SHARKARA

OCTOBER-DECEMBER 2019 VOLUME–50, No. - 04

NATIONAL SUGAR INSTITUTE

Department of Food & Public Distribution
Ministry of Consumer Affairs, Food & Public Distribution
Government of India
Kanpur-208 017, INDIA
Email : nsikanpur@nic.in
Visit us at: http://nsi.gov.in
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OCTOBER-DECEMBER, 2019

IT CONTAINS.....

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FROM DIRECTOR'S DESK.....

The crushing season 2019-20 has commenced with sugar factories of the northern India taking a lead starting their crushing operations earlier as compared to the sugar factories particularly in Maharashtra. During the current crushing season, India's sugar production stood at 4.58 million tonne till December 15 which is down by about 35 per cent from the similar period of last crushing season when it was recorded as 7.05 million tonne. However, Mills in Uttar Pradesh, the country's largest sugar producing state, producing state, produced 2.12 million tonne of the sugar till December 15, up from 1.89 million tonne in the year-ago period due to higher recovery and as they began operations about a week earlier during the current season. As regards country as a whole, 406 sugar mill were operational as on December 15, as against 473 mills on the year-ago same day.

The sugar scenario appears to be comparatively better during the year looking to estimated sugar production of about 26 million tonne with more diversion of sugar for ethanol production and likely hood exports of 6.0 million tonne. As per the industry reports, many sugar factories in Uttar Pradesh, Maharashtra, Karnataka and Andhra Pradesh have already taken up the diversion of B Heavy molasses with few opting for partial diversion of sugar syrup also. However, looking to the requirement of ethanol for EBP10 and EBP20 in future, as I always emphasize upon there is greater urge for assessing potential for alternate feed stocks out of which now there is greater discussion about sugar beet and surplus grains.

Institute during the period while entered into MoU with Assiut University, Egypt looks forward signing more such MoU's with other organizations for collaborative research and extending institute expertise on various technical matters. With erection of mini sugar refinery and grain based distillation unit underway, institute looks forward towards better infrastructural facilities for imparting meaningful practical exposure to the students of various courses.

Wishing you a very happy and prosperous New Year 2020.

(Narendra Mohan)
Director

OUR PROVISIONS:

FOREIGN COLLABORATIONS:

1. A six member Chinese delegation from Guangxi Sugar Industry Development Office, China visited the institute on 11th December, 2019. Delegation took keen interest in institute activities and extended invitation to visit Chinese sugar factories for efficiency improvement.



2. Director visited the STRI Egypt & signed MOU with Assiut University for conducting training programmes/refresher courses for sugar factory personnel in Egypt and carrying out collaborative research at NSI, Kanpur. He also delivered a lecture at "Faculty of Sugar and Integrated Industries Technology" which was attended by faculty, delegates from sugar industry and students.



SEMINAR ORGANIZED/PARTICIPATED:

1. Dr. Ashutosh Bajpai, Prof. Sugar Technology & Dr. Ashok Yadav, Asstt. Prof. Agri. Chemistry attended the Seminar on **"Sugarcane – Is there any alternative?"** along with Prof. Narendra Mohan, Director on 11th November, 2019 at IISR, Lucknow.

2. Dr. Ashok Yadav, Asstt. Prof. Agri. Chemistry & Dr. Lokesh Babar, Jr. Scientific Officer Agri. Chemistry attended one-day National Seminar on **"Sugarcane Challenges and Future Strategies for Doubling Farmers Income"** on 11th November, 2019 at IISR, Lucknow.

3. Shri Brajesh Singh, Technical Officer (Inst.) & Shri N. K. Venkatesh attended a National Seminar on **"IT Security"** on 29th November, 2019 at Kanpur, U.P.

4. Institute participated as event partner in the two days National Seminar on **"Ethanol Production from Different Feed Stocks Including Molasses, Sugarcane Juice, Grain, Sweet Beet and other Cellulosic Materials**" jointly organized by All India Distillers Association (AIDA) on 12th & 13th December, 2019 at Jaipur. Prof. Narendra Mohan, Director National Sugar Institute also delivered a lecture on **"Is Sugar beet a Potential Feed Stock for Ethanol Production?"** during the seminar.

5. Director, NSI delivered J P Mukherjee Memorial Lecture during the **65th Annual Convention of Deccan Sugar Technologist's Association** on the theme **"Indian Sugar Industry- Beyond Sugar"** held on 1st October, 2019 at Pune, Maharashtra. He stressed upon producing sugar as per consumer preferences & market demand besides making value added products by using innovative techniques.



6. Institute participated in Seminar on **"Ganga Conservation"** organized by Kanpur District Administration at CSJM University, Kanpur on 9th December-2019, during which very informative lectures were given on water conservation and measures to be taken for saving the rivers. On this occasion oath was also administered for keeping Holy River Ganga clean. The seminar was attended by more than 1500 students & teachers of various colleges.



OUR RESEARCH AREAS:

The Institute is actively involved in the collaborative endeavors with the sugar and allied industries for developing innovative techniques and technologies for improving the economic sustainability of the sugar industry. The Institute during the period took up R&D work on the following:

RESEARCH:

1. Utilization of potash rich ash for production of valuable bio fertilizer- Studies on viability of prepared bio-fertilizers taken up and cost economics is being calculated. Bio-fertilizers (Rhizobium; PSB & Azatobacter) are also being prepared for new field trials which will be taken up shortly at the institute farm.

2. Cane juice syrup study for shelf-life and production of alcohol – The study has been taken up with a view to ascertain the keeping quality of the concentrated juice for production of ethanol. Trials will be conducted shortly using sugar syrup of different purities and solid content.

3. Studies on the feasibility of utilization of sugarcane bagasse as a potential feedstock to access cosmetic ingredients – In order to prepare higher quantities of C - Glycosidic Alcohol to validate the results and estimate the cost of production, the requisite experimental works are ongoing. From the initial experiments, about total 25 gm. compound was obtained. A patent application is also being filed on the innovative process & product developed.

4. Studies on Production/Isolation of C5-Sugar Alcohol / Sugar using by-product resources of sugar industry – This is a new research project which has been taken up by the institute and the literature survey is being done to sketch plan and start some experimental work.

5. Studies on Pot-efficient Synthesis of Alkyl Levulinates (Als) using Sugarcane- Bagasse Derived Cellulose – The purification of the synthesized compound and its characterization is under progress**.** The synthesized compound is being analyzed for recording NMR spectra and mass spectrometry towards determination of its structure.



6. Mechanical Clarification of Juice – 03 set of experiments have been carried out during the period to validate the results obtained during the initial experiments. Various parameters viz. temperature, dosage of phosphoric acid & flocculent, spinning time and speed were varied to assess effect on colour and turbidity removal. To cope up with the requirements, new laboratory centrifugal is also being procured. More experiments shall be carried out to draw conclusion.

7. Development of Super Short Retention Time Clarifier (SSRT) – Based on the results of experiments achieved during last crushing season, some modifications was planned in the design of SSRT. After finalization of the plan, modification of the clarifier is in progress. Civil work of the platform for installing the SSRT has also been carried out at Experimental Sugar Factory.



8. To study the impact on performance of mechanically coupled twin induction motor drives for Shredder / Fibrizer having unequal sharing of load and to design & develop dedicated drive for the application- Some of the sugar factories situated in different agro-climatic zones shall be visited to collect data for newly installed VFD based system on preparatory devices. The general set-up kept for the cane preparation is two set of cutters, generally known as chopper/leveler, followed by shredder or fibrizer. Conventionally, the prime mover for these machines is invariably a slip ring induction motor (SRIM). The conventional system is appreciably inefficient as a lot of electrical power is dissipated and wasted (to the tune of 8-10% of the actual load) in slip resistance throughout the operation, but this set-up is being running in the industry due to its simplicity and as the other better methods were not in practice.

Recently, in few of the factories VFD based Induction motor drive have been installed on each of the mechanically coupled motor of shredder / fibriser. The problems associated with the conventional system such as issues of load balancing, inefficient use of drives and lowering of the speed of the motor during peak load conditions have been addressed. But in this newly introduced system, the two drives use individual 6-pulse/12-pulse rectifier circuit because of its simple and low cost structure followed by a 2-level inverter. This leads to injection of harmonics in the input current and rise of problems such as “motor bearing failure” and “motor winding insulation breakdown” because of circulating currents and dielectric stresses.

The present study is being done to study the effects of differently rated mechanically coupled induction motors for cane preparation and to design and develop a prototype to validate the study practically through the prototype. After literature survey and collection of data from various factories,

the topology for the prototype has been drawn and the Project proposal/technical specifications have been submitted. Further work will be carried out after the materials are received.

RESEARCH PAPERS/ POSTER / PRESENTED / PUBLISHED/ SENT FOR PUBLICATION:

1. A research paper entitled **"Innovative Futuristic Approach for Sustainable Sugar Industry**" by Narendra Mohan & Anushka Agarwal published in International Journal of Innovative Science & Research Technology. Volume 4, Issue 11, November – 2019.

2. A research paper entitled **"Sustainability of Sugar Industry in Northern Region – Sugar Production & Beyond"** by Narendra Mohan, Director published in National workshop on **"Sugarcane Challenges and Future Strategies for Doubling Farmers Income"** at IISR, Lucknow.

3. A paper abstract **"Direct Use of Sugarcane Bagasse Derived Hemicellulose Hydrolysis Hydrolysate for the Synthesis of C-glycosyl Derivative by the Lubineau Reaction"** by Dr. V.P. Srivastava, Tushar Mishra & Narendra Mohan sent for 26th ISCB International Conference (ISCBC – 2020) to be held from 22nd to 24th January, 2020 at Nirma University, Ahmadabad, Gujarat.

4. A research paper entitled **"Surfactants in Modern Applications"** by Narendra Mohan published in IJSRD - International Journal for Scientific Research & Development| Vol. 7, Issue 09, Nov. 2019 | ISSN (online): 2321-0613.

5. **"A Study on Probable Configurations of Cascaded H-Bridge Multilevel Converters for Slip Power Recovery Application in Sugar Industry"** by Vinay Kumar & Sanjiv Kumar, sent for publication in ICE3 2020 International Conference on Electrical and Electronics Engineering, to be held on 14-15th February, 2020 at MMMUT Gorakhpur, U.P.

6. **"Reduction, Reuse and Recycling of Fresh Water Usage and Mitigation of Effluent Generation in Sugar Industry"** by Vinay Kumar & D. Swain, published in the proceedings of IC WEB BIMSTEC – 2019, held on 14th December, 2019 at Agartala, Tripura.

7. **"Bio-refinery Process for Valorization of Sugarcane Biomass: from Constituents Sugars and Lignols to Value Added Products"** by V.P. Srivastava, Tushar Mihsra & N. Mohan accepted for presentation at the 2nd International Conference and Exhibition on **"Sustainability – Innovation and Diversification in Sugar and Allied Industry"** to be held on 31st January to 2nd February, 2020 at Vasantdada Sugar Institute, Pune, Maharashtra.

8. **"Sugar Beet – A Potential Feed Stock for Ethanol Production"** by Prof. Narendra Mohan published in Sharkara, October – December, 2019.

➢ BUREAU OF SUGAR STANDARDS:

The Institute on behalf of Bureau of Indian Standards prepares and issues Sugar Standard Grades to the entire Sugar Industry of the country for every sugar season. These Sugar Standard Grades are issued to facilitate quality control and to protect the interest of the common consumers. On the basis of these grades, sugar factories mark their produce accordingly. Meeting of Expert Committee on sugar standards was held at NSI, Kanpur on 25th September 2019, wherein seven grades and their sale price were approved for the sugar season 2019-20.

On the basis of the approved Standards, Bureau of Sugar Standards Grades distribution commenced from 1st October, 2019.

Price schedule for the sugar season 2019-20:

1	Sugar Standard Grades to be issued	L-31, L-30, M31, M-30, S-31,S-30 & SS-31
2	Set of New Sugar Standard Grades containing 7 grades +3 empty glass bottles + 3 Velvet Cork in packing case	Rs.19000/= each set
3	Single Sugar Standard Grade	Rs.2500/= each
4	Empty Sugar Standard Glass Bottle	Rs.400/= each
5	Packing case	Rs.600/= each
6	Velvet Cork	Rs.100/= each
7	Postal expenses, forwarding charges, if any	Extra as applicable
8	Payment	For Indian Sugar Standards 2019-20, payment shall be acceptable only through **BHARAT KOSH.** In any circumstances, **no Demand Draft/ Cheque/ Cash amount shall be accepted.**
9	Delivery of Sugar Standard Grades	Monday to Friday (10.00 AM to 5.00 PM)
10	Taxes	GST extra as applicable @18%.

The institute has taken up revision of various existing BIS standards viz. molasses tanks, raw, plantation white, refined and icing sugar etc. on behalf of Bureau of Indian Standards. BIS standards for some other sugars viz. organic sugar, brown sugar & low sulphur sugar are being drafted in consultation with various stake holders.

➢ OUR ADVISORY:

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

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.

CONSULTANCY SERVICES:

During October-December, 2019 consultancy services were provided to the following sugar/ alcohol units and sugar related organization:

1	M/s K.M. Sugar Mills Ltd., Motinagar, Distt – Faizabad, U.P.
2	M/s Triveni Engineering & Industries Ltd., Unit – Deoband, Distt – Saharanpur, U.P.
3	M/s DCM Shriram Ltd., Unit – Ajbapur, Distt – Lakhimpur-Kheri, U.P.
4	M/s Avadh Sugar & Energy Ltd., Hargoan, Distt – Sitapur, U.P.
5	M/s Triveni Engineering Industries Ltd., Unit – Raninangal, Distt – Moradabad, U.P.
6	M/s Dalmia Bharat Sugar & Industries, Ltd., Unit – Jawaharpur, Distt – Sitapur, U.P.
7	M/s New Swadeshi Sugar Mills Ltd., West Champaran, Bihar.
8	M/s Dalmia Bharat Sugar & Industries Ltd., Unit – Nigohi, Distt – Shahjahanpur, U.P.
9	M/s Triveni Engineering Industries Ltd., Unit – Milak Naryanpur, Distt – Rampur, U.P.
10	M/s Bajaj Hindustan Sugar Ltd., Unit – Kinauni, Distt – Meerut, U.P.
11	M/s Bajaj Hindustan Sugar Ltd., Unit – Golagokarannath, Distt Lakhimpur-Kheri, U.P.
12	M/s Avadh Sugar & Energy Ltd., Unit – Seohara, Distt – Bijnor, U.P.
13	M/s Dalmia Sugar & Industries Ltd., Unit – Ramgarh, Distt – Sitapur, U.P.
14	M/s Triveni Engineering Industries Ltd., Unit – Khatauli, U.P.
15	M/s Naglamal Sugar Complex, Distt – Meerut, U.P.
16	M/s DCM Shriram Ltd., Unit – Rupapur, Distt – Hardoi, U.P.
17	M/s DCM Shriram Ltd., Unit- Loni, Distt – Hardoi, U.P.
18	M/s Uttam Sugars Mills Ltd., Unit – Barkatpur, Distt – Bijnor, U.P.
19	M/s Harinagar Sugar Mills Ltd., West Champaran, Bihar.
20	M/s DCM Shriram, Unit- Hariawan, Distt – Hardoi, U.P.
21	M/s Sugarchem, Mumbai, Maharashtra.
22	M/s HPCL Biofuels, Sagauli, Distt – West Champaran, Bihar.

23	M/s Bidar Kisan Shakhar Karkhana Limited, Distt – Bidar, Karnataka.
24	M/s Rai Bahadur Narain Singh Sugar Mills Ltd., Laksar, Distt–Haridwar, Uttarakhand.
25	M/s Balrampur Chini Mills Ltd., Unit – Gularia, Distt – Lakhimpur-Kheri, U.P.
26	M/s Rana Sugars Ltd., Belwara, Distt – Moradabad, U.P
27	M/s Balrampur Chini Mills Ltd., Unit – Haidergarh, Distt – Barabanki, U.P.
28	M/s Balrampur Chini Mills Ltd., Unit – Maizapur, Distt – Gonda, U.P.
29	M/s Balrampur Chini Mills Ltd., Unit – Mankapur, Distt – Gonda, U.P.
30	M/s Doiwala Sugar Company Ltd., Deharadun, Uttarakhand.
31	M/s DCM Shriram Sugar Industries Ltd., Daurala, Distt – Meerut, U.P.
32	M/s Balrampur Chini Mills Ltd., Balrampur, U.P.

ANALYTICAL SERVICES:

1	Directorate General of Supply & Transport, Ministry of Defence
2	M/s Dalmia Bharat Sugar Mills & Ltd., Distillery, Unit – Nigohi, Distt – Shahjahanpur, U.P.
3	M/s Avadh Sugar & Energy Ltd., Unit – Hargaon, Distt – Sitapur, U.P.
4	M/s Dhampur Sugar Mills Ltd., Unit – Rajpura, Distt – Sambhal, U.P.
5	M/s Magadh Sugar & Energy Ltd., Unit – Hasanpur Sugar Mills Ltd.,
6	M/s The Seksaria Biswan Sugar Factory Ltd., Distt – Sitapur, U.P.
7	M/s Shri Shiv Shakti Khandsari Udyog, Disst - Narsinghpur, M.P.
8	M/s Balrampur Chini Mills Ltd., Unit – Tulsipur, Distt – Balrampur, U.P.

The samples of sugar, molasses and waste waters were analyzed for the desired parameters in the NSI-Analytical Laboratory (NABL Accredited).

The institute has also obtained BIS accreditation for the Analytical Laboratory for analysis of sugar and sugar house products.

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OUR OTHER ACTIVITIES:

1. संस्थान में दिनांक 28.10.2019 से 02.11.2019 तक "**सतर्कता जागरूकता सप्ताह–2019**" का आयोजन किया गया तथा दिनांक 28.10.2019 को संस्थान-कर्मियों को जागरुकता की शपथ दिलाई गई। इस सप्ताह के दौरान संस्थान-कर्मियों एवं छात्रों के लिये निबंध एवं व्याख्यान प्रतियोगितायें आयोजित की गईं।



2. संस्थान में दिनांक 31-10-2019 को अधिकारियों, कर्मचारियों एवं छात्रों को सरदार बल्लभ भाई पटेल के जन्मतिथि के उपलक्ष्य में एकता दिवस का आयोजन किया गया, जिसमें **एकता एवं अखण्डता** की शपथ दिलाई गई।



3. राष्ट्रीय शर्करा संस्थान, कानपुर द्वारा गत वर्षो की भाँति इस वर्ष भी अपने वार्षिक खेलकूद संस्थान में आयोजित किये गये। दिनांक **11** अक्टूबर **2019** को आयोजित पुरस्कार वितरण समारोह में विभिन्न प्रतिभागियों (विजेता एवं उप-विजेताओं) को मुख्य अतिथि के रूप में निदेशक, राष्ट्रीय शर्करा संस्थान, कानपुर के द्वारा पुरस्कार से सम्मानित किया गया।



4. संस्थान में दिनांक 26-11-2019 को अधिकारियों, कर्मचारियों एवं छात्रों के द्वारा "संविधान दिवस" पर "प्रस्तावना" पढ़ी गयी ।



5. A Farewell party for the final year students of various courses was organized on 2nd November, 2019 at the institute. Many cultural activities were organized by the students on this occasion. Director & faculty members wished the final year students a bright & successful carrier ahead.



6. A group of Farmers from Madhya Pradesh visited the institute on 21st November, 2019 for enhancing their knowledge of field preparation, cultivation and harvesting of sugar cane by adopting modern techniques.

7. Another group of Farmers from district Chhattarpur, Madhya Pradesh, visited NSI under ATMA programme on 19th December, 2019.

8. Seventy students of B.Sc. Agriculture (Hons.) of Rama University visited the institute on 8th November, 2019. They visited various Laboratories, Nano Brewery, Nano Ethanol Unit & Experimental Sugar Factory situated in the institute.

9. Prof. Narendra Mohan, Director attended the Silver Jubilee celebrations of Dalmia Bharat Sugar Mills Ltd., Unit: Ramgarh and addressed the stakeholders of the company on need for diversification and value addition. Prof. Mohan also felicitated employees of Dalmia Bharat Sugar Mills Ltd. on this occasion.

10. Director addressed 85th AGM of ISMA conducted on 5th December, 2019 and discussed the issues related to ethanol pricing and incidental increase in distillation capacity while using B Heavy molasses and cane juice.

11. Director addressed the 62nd AGM of M/s Sahakari Khand Udyog Mandal Ltd., Gandevi, Navsari, Gujarat on economic and environmental sustainability on 20th December, 2019 along with fruitful discussions, Chairman, Managing Director of the factory.



12. सरकारी कामकाज में राजभाषा के रुप में हिन्दी के प्रति जागरुकता लाने तथा उसके उत्तरोत्तर विकास हेतु संस्थान में 19 दिसम्बर, 2019 को हिन्दी कार्यशाला का आयोजन किया गया।

13. Surveillance audit of Institute for seeking ISO 9001:2018 was conducted from 26th to 27th December, 2019 by QSI, (India) Pvt. Ltd. Jaipur.

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HAPPENING IN THE SUGAR INDUSTRY:

Dwarikesh Sugar commissioned its new 100 KLPD Distillery plant; stock up 1%.
Dwarikesh Sugar Industries commissioned its new 100 KLPD distillery plant at its Dwarikesh Nagar unit, Bundki, in Bijnor District. Using state-of-the-art technology, this project commenced in late 2018. The Company invested in wastewater recovery and zero liquid discharge, strengthening its credentials to grow sustainably around an environment-friendly foundation, the company said in the filing.

Why Indian Sugar Stocks Are In A Sweet Spot.
Shares of sugar makers have rallied in the last month as less-than-estimated production in the ongoing season and expectations of higher exports spelt relief for mills grappling with record output, low prices and farmer dues.

Sugar output drops 35% to 4.58 million tonne till Dec 15: ISMA.
India's sugar production stood at 4.58 million tonne till December 15 of the ongoing marketing year, down 35 per cent from the year-ago period, owing to sharp fall in output in Maharashtra and Karnataka, industry body ISMA said on Wednesday. Sugar marketing year runs from October to September.

Sugar shares rise on heavy volume; Balrampur Chini hits over 2-year high.
Shares of sugar companies were in demand on the BSE, and rallied by up to 7 per cent in intra-day trade today on the back of heavy volumes. Balrampur Chini Mills, Dalmia Bharat Sugar and Industries, Avadh Sugar & Energy, Triveni Engineering & Industries, Dwarikesh Sugar Industries and Dhampur Sugar Mills.

Growth of date sugar market in North America, MEA projected to be highest.
North America and Middle-East and Africa (MEA) are two of the largest date sugar manufacturing regions. These were the findings of a report on the date sugar market by Fact.MR. It added that in 2018, Europe was the largest consumer of date sugar, though the market growth in Middle-East and Africa.

UP set to hold fort while India's sugar output likely to fall 20%.
India's year-on-year sugar production in 2019-20 till November 30 has almost halved, showing a dip of nearly 54% and experts are of the view that by the end of the 2019-20 sugar season, the likely production will show a dip of almost 20%, as compared to last season.

Farmers ask Haryana government to increase sugarcane prices.
The Haryana unit of the Bharatiya Kisan Sangh (BKS) on Monday demanded an increase in the prices of sugarcane by New Year during a press conference in Kurukshetra. The farmers threatened to lock down all the sugar mills in the state if the prices are not revised by the government till January.

Maharashtra sugar recovery to take hit this season on extended monsoon.
Around 124 sugar mills in Maharashtra, including 68 cooperative factories and 56 sugar factories, have commenced crushing to produce around 76.63 lakh quintal of sugar in the 2019-20 season.

Indian Sugar Exports poised to hit record 5 Million Tons this year.
India, the world's biggest sugar producer, is poised to break its own export record this year thanks to a flurry of overseas sales in the past few months, prompted by attractive global prices, trade and industry officials said on Tuesday.

Acute shortage of labour to extend Maharashtra's sugar season.
Maharashtra's sugarcane crushing is all set to extend by at least a fortnight as mills complain of acute shortage of harvesting labourers. Mills say that at present around 15-20 per cent less labourers have turned up for duty this season.

Haryana CM asks officers to increase sugar production.
Haryana Chief Minister Manohar Lal Khattar on Monday directed the Cooperation Department officers to formulate a plan giving special impetus to high-level management to increase sugar recovery from the state's cooperative sugar mills and so that sugar production can also be increased.

Kolhapur millers ready to pay one-time FRP to sugar cane farmers. |
Three weeks after the sugar cane crushing began in the district, the millers have decided to pay one-time FRP to the farmers this year. The decision was taken in a meeting organised by the sugar millers at the office of Kolhapur District Central Cooperative Bank on Saturday.

Karnataka: 'Revive sugar mills or face consequences'.
Karnataka Rajya Raitha Sangha's (KRRS) K.R. Pet taluk unit on Friday warned the State government over its alleged apathy in reviving the Pandavapura Sahakari Sakkare Karkhane (PSSK) and Mysore Sugar Company Ltd. (Mysugar) in the district.

India exported 37 lakh tonne sugar in 2018-19 marketing year.
India exported about 37 lakh tonne of sugar in the 2018-19 marketing year ended September to clear the surplus stock, the government told the Rajya Sabha on Friday. Union minister Danve Raosaheb Dadarao said sugar mills were advised to export sugar as per their MIEQ (Minimum Indicative Export Quota) allocation.

Mills to be booked for accidents by heavy vehicles.
Sugar mills will be held co-accused in case of accidents resulting from absence of reflective tape on heavy vehicles carrying sugar cane. The sugar cane cutting season has now begun in the state and will continue till March-April next year.

'This sugar stock could see a double-digit swing in next 3-4 weeks.
The Nifty has entered in a narrow sideways trading band with a negative bias after making a new all-time high in November. It formed a bearish dark cloud cover pattern the previous week, suggesting

that the bears have started creating shorts as the Index approaches stiff resistance zone of 12,100-12,200.

Sugar export subsidy maths hits EID Parry SEZ refinery.

Even though sugar mills in the country are cheering the export subsidy extended by the government this year, its fine print has left EID Parry Ltd in a quandary over its sugar refinery in Kakinada. The government this year changed the way subsidy is given on sugar exports to make it compliant.

India Sugar: Up in west on low supply of medium grade; ICE tad down.

Prices of medium-grade sugar rose in the wholesale markets of west India today because of lower supply of the medium-grade variety compared with that of the small-grade, traders said. In Mumbai, prices rose by 20 rupees per 100 kg, and in Kolhapur, they were up 50 rupees.

More than half of the country's sugar came from UP this year.

Owing to a number of reasons, UP has attained the distinction of accounting for more than half of the total sugar production in the country for this year. The data, from Indian Sugar Mills Association (ISMA), is for the period till November-end.

Maharashtra: Permission pending, 15 sugar mills unable to start ethanol production.

As many as 15 sugar mills in Maharashtra are unable to start production of ethanol as the absence of a full-fledged cabinet has delayed their process of getting permission to do so. These mills had planned to reduce their sugar production and instead divert sugarcane juice to 'B' heavy molasses.

UP holds sugarcane price at Rs 315 per quintal for 2019-20 season.

In a major relief to the sugar industry amid a domestic and global market glut, Uttar Pradesh government has decided to the sugarcane price or State Advised Price (SAP) unchanged at Rs 315 per quintal (100 kg) for the common variety of the cash crop for the 2019-20 crushing season.

Sugar mills' production falls 54% to 18.85 lakh tonnes till Nov 30.

Sugar mills in India produced 18.85 lakh tonnes (LT) of sugar till November 30 in sugar season (October to September) 2019-20, 54 per cent lower than the 40.69 LT produced during the corresponding period in the previous year, said an Indian Sugar Mills Association (ISMA) press release on Tuesday.

200-tonne Goa sugarcane reaches Khanapur factory.

In a relief to the sugarcane farmers of the state, the government through the Sanjivani sugar factory has finally started harvesting the sugarcane, and is being transported to Laila Sugars Ltd, located at Khanapur, Belgavi, around 74 kilometres away from the factory at Dharbandora.

Expect Indian sugar export to pick up for the next 4-5 months, says ISMA.

Sugar prices have come under pressure domestically and this after the December quota has seen an increase by the government. The increase in sugar quota is to provide liquidity to the on-going crushing season so that the mills can pay up to the farmers.

Cane growers may have earned Rs 9k cr. in 10 years if revenue-sharing formula adopted: CACP chief.

Sugarcane farmers would have earned an extra income of Rs 8,000-9,000 crore in the past 10 years had state governments adopted the revenue-sharing formula recommended by the C Rangarajan panel for the sugar sector, farm price advisory body CACP Chairman Vijay Paul Sharma said on Thursday.

Uttarakhand: Govt. sets up panel for deciding sugarcane SAP.

The Uttarakhand government on Thursday stated that it has set up advisory committee for deciding state advisory price (SAP) of sugarcane for the ongoing crushing season, and will announce the price within a week.

UP orders sugar mills to operate at optimum capacity to avoid penal action.

Even as the sugar season 2019-20 is gathering momentum in Uttar Pradesh, the country's top producer of the kitchen staple, the Yogi Adityanath government has directed the mills to operate at optimum capacity.

High Court has hint of sweetness for cane farmers.

Cane commissioner to again decide on farmers' dues of 2002. However, the factory has shut down The 'Cane Commissioner' has been ordered by the High Court on December 3, 2019 to adjudicate the claims of farmers on sugarcane supplied to The Indian Sugars & Refineries in 2002.

Sugar cane crushing season begins.

The cane crushing of 2019-20 season in Govada Sugar Factory started on Friday morning with a target of 4.5 lakh tones of crushing. Govada Sugar Factory MD Sanyasi Naidu and assistant cane manager GVV Satyanarayana performed poojas at the cane carrier in the factory.

No entry: Sugar cane-laden vehicles barred from Kolhapur.

With the onset of the sugar cane crushing season in the district, many farmers have started transporting the produce from the fields to the mills.

Co-op banks turn away 55 sugar mills in Maharashtra.

Around 55 sugar mills in Maharashtra may find it difficult to commence crushing in 2019-20 sugar season since they have been turned away by the Maharashtra State Cooperative Bank (MSC), the state's apex cooperative bank, and district cooperative banks because of their negative net worth and net disposable resources (NDRs).

After a short spell of uncertainty, nearly 32 mills commence crushing in Maharashtra.

After a short spell of uncertainty, around 32 sugar factories in Maharashtra have commenced crushing operations. These factories, however, have commenced crushing in a nominal manner. Maharashtra sugar commissioner Shekhar Gaikwad stated that no crushing data has been made available and factories have made symbolic beginning to mark the start of the 2019-20 season.

India to export 4 million tons of sugar, says Marex Spectron.
India to produce 27 million tons of sugar and export 4 million tones, says a survey carried out by Marex Spectron, a London-based commodities broker. Indian government has allowed export of 6 million tons of sugar. The survey tried to answer three burning questions in front of the global sugar industry.

Sugar prices to improve on lower production estimates: Report.
The downward revision of sugar production by 7.8 per cent to 26 million tonne in this sugar season (SS) along with the expected exports is likely to boost sugar prices in the near term, according to a report. Domestic sugar production estimates for SY2020 are revised downwards by 7.8 per cent to 26 million tons.

Short supply: Maharashtra may not meet ethanol target this season.
Sugar millers in Maharashtra have submitted bids for only Rs 22 crore for a tender placed by oil marketing companies (OMCs) for 58 crore liters of ethanol. On a pan-India basis, oil companies placed tenders for 5.11 billion liters of ethanol in 2019-20 out of which sugar companies offered 1.63 billion liters of ethanol.

Goan sugarcane to be crushed at Khanapur this year, next: Gaude.
Goan sugarcane would be exported to the Khanapur sugar factory as it's not possible to do any crushing at the Sanjivanee sugar factory this year. The same thing would be continued next year if Sanjivanee does not start by then, Cooperation Minister Govind Gaude said on Wednesday.

NSL sugar factory to pay up Rs 1.71 crore tax dues.
The NSL sugar factory at Bhusnoor village in Aland taluk was recently found to have not remitted taxes for the last 10 years, and it was also being run without its license being renewed.

Netherlands – Pectins from beet pulp found effective for use in leather production.
The Dutch specialty chemicals manufacturer Smit & Zoon found that pectins from sugar beet pulp are excellent tanning agents in the production of leather.

USA – Corn growers dismayed over EPAs final rule on refinery exemptions.
The Trump administration finalized U.S. biofuel blending requirements for 2020 on 19th December, leaving a key part of the rule unchanged from an earlier proposal that the corn lobby had criticized as inadequate to help struggling farmers, reported Reuters.

Ethiopia – Coca-Cola plans to buy sugar plants to fully secure its sugar need locally.
The Coca-Cola Company under its subsidiary in Ethiopia has tendered its bid to acquire sugar plant/s the government is about to privatize in the early months of 2020, according to local paper.

Indonesia to import only high pol raw sugar in due course.
Indonesia is revising its sugar import rules. Purchases will be limited to high pol raw from overseas, according to Indrasari Wisnu Wardhana, the Trade Ministry's foreign trade director general, reported Reuters.

Brazil – Outlook for sugar and ethanol sectors looks positive says Moody's
The rating agency recently Moody's shifted the outlook for Brazil's sugar and ethanol industry from negative to stable, citing rising demand for ethanol from the country, reported Reuters.

BP and Arzeda enter into second phase of biochemical collaboration.
The oil major BP and Arzeda, the Protein Design Company™, recently announced that they have entered a second extended collaboration agreement for developing a bioprocess for the production of an undisclosed renewable chemical of high strategic and industrial interest to BP.

Argentina – Eight people killed following explosion at La Esperanza's mill.
Eight people died and at least 10 were injured after an explosion followed by a fire broke out in the distillery at the La Esperanza mill in the department of San Pedro de Jujuy, according to local press reports.

Brazil – Amyris to build US$75 million factory producing zero-calorie sweeteners.
The biotech start-up Amyris plans to build a factory in Barra Bonita, Sao Paulo state. Costing US$75 million, the factory will produce zero-calorie sweeteners from sugar cane.

Carnegie's cane-based Xorel is first textile to achieve Living Product Challenge Certification.
Carnegie's Biobased Xorel, a groundbreaking high-performance textile sourced from sugarcane, achieved Living Product Challenge Certification. Carnegie became the first textile company to achieve this advanced protocol.

Cyanobacterium metabolically engineered to produce astaxanthin.
Researchers at Kobe University's Engineering Biology Research Centre have succeeded in synthesizing astaxanthin using the fast-growing marine cyanobacterium Synechococcus sp. PCC7002.

India – DCM Shriram's sugar unit diversifies – building new 200k litre distillery.
DCM Shriram shares surged 4.76% to INR360 (US$5.07) after the company's sugar unit said it commissioned 200k litres per day (KLD) distillery at Ajbapur in Uttar Pradesh on 3 December 2019.

Norwegian shoppers cross into Sweden for cheaper sugar-based products.
Recent press reports from Norway are replete with mention of a significant drop in per capita sugar consumption, driven largely by hefty taxes. But this masks the actual consumption as Norwegians have been driving across to Sweden to buy confectionery and soda which are much cheaper as they are not taxed.

Australia – CANEGROWERS trials KPMG's blockchain supply chain solution.
Consultancy firm KPMG's blockchain-based track and trace platform is being trialled by CANEGROWERS, the body for Australian sugarcane growers.

Ghana – Take 2! Idled Komenda Sugar Factory gets an injection of US$28 million from Park Agrotech
The Ministry of Trade and Industry, in an effort to put the dormant Komenda Sugar Factory in production, has named Park Agrotech Ghana Limited as the strategic investor for the factory.

USA – Over 58,000 ha of beet unharvested due to inclement weather.
The sugar beet harvest as of Nov. 3 was the slowest on record since 2000, the US Department of Agriculture (USDA) said in its Nov. 15 Sugar and Sweeteners Outlook. Rain and snow pelted crops in September and October. That was followed by a blizzard, and then warm temperatures that left fields a boggy mess. Next came a deep freeze, ruining the underground sugar beet crop, and dealing a harsh blow to farm incomes.

USA – 2019-20 sugar output forecast to drop by over half a million tonnes.
In recent weeks, prospects for US sugar production have declined significantly due to adverse weather in both sugar beet and sugarcane regions. The US Department of Agriculture (USDA), in its Nov. 8 World Agricultural Supply and Demand Estimates report has projected a significant decline in 2019-20 sugar output with stocks-to-use ratio forecast to drop to dangerously low 10.5%.

Punjab for strengthening sugarcane cultivation.
Punjab Cooperation Minister Sukhjinder Randhawa here on Wednesday met Union Agriculture Minister Narendra Singh Tomar and discussed strengthening of sugarcane cultivation in the state for welfare of farmers. He also urged special funds by the National Cooperative Development Corp (NCDC) for strengthening as well as renovation of sugar mills in Punjab.

Sugarcane will be weighed in Goa, Gaude tells farmers.
The state government has agreed to weigh the produce of local sugarcane farmers before sending it to Karnataka for processing. "Farmers were demanding that their produce be weighed here as there were chances of it being pilfered in transit.

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➢ **RESEARCH ARTICLE:**

"SUGARBEET – A POTENTIAL FEED STOCK FOR ETHANOL PRODUCTION"

By

Narendra Mohan
Director
National Sugar Institute
Kanpur

ABSTRACT

Even after making all out efforts, blending of ethanol@10% in the petrol has not become a reality. With most of the ethanol coming through the molasses route and grains contribution been in-significant, there is dire need for developing alternate feed stocks to achieve the target of producing 3300 million liters of ethanol to make EBP10 a success. Sugarcane production and crushing since always witnesses surges and even with sugarcane crushing @ 325 million tonnes it is to be too optimistic to think of achieving the blending target of even 10% unless diversion of alcohol for potable sector and chemical sector stops. Sugar Beet has been identified as one such crop which has the promise to become a potential feed stock for ethanol production in future.

Key words: sugar beet, ethanol, blending, climate

INTRODUCTION

India is in search for feed stocks other than molasses to cope up with the requirement of ethanol for Ethanol Blending Programme. Out of the various feed stocks being considered viz. Sweet Sorghum, Cassava and Sweet Potato etc., Sugar Beet appears to hold promise to become a potential feed stock for producing ethanol directly from juice. There are challenges as regards climatic conditions, seed availability and market assurance but the crop scores many points over the Sugarcane crop with respect to crop duration, irrigation water requirement and sugar content. Sugar Beet is one of the three crops (sunflower and soybean being the other two) which were introduced in India around the same time in 1950s. While the other two have now established themselves commercially in India, Sugar Beet is still awaiting to contribute significantly to the Indian agricultural scenario. None of these crops have been lacking in potential but till Government push and industrial support became a reality, both sunflower and soybean were struggling to find their economic niche.

Sugar Beet is the last of the trio whose potential still remains unexplored in India. However, there is a buzz in the country over Sugar Beet cultivation during the last few years both in the tropical

and sub-tropical regions for producing ethanol and trials have been conducted at National Sugar Institute, Kanpur also to assess the strength and weaknesses of the Sugar Beet crop. In the paper, the author has tried to bring forth the factual position with respect to Sugar Beet cultivation in the country for its possible use for ethanol production.

The crop

Sugar Beet is a temperate crop, botanically known as *Beta vulgaris L.* It is a man-made crop and is the product of human selection from fodder beet for higher sugar content. The impetus for the development of Sugar Beet in Europe came when there was an embargo on the import of sugarcane sugar during the world war. It belongs to family *chenopodiaceae*, the spinach family. In its native temperate habitat, the root crop is sown in the spring and harvested in the autumn. The harvest of the crop coincides with the onset of winter. This gives a wide window of time available to process Sugar Beet without much loss in quality. For seed production, the roots are left intact in the soil for over-wintering for flowering stalks to emerge in the coming spring.

The Indian context

Riddled with the cycles of boom and boost in sugarcane production in India, the Sugar Beet crop was introduced earlier with the object of augmenting for sugar production. In 1960s, extensive exploratory trials were conducted all over the country to find out suitable area of root and seed production. Based on the preliminary results, it was felt that Sugar Beet could be grown during winter in North India, while Kashmir valley and hills such as Darjeeling and Shimla were found suitable for seed production. To strengthen the research and development activity, an All India Coordinated Research Project on Sugar Beet was launched in 1971 by the Indian Council of Agricultural Research with centres at Lucknow, Pantnagar, Sriganganagar, Phaltan, Jalandhar and Kanpur. Later on, Kalyani in West Bengal, Solan in Himachal Pradesh and Mukteshwar in Kumaon hills were added. At the same time, a Sugarcane-cum-Sugar Beet (600 TBD) plantation white sugar factory was established at Sriganganagar in Rajasthan. The 1970's and 1980's was a period of intense research activity on Sugar Beet. Work was carried out in germplasm evaluation, varietal development, agronomical, pathological, entomological and agricultural engineering aspects.

Sriganganagar provided the testing ground of the production and processing Technology. India opted for self-reliance for Sugar Beet seed and an open -pollinated, diploid Russian variety namely, *Ramonskaya*-06 (R-06) was found suitable for Indian conditions along with some other anisoploid varieties from Europe. The seed production of R-06 was successfully undertaken by The National Seeds Corporation in Srinagar and later on shifted to Himachal Pradesh. The crop was a success with the farmers and factory. Sriganganagar Sugar Mills had a commercial run of over thirty years when the factory was closed due to reasons not exclusive to Sugar Beet. One of these, however, was the trade liberalization which closed the remunerative disposal of Sugar Beet molasses to a Mumbai-based pharmaceutical company. The best average root yield obtained during the run was 39 t/ha and a sugar recovery of 11.32%. It may be borne in mind that this was made possible without the best available

varieties and agricultural practices. As per the studies conducted at that time, the Sugar Beet crop was found to be the most remunerative rabi crop as compared to wheat and mustard.

Sugarcane production in country has seen many ups and downs, sometimes brought about by failure of rains, but more often by the fluctuations in price of sugarcane and issues related to payments of sugarcane supplies. In early 2000s and during the period 2012-2015, many southern states were reeling under consecutive droughts leading to insufficient cane supplies to the factories and at this juncture, some multinational Sugar Beet seed companies came out with tropicalized Sugar Beet varieties and a need was felt to conduct feasibility trials. The ICAR responded with an AP Cess Network project in 2004. The work done at the five centres with two of these in Maharashtra, showed that Sugar Beet could be grown successfully from October to May.

Fig. 1 : Geographic locations of Sugar Beet trials

The possibility of having more than one crop a year is also not ruled out under tropical agro-climates. The package of practices along with the suitable varieties was developed. The potential for root was observed to be 60-80 t/ha with a sugar content in the roots of 13-15 %. The following table no. 1 gives the performance of Sugar Beet varieties with respect to yield and sucrose content reported from diverse seed sources :

Table No. 1 : Results of trials of various Sugar Beet varieties

S.N.	Varieties	Sucrose Content (%)		Root Yield (t/ha)		Gross sugar 180 DAS* (t/ha)
		150 DAS*	180 DAS*	150 DAS*	180 DAS*	
	LK-27	13.05	14.93	78.22	67.92	10.868
	LKC-95	12.71	14.98	76.00	65.05	11.058
	SYT-06-07	14.26	16.40	84.79	70.99	10.807
	SYT-06-13	14.50	16.67	75.37	69.24	10.890
	IN-06	14.13	16.06	90.77	69.33	9.566

	IN-07	14.28	15.76	65.27	61.32	10.248
	PAC-60002	14.88	17.14	81.49	70.62	11.444
	PAC-60006	13.56	16.18	72.20	66.97	11.097
	FELICITA	13.07	15.19	84.63	80.82	11.728
	RASOUL	13.38	14.88	64.86	55.56	9.044
	LS-6	13.14	16.22	82.77	70.42	11.484
	SHUBHRA	13.78	17.67	93.59	77.77	13.253
Mean		13.73	16.01	79.16	68.83	10.957

* DAS – days after sowing

Such trials were carried out at National Sugar Institute, Kanpur on three sugar beet verities, namelyLS-6, SZ-35 and PAC-60008 for three seasons during the period November to March. The yield was estimated to be about 80 tonnes per hectare although the same was varying to certain extent from one variety to another. The beet juice was used to assess the ethanol production potential and the same was observed to be about 90-100 liters per ton of Sugar Beet on laboratory scale.

The present scenario

The changing bio-fuel scenario in the country has started looking at Sugar Beet with ethanol as the end product. Several sugar factories in Andhra Pradesh, Maharashtra, Karnataka and Punjab have been keen to give Sugar Beet fair trial, after having been convinced of its agronomical feasibility through in-house crop experimentation. In this, a key role have been that of the multinational Sugar Beet seed companies, such as Syngenta, SES Vanderhave and KWS through their Indian operations. These companies are still active in providing the know-how, seed and guidance in growing and handling of Sugar Beet. The SDF financed the fabrication and setting up of a pilot plant for Sugar Beet processing at Samarth SSK Ltd. in Maharashtra, while it was taken up by some other private factories too of their own to assess the economics of Sugar Beet cultivation and ethanol production.

The need for a stimulus

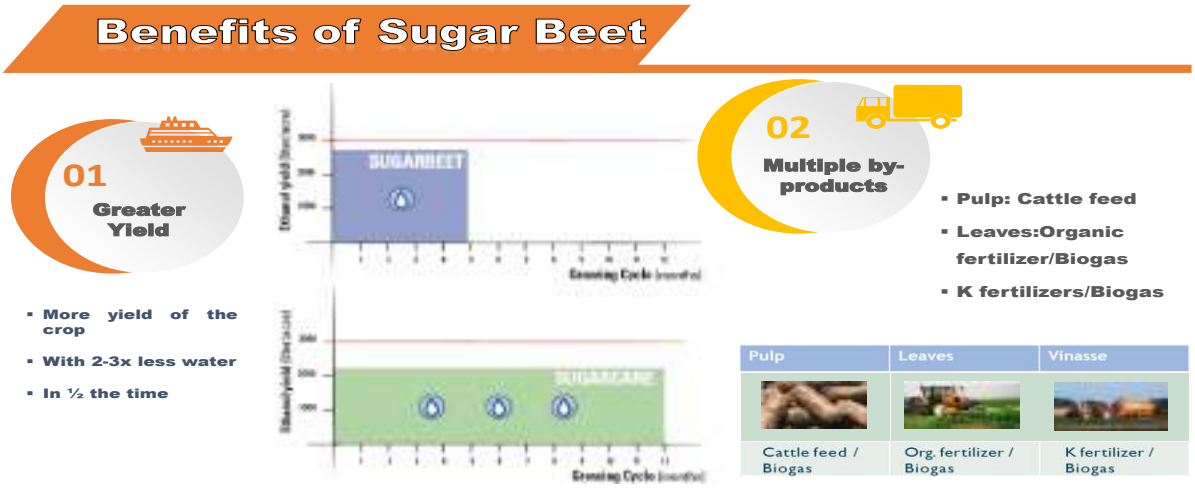
The history of Sugar Beet development in Europe and the USA and also at Sriganganagar (Rajasthan) in India shows that unless there were incentives given by the Government, Sugar Beet could not be a success. In Sriganganagar, it was the extra canal water provided for every acre Sugar Beet which was a big attraction, and the assured purchase of Sugar Beet by the sugar factory. Similarly, farmers need to be attracted to the crop through other such incentives. Being an industrial crop, at the first instance Government may provide necessary fund for the establishment of Sugar Beet processing units particularly for producing ethanol. A contract for the timely purchase of the entire produce has to be in place. Further, support for availability of seed, fertilizers and pesticides along with technical guidance in raising the crop has to be provided. The central and state agricultural extension and development machinery has to make an all out effort to be equal partners with the farmers and the

factory to lend the necessary support with their active presence and post harvest management of the produce.

The positives and pitfalls

Sugar Beet has been shown to be agriculturally feasible under Indian conditions. It has the potential sugar yield comparable to sugarcane in half the time with water saving of 30-40% as shown in Fig. 2. The suitable varieties have been identified and the production technology has been developed. The mechanization of sowing operation has been done. The ecological niche for the successful cultivation of the crop have been identified. As we go along and gain experience of growing it in specific locations, innovative refinements in crop and produce management shall be introduced. In fact, working models are provided by the successful cultivation of Sugar Beet in countries like Egypt, Morocco, Iran, Pakistan, EU and North America, which have a wide range of agro-climatic conditions and from largely manual to totally mechanized making precision farming.

Fig. 2 : Advantages of Sugar Beet Production



India is endowed with a wide range of climatic conditions which allow us to be self reliant in Sugar Beet seed production. A business model has to be developed in the form of contract farming where various stakeholders commit themselves to their specific role in the entire venture. This was being done at Sriganganagar among farmers, factory and seed companies. The state government has to play the role of a facilitator and observer for fair play by various stakeholders.

Thus, Sugar Beet has all the potential to become a viable industrial crop in India. Most of the components are already worked out and can be integrated in a mission mode with the appropriate government policy, industrial entrepreneurship and committed agricultural department. It may also be mentioned that Sugar Beet has an in-built tolerance to saline and alkaline soil conditions. It is therefore capable for bringing under plough and reclaim vast tracks of salt affected soils in the country, estimated to be more than 6.0 million hectares. For integrating Sugaeet with the existing cropping pattern, a lot of work has been done and this may be tailored to suit the new locales. It can easily be grown as an intercrop with sugarcane to increase sugar productivity per unit time and area.

Sugar Beet & Sugar or Ethanol Production

As regards utilization of Sugar Beet for sugar production is concerned there are certain issues which are worth consideration:

1. Since the Sugar Beet doesn't have fuel of its own (as bagasse in case of sugarcane), fuel from outside shall be required to meet steam generation requirements at the boiler.
2. Clarification of beet juice is carried out by carbonation process, where lime requirement is almost10 times than that required in sulphitation process for cane juices.
3. Capital cost of such sugar processing plant is more due to more no. of unit operations.
4. India is already surplus in sugar production and finding it difficult to dispose of the sugar in global market.

Thus, these issues are to be addressed if production of sugar is to be carried out. However, as mentioned earlier the crop has potential for utilization of beet juice for industrial fermentation so as to produce ethanol as the country needs alternate feed stocks to cope up with the requirement for EBP 10 as shown in Fig. 3.

Fig. 3 : Ethanol vis a vis Feed Stock Scenario

MOLASSES/ETHANOL SCENARIO

S. No.	Particulars	Production	UOM	Ethanol Quantity	UOM
1	Sugarcane crushed	300	MMT		
2	Sugar production	33.0	MMT		
	Molasses C grade	13.5	MMT	3173	**Million Liters**
3	Alcohol used for potable and other purpose			1500	**Million Liters**
4	Ethanol available for EBP through C-molasses			1673	**Million Liters**
5	Ethanol from B-Heavy molasses			300	**Million Liters**
6	Ethanol from Grains			500	**Million Liters**
7	Total Ethanol availability			2473	**Million Liters**
8	**Shortfall for EBP 10**			**768**	**Million Liters**

EBP -20.....NEED FOR "SMART" DISTILLERIES WORKING ON MULTI-FEED STOCKS

Ethanol made from C Molasses	1673	Million Litres
Ethanol made from B-Hy and Cane Juice considering diversion on 2 million tonnes of sugar through such routes	1200	Million Litres
Ethanol made from grains (on the basis of current trend)	500	Million Litres
Total availability from all sources	3373	Million Litres
Ethanol required for 20% Blending	6483	Million Litres
Ethanol required from new sources viz. Sugar Beet etc.	3110	Million Litres

It is evident that even after considering diversion of 2.0 million tonnes of sugar through B Heavy molasses or cane juice or through other routes yielding about 1200 million liters of ethanol and availability of 500 million liters of ethanol through grains, there may be a shortfall 3310 million liters of ethanol for EBP 20 envisaged for future. Even for EBP 10, there appears to be shortage of ethanol as shown in Fig. 2 and as such alternate feed stocks for ethanol production are very much required.

Conclusion

- Considering requirement of ethanol for EBP 10, it is not possible to cope-up only through molasses route.
- There is need for using alternate feed stocks for making EBP 10 and EBP 20, a success.
- Sugar beet has the potential to be a feedstock for the purpose.
- There shall be need for developing indigenous sugar beet varieties.
- Adoption of sugar beet cultivation holds promise but shall require greater extension work and assurance to farmers.
- It shall also require robust harvesting and transport mechanism.

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ABSTRACTS

World ethanol trade to contract for first time in years by FO Licht published in International Sugar Journal, October, 2019.

United States and Brazil dominate both the global production and exports of ethanol. Though Brazil is a bit-part player in exports as it is also the major importer, importing from USA. The rest of the countries/regions producing ethanol lag behind significantly in production and exports/imports. Trade wars (e.g. US-China) and protectionist measures may serve to impose a marginal restraint on ethanol trade. Recent rebel drone strike against two oil installations in Saudi Arabia which has cut its crude oil output by 50% and resulted in global oil price increasing by 20% may be a significant driver in ethanol production.

Post-release variety testing: a key activity to ensure commercial value of genetic improvements by S Ramburan published in International Sugar Journal in October, 2019.

Post-release variety testing has been a core feature of SASRI's activities over the last 40 years. This paper reviews the value added from such activities with regard to variety adoption and return on industry investment. Sugarcane post-release testing is unique to South Africa and to date has been conducted separately from the plant breeding project. The testing network engages grower co-operators in a participatory approach. Examples of how knowledge exchange activities have influenced variety adoption trends are illustrated. The contribution of trials to variety adoption is illustrated through a survey of extension specialist opinions.

Factory benchmarking — are useful indicators used? by JD Snoad published in International Sugar Journal, October, 2019.

Common factory figures have often been used as performance indicators by generations of technologists and managers. This paper seeks to examine their suitability for this purpose. Metrics were evaluated against criteria describing a perfect indicator, defined as one that was adequately related to actual business outcomes, reflected success in managing controllable factors, considered the impacts of uncontrollable factors, and was expressed in commercially relevant terms. Relevance was considered at the levels of overall business, facility, and individual technologist. The results challenge some longstanding perceptions about the relevance of commonly used factory figures.

Addressing constraints in the factory rate-control system by GA Kent & S McNamara published in International Sugar Journal in October, 2019.

Although there are extraction benefits in maintaining a constant first-mill speed, there are inevitably capacity constraints that prevent that speed from being continuously maintained. This paper presents modifications to a conventional cane-rate control system that have been implemented at Tully to address the constraints. In order to maximise cane rate, it is generally desirable to operate at a relatively high first-mill speed. With feeding station constraints, a high first-mill speed may result in occasions when the feeding station is unable to deliver

sufficient cane to sustain the desired prepared cane level in the first-mill chute.

World sugar output to fall to a three-year low in 2019/20 by FO Licht published in International Sugar Journal, November, 2019.

Abstract Global sugar production in 2019/20 may fall by 6.4 mln tonnes on a local crop year basis to 180.3 mln. If realized, this would be 21.4 mln tonnes less than the record 201.7 mln tonnes produced just two years ago. However, the projected drop in global output is heavily dependent on significant decreases in output in India and Thailand, with especially the forecast for the former country always good for a surprise. Brazilian production is expected to fall even below last year dismal value and would then reach a 14-year low.

Identification of sources of resistance to wilt caused by Fusarium sacchari in Indian sugarcane parental population by R. Viswanathan, C. G. Balaji, R. Selvakumar, P. Malathi, A. Ramesh Sundar, A. Annadurai, Adhini S. Pazhany, K. Manivannan & R. Nithyanandam FO Licht published in International Sugar Journal, November, 2019.

Wilt of sugarcane caused by the fungal pathogen Fusarium sacchari is a serious stalk disease affecting production and productivity in the crop in India. In certain occasions, the disease occurs in severe epidemic form in the field and causes devastating effects to cane cultivation. Though screening for wilt in advanced varieties is being done in selected research stations in the country, resistance in the parents used for hybridization is not clearly known. We have taken up a detailed study to assess wilt resistance in parental clones of National Hybridization Garden (NHG).

Sugar beet pulp fiber is a source of bioactive food and feed ingredients by Arland T. Hotchkiss, Jr., Phoebe Qi, LinShu Liu, Hoa K. Chau, Peter H. Cooke, Alberto Nuñez, Andre K. White & Marshall L. Fishman FO Licht published in International Sugar Journal, November, 2019.

The demand for healthy food ingredients and clean labels is increasing. Sugar beet polysaccharides and protein have several health-promoting bioactivities. Pectin, hemicellulose and cellulose polysaccharides were extracted from sugar beet pulp. One of the proteins associated with sugar beet pectin is extensin. Sugar beet pectin is an excellent oil-in-water emulsifier in beverages, in part due to 9% protein content, and can be used for microencapsulation of lipophilic food ingredients. The interacting complexes and covalent conjugates between sugar beet pectin and the dairy protein β-lactoglobulin were characterized in detail.

Effect of dithiocarbamate biocides on gum-producing bacteria isolated from a South African sugarcane processing factory by S. Nel, SB Davis, A Endo & LMT Dicks FO Licht published in International Sugar Journal, November, 2019.

Exopolysaccharide (gum)-producing bacteria cause financial losses to the sugarcane processing industry. In previous studies, we have reported on the isolation of several strains of gum-producing lactic acid bacteria and Bacillus species from a South African sugarcane processing factory. Here we report on the antibacterial effect of PreventolÒZ and

BusanÒ1021, two dithiocarbamate biocides used in the sugar industry, on seven species of gum-producing bacteria. PreventolÒZ, administered at 20 ppm, demonstrated a bactericidal (killing) effect against Leuconostoc mesenteroides A16-9, Leuconostoc lactis B9-3, Bacillus subtilis B7-19 and Bacillus amyloliquefaciens B7-51 after 6 h of contact, but had only a bacteriostatic (growth inhibiting).

Enhancing the value of process-accounting figures by JD Snoad published in International Sugar Journal, December, 2019.

A first-principles approach can be used to better understand factory figures and their interrelationships. In examining these, distinction is made between Commercial Cane Sugar (CCS) as used in cane payment, and Pure Obtainable Cane Sugar (POCS) as originally defined. The POCS definition can be used to convert chemical control balance losses to Pool Sugar Index (PSI) equivalent units. The molasses loss expected under the CCS/POCS methodology is discussed including two methods of calculation. These concepts are used in examining the relationship between cane purity, formula expected molasses loss, recovery, and PSI.

Potential cane and sugar losses from top-shoot borer, Scirpophaga excerptalis (Walker) (Lepidoptera: Crambidae) by Lastus S Kuniata, Kaile T Korowi & awrencia Kikitam published in International Sugar Journal, December, 2019.

Top-shoot borer, Scirpophaga excerptalis (Walker) (Lepidoptera: Crambidae), is one of the moth borers considered as pests of sugarcane in Papua New Guinea. Larvae bore from the top of the cane through the spindle and into the growing point (meristem), killing the stalk. Cane of 4 weeks old through to mature cane can be damaged. Here, the population dynamics of top-shoot borer at Ramu, Papua New Guinea, and estimated sugarcane juice losses are reported. The life cycle of top-shoot borer is 48–62 days and cane of all ages can be attacked.

Effectiveness of different sources of nitrogen in MS media for rapid in vitro shoot initiation of sugarcane (Saccharum officinarum L.) genotypes by Suresh Yadav, T.E. Nagaraja, H.C. Lohithaswa, K.V. Shivakumar & Meniari Taku published in International Sugar Journal, December, 2019.

Tissue culture techniques are important tools of crop improvement and rapid multiplication of sugarcane clones. Nitrogen is essential not only for growth, but also for morphogenesis in tissue culture, which is markedly influenced by the availability of nitrogen and the form in which it is presented in the plant. In a laboratory experiment with sugarcane genotypes Co 86032, CoVC 15-22-05, CoVC 15-22-26 and CoVC 18061, the efficacy of different sources of nitrogen; namely ammonium sulphate, tri ammonium citrate and supplement for MS (Murashige and Skoog) medium were evaluated.

Genome-wide functional analysis of sugarcane ESTs by Inderjit Singh Yadav, Pawan Kumar Malhotra & Amandeep Sharma published in International Sugar Journal, December, 2019.

Sugarcane is a C4 plant with complex polyploid nature which accumulates sucrose in its stem as an important source of sugar

production worldwide. The polyploid complexity hinders whole genome sequencing in sugarcane. Modern sequencing technologies are generating large amount of expressed sequence tag (EST) data. The dbEST at NCBI is a good source of functional genes that can serve as starting materials for functional genomics of crops like sugarcane. The present study was carried out for developing an annotated resource for sugarcane breeding based on EST sequences.

Response of selected South African coastal sugarcane varieties to chemical ripeners: Active ingredient effectiveness and associated impacts on grower and miller sustainability by PDR Van Heerden published in International Sugar Journal, December, 2019.

Evaluation of varietal responses to ripeners is a necessary sugarcane research function. This paper underlines this necessity through analyses of data from a rainfed trial conducted over two seasons. Ethephon®, Fusilade Forte® and their combination were ground-applied to replicated plots.

At harvest, recoverable value per cent (RV%), juice purity (JP) and yields (cane and RV) were determined. Recommended input costs and applicable RV price were used to estimate gross margins (GMs). A Sugar-Juice-Molasses (SJM) balance calculation was used to estimate potential implications of JP-driven influences on factory sucrose recovery.

Key considerations for high-performance continuous vacuum pans by BStC Moor, S Rosettenstein & N du Plessis published in International Sugar Journal, December, 2019.

The two most important objectives for a high-performance continuous vacuum pan (CVP) are good crystal quality and high exhaustions. To achieve these, the pan design needs to incorporate features that promote plug flow (a narrow crystal residence-time distribution), a high heat-transfer coefficient (HTC) and vigorous circulation. Focussing on these will also achieve an energy-efficient pan that can operate on a low steam-massecuite temperature differential. Good plug flow is essential for good crystal quality (low CV), which enables good purging with minimal washing and good exhaustions.

Evaluation of Performance of Early and Mid-late Clones for Maharashtra by J.M. Repale & R.S. Hapase published in Indian Sugar, October, 2019.

The experiment was conducted at research farm of Vasantdada Sugar Institute, Pune during Suru season (January Planting) of 2016-17 and 2017- 18 to evaluate the productivity of early and mid-late maturing clones for cane yield and quality characters under two plants and one ratoon crop. The pooled results revealed that one mid-late maturing clone, CoVSI 11001 was found significantly superior over the standard Co 86032 for cane and sugar yield while, however the clone VSI 10001 was found superior only for cane yield.

One early maturing clone CoVSI 12001 was found significantly superior over the standard CoC 671 for cane and sugar yield. None of the clone was found superior to standard CoM 0265 for cane and sugar yield. Two clones viz., Co VSI 11001 and CoVSI 12001 were found highest for sucrose % juice and C.C.S. % at 12th

months of crop age as compared to the standards Co 86032 and CoC 671, respectively.

"Emerging Trends for Improving Sugarcane Productivity and Sugar Recovery in Karnataka" by R.B. Khandgave published in Indian Sugar, November, 2019.

Karnataka state is the 3rd largest producer of sugarcane and sugar in India. For the past two years sugar production in the state decline drastically due to severe drought conditions coupled with reduced cane price. The factors responsible for decline in cane productivity viz., biotic and abiotic stresses, imbalance and over/ under use of chemical fertilizers, Uncontrolled and faulty irrigation schedules and methods, deterioration of soil physical characters, lesser/no use of organic manures, less or no emphasis on use of bio-agents and bio-fertilizers, poor quality cane seeds, adoption of un-scientific agronomic practices and ignorance of intercropping.

Editor:

Dr. Ashutosh Bajpai
Prof. of Sugar Technology
Department: Sugar Technology
Address: National Sugar Institute,
Kalyanpur, Kanpur – 208017
Mobile No. – 9415428762
Email: dr.abajpainsi@gov.in

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& Public Distribution
Kalyanpur,
Kanpur – 208017
Uttar Pradesh (India)

Visit us at http//:nsi.gov.in
Contact:
nsikanpur@nic.in, director.nsi@gov.in
Telephone
+91-512-2570730 Fax: +91-512-2570247