, the total ethanol production capacity in the country reached around 13000 ML/year by June 2023.
- ✓ However, ethanol production capacities of about 17000 ML/year are needed to achieve 20% blending by 2025 and also to meet the alcohol requirements of other sectors such as potable liquor and chemicals.



YEAR WISE SUGAR BASED ETHANOL CAPACITY ADDITION



EXISTING & UPCOMING ETHANOL PRODUCTION CAPACITY IN INDIA



BIO-ETHANOL - PRODUCTION AND BLENDING ACHIEVED

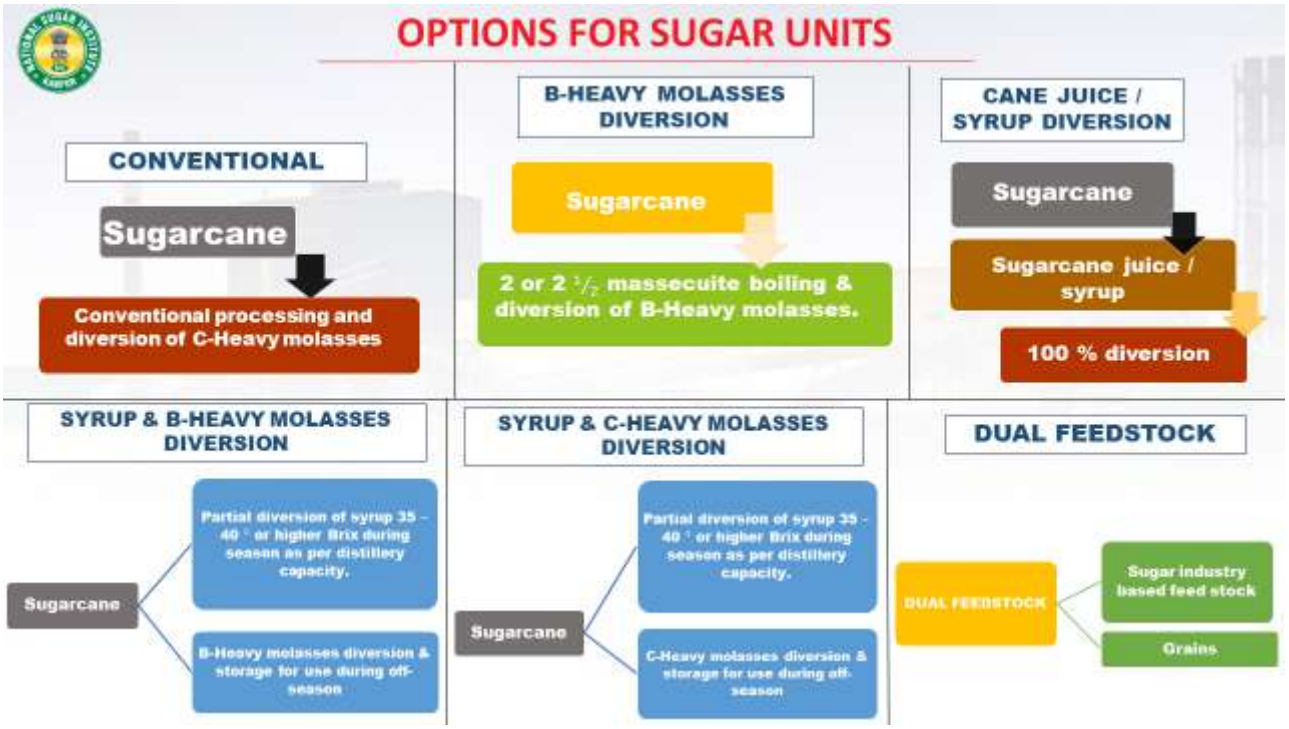
- Production of fuel-grade ethanol and its supply to OMCs has increased by 8 times from 2013-14 to 2021-22. In ESY 2021-22, India reached an historically high figure of about 4120 ML/year, achieving 10.12% blending.
- In the current ESY 2022-23, till August 2023 about 4135 ML of ethanol has been blended with petrol, achieving 11.72% blending.
- It is expected that in the current ethanol supply year 2022-23 the country will achieve a 12% blending target due to greater diversion of sugar for ethanol production.

Ethanol blending levels achieved from 2013-14 to 2021-22

ETHANOL BLENDING SCENARIO (AS ON 06TH AUGUST 2023)

Quantity in Crore liters

Raw material	Total LOI Qty	Total Contracted Qty	Receipt Qty
Sugarcane Juice/ Sugar Syrup/Sugar	143.78	137.24	124.85
B-Heavy Molasses	242.02	249.31	187.3
C-Heavy Molasses	6.52	6.12	4.27
Damaged Food Grains	24.7	21.49	9.87
Maize	0.1069	0.11	0
Surplus Rice from FCI	147.32	149.48	68.81
Total	**564.45**	**563.74**	**395.1**


OPTIONS FOR SUGAR UNITS
CONVENTIONAL
Sugarcane
Conventional processing and diversion of C-Heavy molasses
B-HEAVY MOLASSES DIVERSION
Sugarcane
2 or 2 ½ massecuite boiling & diversion of B-Heavy molasses.
CANE JUICE / SYRUP DIVERSION
Sugarcane
Sugarcane juice / syrup
100 % diversion
SYRUP & B-HEAVY MOLASSES DIVERSION
Sugarcane
Partial diversion of syrup 35 - 40 ° or higher Brix during season as per distillery capacity.
B-Heavy molasses diversion & storage for use during off-season
SYRUP & C-HEAVY MOLASSES DIVERSION
Sugarcane
Partial diversion of syrup 35 - 40 ° or higher Brix during season as per distillery capacity.
C-Heavy molasses diversion & storage for use during off-season
DUAL FEEDSTOCK
DUAL FEEDSTOCK
Sugar industry based feed stock
Grains


OTHER OPTIONS FOR SUGAR UNITS- PRESENT
Rice (from FCI)
Maize
Damaged food grain/Broken Rice

CHALLENGES IN ETHANOL PRODUCTION

1. Availability of raw material
2. Lack of capacity utilization & nee to develop a business model.
3. Requirement of alcohol by other sectors.
4. Debate on Food vs Fuel and both rice and sugarcane tagged as water intensive crop.
5. Relative economics of sugar and ethanol production.
6. Availability of Flexi-Fuel Vehicles.
7. Advent of CNG/LPG/Electric Vehicles.

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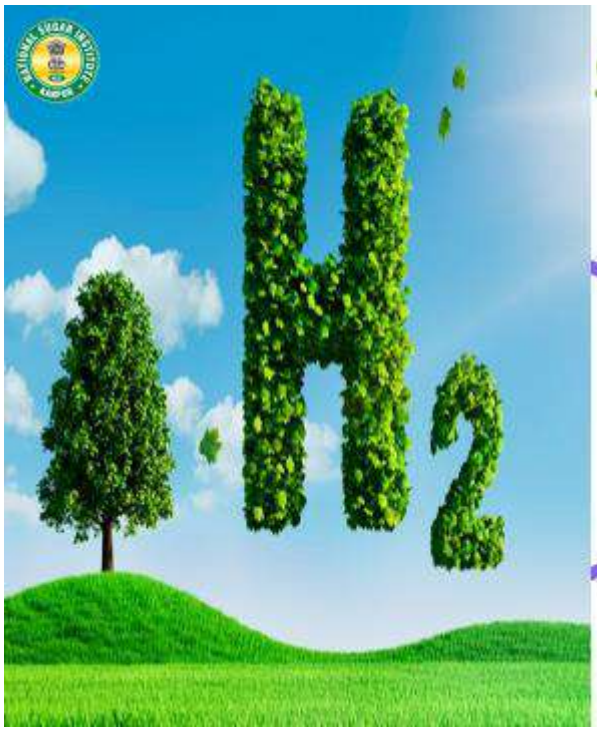
FOOD V/S FUEL- SEARCH FOR OTHER FEEDSTOCK

TO REDUCE COST OF PRODUCTION

- Improving productivity by enhancing technical efficiency i.e. benchmarking the efficiency parameters.
- Reducing steam and power consumption.
- Reducing and optimizing other inputs.
- Credits from by-products, grain on sugar industry based feed stocks.
- Conversion of waste to wealth.

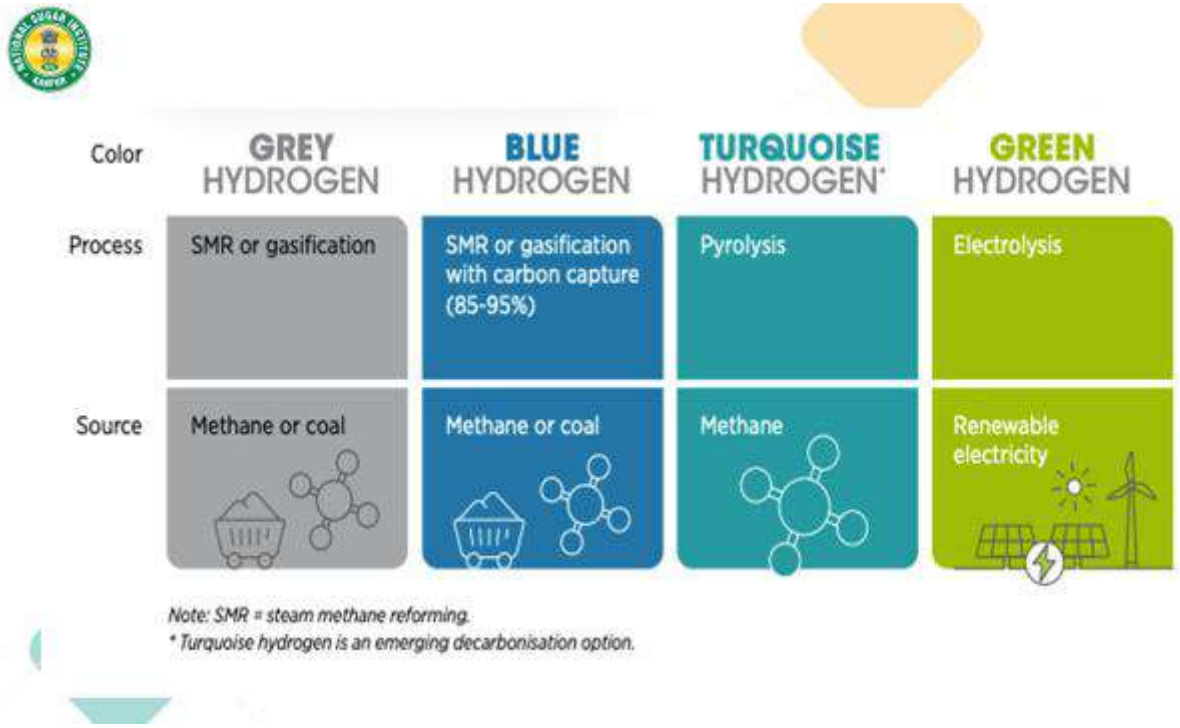


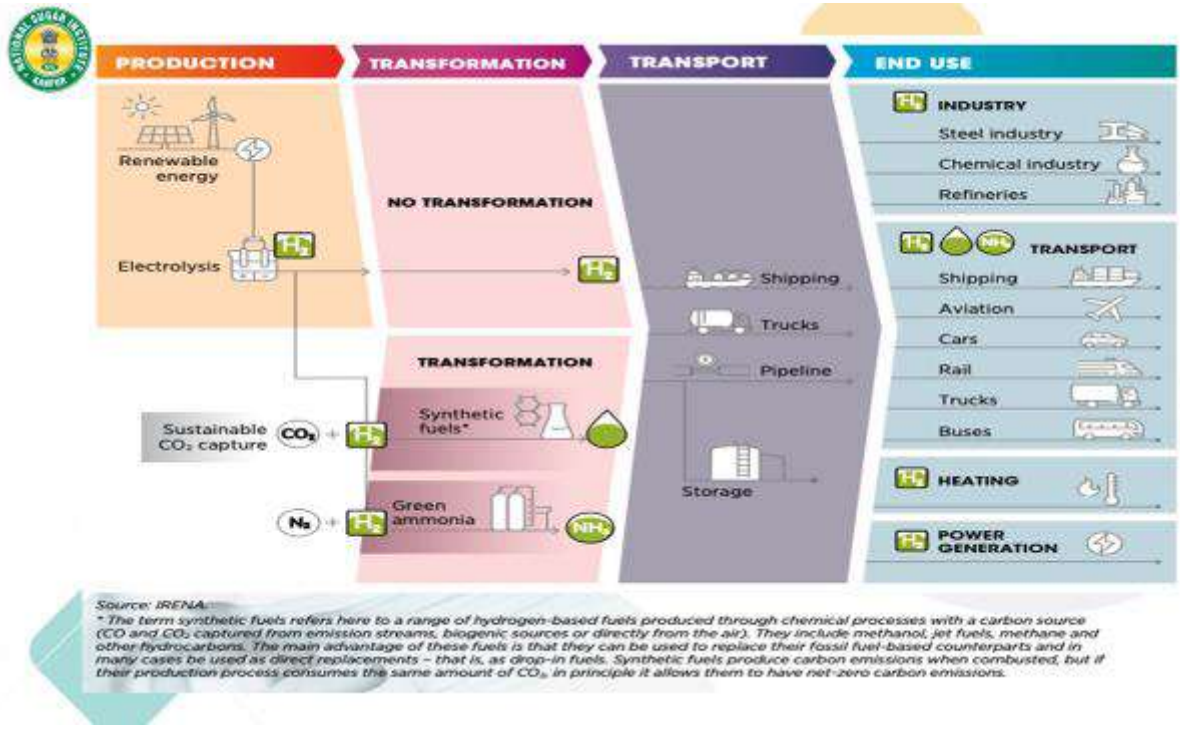
GREEN HYDROGEN

So, what is green hydrogen? Simply put, it is hydrogen fuel that is created using renewable energy instead of fossil fuels. It has the potential to provide clean power for manufacturing, transportation, and more and its only by-product is water.

Green hydrogen has been in the news often lately. President -USA, promised to use renewable energy to produce green hydrogen that costs less than natural gas. The Department of Energy is putting up to $100 million into the research and development of hydrogen and fuel cells.

The European Union will invest $430 billion in green hydrogen by 2030 to help achieve the goals of its Green Deal. And Chile, Japan, Germany, Saudi Arabia, and Australia are all making major investments into green hydrogen.


Color
GREY HYDROGEN
BLUE HYDROGEN
TURQUOISE HYDROGEN*
GREEN HYDROGEN
Process
SMR or gasification
SMR or gasification with carbon capture (85-95%)
Pyrolysis
Electrolysis
Source
Methane or coal
Methane or coal
Methane
Renewable electricity
Note: SMR = steam methane reforming.
* Turquoise hydrogen is an emerging decarbonisation option.


PRODUCTION
TRANSFORMATION
TRANSPORT
END USE
Renewable energy
Electrolysis
NO TRANSFORMATION
TRANSFORMATION
Sustainable CO2 capture
Synthetic fuels*
Green ammonia
Shipping
Trucks
Pipeline
Storage
INDUSTRY
Steel industry
Chemical industry
Refineries
TRANSPORT
Shipping
Aviation
Cars
Rail
Trucks
Buses
HEATING
POWER GENERATION
Source: IRENA.
* The term synthetic fuels refers here to a range of hydrogen-based fuels produced through chemical processes with a carbon source (CO and CO2 captured from emission streams, biogenic sources or directly from the air). They include methanol, jet fuels, methane and other hydrocarbons. The main advantage of these fuels is that they can be used to replace their fossil fuel-based counterparts and in many cases be used as direct replacements – that is, as drop-in fuels. Synthetic fuels produce carbon emissions when combusted, but if their production process consumes the same amount of CO2, in principle it allows them to have net-zero carbon emissions.

ADVANTAGES

 # Why Is This Pathway Being Considered?

Biomass is an abundant domestic resource.

 # Biomass "recycles" carbon dioxide.

Plants consume carbon dioxide from the atmosphere as part of their natural growth process as they make biomass, off-setting the carbon dioxide released from producing hydrogen through biomass gasification and resulting in low net greenhouse gas emissions.

 # Helps in meeting energy requirement.

Green hydrogen—produced through renewable resources such as solar and wind—holds significant promise in meeting the world's future energy demands.

.....INDIA TALKS ABOUT IT

The centre plans to offer green hydrogen incentives worth at least 10 per cent of their costs to fuel producers under a $2 billion scheme which will begin in June this year.

The government will offer incentives worth at Rs. 30 per kg for the production of green hydrogen fuel. The cost of manufacturing green hydrogen is currently around Rs 300 per kg in India.

CHALLENGES

- **High cost**: energy from renewable sources, which are key to generating green hydrogen through electrolysis, is more expensive to generate, which in turn makes hydrogen more expensive to obtain. US$ 3-6 per kg.
- **High energy consumption**: the production of hydrogen in general and green hydrogen in particular requires more energy than other fuels.
- **Safety issues**: hydrogen is a highly volatile and flammable element and extensive safety measures are therefore required to prevent leakage and explosions.

CONCLUSION

1. In the near future, an industry that produces bio-electricity, liquid fuels, bio-gas fuels from a renewable source would be considered as having a fascinating vision.

2. Thus, there is abundant opportunity for the wider use of bagasse for bio-electricity generation, molasses for production of ethanol and filter cake for generation of bio-gas/ bio-CNG in sugarcane producing countries. Going beyond is "Green Hydrogen".

3. The sugarcane may not be viewed as a crop for producing sugar, but a crop containing bio-mass for producing bio-food, bio-energy and bio-chemicals.

4. Achieving vertical growth shall bring about a win-win situation for both farmers and millers.

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ABSTRACTS

Does rotating cultivars with intermediate resistance influence pachymetra root rot of sugarcane?, by A.S. Jasen, B.J. Croft, R.C. Parfitt and P.H. Brown, Cooperative Sugar- July 2023, Vol. 54, No. 11

Concern have been raised by industry members over lower than expected cane yields associated with high oospore levels in sugarcane cultivars rated to have intermediate resistance to pachymetra root rot. This is a significant issue, as intermediate cultivars represent more than 70% of the Sugarcane grown in Australia.

It is possible that planting the same intermediate cultivar ins successive crop cycles could lead to increased yield losses due to pachymetra toot rot. This paper examines the sugarcane cultivars, located in the Herbert, Central and Southern growing regions. Levels of oopspores of Panchymetra chaunorhiza and cane yields were assessed in ratoon crops of replicated cultivar-assessment trials and in subsequent crops of intermediate-resistant Q208[b] (planted on the sites of previous cultivars trials).

Evaluation of genetic response of sugarcane (Saccharum species hybrids) genotypes with varied concentration of cytokinins for rapid in vitro mass multiplication, by Neelangangavva V. Navali, T.E. Nagaraja, H.C. Lohithaswas and Suresh Yadav, Cooperative Sugar- July 2023, Vol. 54, No. 11

In a lab experiment, the efficacy of six different combinations of cytokinins 6-Benzyl amino purine (BAP) and kinetin (Kin) on in vitro multiplication of fcur sugarcane genotypes were evaluated. Findings indicated that MS medium supplemented with BAP (0.2 mg/l) + Kin (0.015 mg/l) produced the best growth responses in genotype Co 86032 with superior auxiliary bud emergence, and shoot establishment than the other genotypes. MS medium with BAP (0.5 mg/l) + Kin (0.015 mg/l) proved optimum for genotype VCF 0517, CoVC 09-61-07, and CoVC 10-43-06. However, multiples shoot induction characters varied widely among the four sugarcane genotypes.

Factor affecting recent trends in sugar beet yields and implication for sugarcane productivity, by Keith Jaggard and Trish Rosbrook, Cooperative Sugar- August 2023, Vol. 54, No. 12

Yields of sugar beet have risen steadily for almost the last four decades, whereas yields of sugarcane have not. This study uses the literature to examine some of the reasons for this difference. Beet has benefitted from climate change (warmer spring and autumns and increased CO2 concentration in the atmosphere) to a much greater extent than cane. Because beet is raised from seed that is always produced under the direct control of the plant breeder,

improvements in cultivars are taken up very rapidly, whereas the ratoon production of cane means that improvements are inevitably transferred to commercial practice more slowly.

Phased-array ultrasonic testing (PAUT) in lieu of radiography (RT) on small-bore boiler tubes, by Chris Charlesworth, Cooperative Sugar-August 2023, Vol. 54, No. 12

Radiography of connection bank tube wilds and other pressure part welds has been the industry go-to method for many years. However, production rates are slow and there are many occupational health and safety issues to be managed, often requiring temporary evacuation of the site during radiography events or restricting radiography to out of normal hours. Fabrication codes and standards across the world have recognised other non-destructive testing methods of quantify the integrity and soundness of weldments, especially ultrasonic techniques when looking for internal imperfections or defects in materials and weld configurations.

Profitability of different cane varieties, by G.A. Kent, A.P. Mann and R.C. Partitt, Cooperative Sugar-September 2023, Vol. 55, No. 1

The main selection criterion in the Australian breeding program, Economic Genetics Value (Regv), does not adequately account for cane fibre content and does not account for fibre quality. These fibre parameters can have a large impact on the processing cost for a variety, and hence, affect its attractiveness form and overall industry perspective.

This paper presents an economic model that does account for the processing cost of a variety and calculates a net economic value for a variety in dollar per hectare relative to the value calculated for Q208(b, a widely-grown variety. The model was applied to data from three Australian factories and used to determine the most profitable of the major varieties processed by those factories.

Rejuvenation of Indian Sugar Industry through National Biofuel Policy and Adoption of Sustainable Sugarcane Production Technologies, by Dr. R.B. Doule, Cooperative Sugar-September 2023, Vol. 55, No. 1

The Indian Sugar Industry is a key driver of rural development, supporting India's economic growth. The industry is inherently inclusive, supporting over 500 lakhs farmers and their families, along with workers and entrepreneurs of over 500 mills, apart from a host of wholesalers and distributors spread across the country. The industry is at a crossroads today, where it can leverage opportunities created by global shifts in sugar trade as well as the emergence of sugarcane as a source of renewable energy, through ethanol and cogeneration. The domestic sugar production in 2021-22 is 359.55 Lakhs tones which is a highest Indian record. The country has not only become self-

sufficient in sugar but a sizable portion is also earmarked for export, earning precious foreign exchequer.

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Editor

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