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Since inception, the institute has endeavored not only to provide competent technical manpower but also the cost effective proven technology to the sugar & allied industry. With this view, the year 2017 witnessed many developments at the institute viz. conversion of conventional classrooms into SMART classrooms, establishment of Nano-brewery, Instrumentation laboratory and a new course on Process Instrumentation & Automation. Students from Bhutan, Nepal, Kenya and Yemen undertook teaching and training in various regular & customized training programmes. The institute also spread its wings to other countries for rendering technical consultancy and for carrying out collaborative research work. With extensive work on “Production of Ethanol through alternate feed stocks” and “Electro-coagulation technique for waste water treatment”, the institute got better placed with the industry.

Wishing you a very happy and prosperous New Year 2017



Narendra Mohan  
Director

### XXIX<sup>th</sup> ISSCT CONGRESS 2016

Shri Narendra Mohan, Director, Dr. Ashutosh Bajapi, Professor of Sugar Technology, Dr. V.P. Srivastava, Asstt. Professor of Organic Chemistry and Shri Mahendra Yadav, Junior Technical Officer(Sugar Technology) attended the 29<sup>th</sup> Congress of ISSCT from 5<sup>th</sup> to 8<sup>th</sup> December 2016 held at Chiang Mai, Thailand to present their research papers.



The experts presented papers on topics concerning “Production of Graphene Oxide from bagasse”, “Development of process for producing sulphur free Sugar using CO<sub>2</sub> gas

from distillery fermenters”, “Use of alternate feed stocks for ethanol production” and on “Reducing steam consumption in sugar factories.



### SEMINAR/ TRAINING PROGRAMME ORGANIZED:

1. Two days All India Seminar on “**Production of Ethanol/ Bio- Fuels and Effluent Treatment Technologies to Achieve Zero Liquid Discharge (ZLD)**” organized jointly with All India Distillers Association at Hyderabad on 17-18<sup>th</sup> October 2016. Large no.

of delegates from sugar producing states of India and from France & China also participated in the seminar. Shri Santosh Kumar, Asstt. Prof. Bio Chemistry presented a paper on “Indian Alcohol Industry- Future Challenges” during the seminar.



2. Three days residential training programme on “New Development in Pollution Control Technologies (Water & Air) – Adequacy and Efficiency (with field visits)” for the officers of various State Pollution Control Board’s was organized by the Institute at NSI from 9<sup>th</sup>-11<sup>th</sup> November, 2016. Officials from UP, Uttarakhand, Punjab, Gujarat, MP, Rajasthan attended the training programme.

During the programme, lectures were delivered by the Institute faculty and outside eminent experts on minimizing fresh water consumption, waste generation and modern technologies for waste water treatment.



Side by side, practical training was imparted to the participants on analysis of waste water/effluents for various parameters viz. TSS, TDS, BOD, COD, pH etc.

3. Two days “**Knowledge Development cum Awareness Programme**” for Directors’ and other Senior Officials of Sugarfed Punjab was organized by the Institute at Chandigarh on 5<sup>th</sup> and 6<sup>th</sup> October, 2016. The participants were imparted knowledge on key areas requiring continuous monitoring for better efficiency of sugar units.

**FELICITATIONS:**

A Poster presentation made by the Institute on “**A process for purification of Sugar factory condensates & effluent by electro coagulation**” was chosen for first prize during the International Conference and Exhibition on “**Sugarcane Value Chain -Vision 2025 Sugar**” organized by Vansant Dada Sugar Institute, Pune from 13<sup>th</sup> to 15<sup>th</sup> November, 2016 at Pune, Maharashtra.

**NANO BREWERY AND ANALYTICAL LABORATORY:**

Commissioning of Nano Brewery at the Institute completed with the production of first lot of Corona and English Pale Ale Beer.



Nano Brewery has been established for better training to the students of Alcohol Technology course and to conduct experiments on beer recipes. It has also been established keeping in view starting a new course on brewing in future.

An Ethanol Pilot Plant for training and research purposes is also under erection. The “NSI Analytical Laboratory” has also been set up to seek NABL Accreditation and to facilitate the sugar Industry for analysis of sugar and sugar house products as per standard protocols at reasonable charges.



### INSTITUTE GOING GLOBAL :

1. Three months training programme on Sugar Refinery for the Chemical Engineers of M/s Yemen Company for Sugar Refining, Hodeida, Republic of Yemen concluded at the Institute. Training was imparted to the trainees during the period on various techniques of raw melt clarification, concentration and crystallization.

2. Shri Narendra Mohan, Director and Shri D. Swain, Professor of Sugar Engineering visited Bhutan on 29<sup>th</sup> to 30<sup>th</sup> December 2016, to finalize training programmes to be conducted for distillery personnel of M/s Army Welfare Project Limited. (A unit of Royal Government of Bhutan).



The Institute team also finalized scope of consultancy services to be given by institute for improving efficiency of the existing distillery.

### RESEARCH:

The Institute during the period took up R&D work on the following:

**1. An investigation on standardization of suitable and cost effective pretreatment methodology of bagasse for isolation of pure cellulose, hemi-cellulose & lignin for utilization as fermentable sugars** –The Study was taken up to assess the effect of different pre-treatment processes and their combination on cellulose, hemi-cellulose and lignin separation from ligno-cellulose. Cellulose, hemi-cellulose and lignin separated by using grinding/milling, ultra sonication in combination with different chemicals. Purity of cellulose, hemi-cellulose and lignin separated through organsol, basic and acid treatment along with ultra sonicator to be tested further.



## 2. Isolation and purification of yeast strains from saccharine materials and their performance for fermentative production of alcohol

Various saccharine materials were screened for carrying out isolation work. The isolation of yeasts was started and good growth of cells was seen with different raw materials except for sunflower and marigold. The isolation and purification of yeast strains isolated from various sources has been completed and these have been inoculated onto molasses medium in order to assess their ability to ferment the molasses. The yeast isolated from mango, guava and marigold did not produce good results, however, results with strains isolated from banana, apple and hibiscus were encouraging while best results were obtained with yeast strain isolated from spoiled apple.

### 3. Production of invert syrup from Cane Juice, Molasses, Sweet Sorghum & Sugar Beet Juice

The expressed sugar cane juice was treated with different concentrations of Aloe Vera extract and then subjected to ion exchange treatment (cation first and anion later on).



The syrup thus obtained was analyzed for % inversion and colour reduction. The studies shall further be carried out by clarifying using

moringa and hibiscus species, after which it shall be treated with ion exchange resins.

### 4. Graphene oxide from bagasse: synthesis & its utilization in carbo-catalysis

An effort has been made to evaluate the synthetic efficacy of bagasse dried graphene oxide as catalyst. A paper entitled “Graphene oxide from bagasse: synthesis and its utilization in carbo-catalysis” was presented under co-product session at 29<sup>th</sup> ISSCT Congress, held from 5<sup>th</sup> to 8<sup>th</sup> December, 2016 at Bangkok, Thailand.

### 5. Studies on sugar assisted synthesis of Graphene

The characterization of reduced Graphene oxide (rGO) synthesized from Graphene oxide (GO) using sugarcane juice and molasses as reducing agents has been done via X-ray diffraction analyses. The compilation of the work done in the form of a dissertation has been completed.



### 6. Improvement in Sugar Quality by clarification of intermediate boiling house products

During the crushing season 2016-17, laboratory experiments will be conducted in some commercial sugar factories for clarifying liquors fed particularly for A massecuite boiling in order to assess suitability of the process for producing low ICUMSA value sugar. Initially, samples of different molasses

i.e. A-light, melt and A-heavy have been collected from commercial sugar factories. Treatment & analysis of these Intermediate products with phosphoric acid, flocculants and mechanical means etc. is in progress. The dosage of chemicals and optimization of processing parameters shall also be made.

#### **7. Production of Bio-CNG from Press Mud-**

Blue print for under taking pilot/ prototype scale trials in the Experimental Sugar Factory using press mud with or without spent wash has been prepared. Details of homogenizer and reactor have been worked out and trails are proposed to be taken after completing the laboratory trials.

#### **SEMINARS ATTENDED:**

1. Shri Narendra Mohan, Director, Shri Doctor Swain, Prof. Sugar Engineering, Dr. Seema Paroha, Prof. Bio Chemistry, Shri A.K. Garg, Asstt. Prof. Sugar Technology and Shri Brajesh Singh, Technical Officer (Instrumentation) attended the International Conference and Exhibition on **“Sugarcane Value Chain – Vision 2025 Sugar”** organized by Vasantdada Sugar Institute from 13-15<sup>th</sup> November, 2016 at Pune.



2. Shri J.P. Srivastava, Chief Design Engineer and Shri M.P. Singh, Sr. Technical Asstt.

(Sugar Tech) presented their papers on **“Energy Efficiency in Sugar Mills”** and **“Reducing Steam Consumption in Boiling House – An Overview”** respectively during one day all India seminar organized by STAI on 14<sup>th</sup> October, 2016 at Amritsar. Shri Mool Chandra, Jr. Technical Officer (Sugar Technology) also attended the seminar.

3. Shri Narendra Mohan, Director and Shri Mahendra Kumar Yadav, Junior Technical Officer (Sugar Technology) attended the National Seminar on **“Challenges, Opportunities and Innovative Approaches in Sugarcane: Agriculture, Bio-energy and Climate Change”** organized by U.P. Council of Sugarcane Research, Shahjahanpur, U.P., from 21<sup>st</sup> to 23<sup>rd</sup> December, 2016. Shri Narendra Mohan, Director also presented a paper on **“Sustainability of the Indian Sugar Industry: A Road Map”** during the seminar.

#### **RESEARCH PAPERS PUBLISHED/SENT FOR PUBLICATION:**

1. **“Energy Efficiency in Sugar Mills”** by Narendra Mohan and J. P. Srivastava presented during the all India seminar organized by STAI at Amritsar on 14<sup>th</sup> October, 2016.

2. **“Reducing steam consumption in boiling house – An overview”** by Narendra Mohan, A Bajpai and M P Singh presented during the all India seminar organized by STAI at Amritsar on 14<sup>th</sup> October, 2016.

3. **“Indian Alcohol Industry – Future Challenges”** by Santosh Kumar and Narendra Mohan presented during two days all India Seminar on **“Production of Ethanol/Bio-Fuels and Effluent Treatment Technologies to Achieve Zero Liquid Discharge (ZLD)”** organized jointly by the Institute and All India

Distillers Association at Hyderabad on 17-18<sup>th</sup> October, 2016.

4. **“Sugar Cane Juice Clarification by Distillery Fermenter Gasses”** by Narendra Mohan, A, Bajpai and M.P. Singh presented during ISSCT XXIX Congress held from 5<sup>th</sup> to 8<sup>th</sup> December-2016 at Thailand.

5. **“Feasibility of Ethanol Production in India through Alternate Feed Stocks”** by Narendra Mohan, Dr.(Mrs.) Seema Paroha and Santosh Kumar presented during ISSCT XXIX Congress held from 5<sup>th</sup> to 8<sup>th</sup> December-2016 at Thailand.

6. **“Recycling of Pan and last body evaporator vapours by compressing with MVR and used in first effect of evaporator”** by Narendra Mohan and Mahendra Kumar Yadav presented during ISSCT XXIX Congress held from 5<sup>th</sup> to 8<sup>th</sup> December-2016 at Thailand.

7. **“Graphene Oxide from Bagasse: Synthesis and its utilization in Carbocatalysis”** by Narendra Mohan and Vishnu Prabhakar presented during ISSCT XXIX Congress held from 5<sup>th</sup> to 8<sup>th</sup> December-2016 at Thailand.

8. **“Sustainability of the Indian Sugar Industry: A Road Map”** by Narendra Mohan presented during National Seminar on **“Challenges, Opportunities and Innovative Approaches in Sugarcane: Agriculture, Bio-energy and Climate Change”** organized by U. P. Council of Sugarcane Research, Shahjahanpur, U. P., from 21<sup>st</sup> to 23<sup>rd</sup> December, 2016.

9. **“Ethanol & Indian Sugar Industry: Approach for Sustainability & Success”** by Narendra Mohan sent for publication in the

“Industrial Co-generation India”, a newsletter of MNRE.

## **PREPARATION & SALE OF SUGAR STANDARD GRADES:**

Bureau of Sugar Standards issued 1440 Sugar Standard Grades to 238 Sugar factories during the period October –December 2016 of the present crushing sugar season 2016-17.

## **VISITORS FROM ABROAD:**

Dr.Patricia Imas, Coordinator India and China, International Potash Institute, Switzerland and Dr. S.K. Bansal , Director, Potash Research Institute, Gurugram, India visited the Institute on 2<sup>nd</sup> December,2016 to see the progress of collaborative work on enhancing sugarcane yield by use of balance dose of micronutrients including potash.



**CONSULTANCY:** During October to December, 2016, consultancy services were provided to the following:

1. M/s Dalmia Bharat Sugar & Industries Ltd., Unit-Ramgarh, Sitapur, U.P.
2. M/s Maa Mahamaya Sahkari Sakhar Karkhana, Ambikapur, Chhattisgarh.
3. M/s Rajasthan State Ganganagar Sugar Mills, Shri Ganganagar, Rajasthan.

4. M/s Dalmia Bharat Sugar & Industries Ltd., Unit-Nigohi, Shahjahanpur, U.P.



5. M/s Khemani Distilleries Ltd., Daman.

6. M/s Tamil Nadu Sugar Corporation, Chennai, Tamil Nadu.

7. M/s Ponni Sugars (Erode) Ltd., Odapalli, Erode, Tamil Nadu.

8. M/s The Punjab State Federation of Coop. Sugar Mills Ltd., Chandigarh, Punjab.

9. M/s Gems Sugars Ltd., Hoodi Apartments, 120, Cinnigham Road, Bangalore, Karnataka.

10. M/s KCP Sugar and Industries Corporation. Ltd., Vuyyuru, Distt. Krishna, Andhra Pradesh.

11. M/s Dhampur Sugar Mills Ltd. Unit-Dhampur, Bijnor, U.P.

12. M/s Dhampur Sugar Mills Ltd. Unit-Asmoli, Bijnor, U.P.

13. M/s Shri Sayan Vibhag Sahkari Khand Udyog Mandli Ltd. Sayan, Gujarat.

14. M/s Shanti Sugar Industries, Chandpur, Bijnor, U.P.

15. M/s L.H. Sugar Factories Ltd., Pilibhit, U.P.

16. M/s Sar Senapati Santaji Ghorpade Sugar Factory Ltd., Kamma, Kagal, Maharashtra.

17. M/s Oudh Sugar Mills, Hargaon, Sitapur, U.P.

18. M/s Wave Industries Pvt. Ltd., unit-Dhanaura Mandi, Bijnor, U.P.

19. M/s DSCL Sugars Ltd. unit- Ajbapur, Lakhimpur Kheri, U.P.

## हिंदीकार्यशाला:

सरकारी कामकाज में राजभाषा के रूप में हिंदी के प्रति जागरूकता लाने तथा उसके उत्तरोत्तर विकास हेतु संस्थान में 19 दिसम्बर, 2016 को हिन्दी कार्यशाला का आयोजन किया गया जिसमें संस्थान के निदेशक ने सभी विभागाध्यक्षों को निर्देशित किया कि सभी अपने अधीनस्थ कर्मचारियों को हिन्दी में कार्य करने को प्रेरित करें जिससे कि राजभाषा विभाग के निर्देशों का पालन सुनिश्चित किया जा सके।



## E-GOVERNANCE INITIATIVES:

The institute participated in the video conferencing on 1<sup>st</sup> December, 2016 through which Hon'ble Minister of Human Resources Development, Government of India addressed the Vice-Chancellors and Directors of various universities and Institutions of higher learning on the Government Mission towards creating a digital economy.



## PLACEMENTS:

On/Off line campus interviews were conducted by the following sugar factories and other companies to recruit students of various courses during the period:



1. M/s VRL Automations, Bengaluru.
2. M/s SEDL, Mohali, Chandigarh.
3. M/s Uttam Sugar Mills Ltd., Noida
4. M/s Dhampur Sugars Mills Ltd, New Delhi.
5. M/s Chamundeshwari Sugars, Karnataka.
6. M/s Triveni Engineering & Industries, U.P.
7. M/s KM Sugar Mills Ltd, Masodha, Faizabad, U.P.
8. M/s Simbhaoli Sugars Ltd, Simbhaoli, Hapur, U.P.

## SWACHHTA PAKHWADA:

Special cleanliness drive was undertaken from 16<sup>th</sup> October to 31<sup>st</sup> October, 2016 in and around campus.



During the Pakhwada, Swachhta Oath was administered by the Director, to the students and staff of Institute. During the period essay, blood donation camp, nukkad natak, debate and painting competitions were also organized involving staff, students and wards of the staff members.



On this occasion “Swachhta Award” was also given to Instrumentation Engineering division being the most swachh division.

## SAMVIDHAN DIWAS:

Institute celebrated “Samvidhan Diwas” on 25<sup>th</sup> November, 2016. Senior Administrative Officer and Professors enlightened the students and staff of the Institute about the importance of the occasion.

## VIGILANCE AWARENESS WEEK:

Activities under “Vigilance Awareness Week” were taken up from 31<sup>st</sup> October to 5<sup>th</sup> November, 2016. The Director administered the oath to the staff and the students. During the week debate and essay competition were also organized on this occasion.

