



# Presentation on Activities of **NATIONAL SUGAR INSTITUTE KANPUR (INDIA)**





# HISTORY OF THE INSTITUTE



- The Government of India established the Imperial Institute of Sugar Technology at Kanpur in October, 1936, by taking over the sugar section of Harcourt Butler Technological Institute, (H.B.T.I) Kanpur. The name of the Institute was later changed to Indian Institute of Sugar Technology (I.I.S.T.), and then again to National Sugar Institute (N.S.I) in 1957.
- Presently it is working under administrative control of Ministry of Consumer Affairs, Food and Public Distribution, Department of Food & Public Distribution. The institute is primarily a teaching institute engaged in various academic, research and consultancy activities.
- The institute serves specifically the sugar and ethanol sector to meet their requirements of technical man power, technical know how and to facilitate quality control. It also assists central and state governments by providing technical inputs.



# ORGANIZATIONAL SET UP (DIVISIONS)



- Sugar Technology
- Sugar Engineering
- Chemical Engineering
- Instrumentation Engineering
- Design & Development
- Organic Chemistry
- Physical Chemistry
- Agriculture Chemistry & Farm
- Bio Chemistry
- Survey & Information
- Consultancy Division
- Experimental Sugar Factory
- General Administration



# MAIN FUNCTIONS



## Teaching

- To provide applied knowledge in Sugar Tech., Sugar Engg., Alcohol Tech. & other related disciplines.

## Consultancy

- To provide consultancy to sugar & allied industries on various technical aspects.

## Sugar Standards

- To provide sugar standards for quality control of marketable sugar in India.

## Research

- To carry out applied research on the issues related to the sugar & allied industry.



# FUNCTIONS OF THE INSTITUTE



## TEACHING :

1. At present, institute conducts 06 PG Diploma and 03 Certificate level courses. These courses are in Sugar Technology, Sugar Engineering, Alcohol Technology and other related disciplines. Institute also conducts Fellowship Programmes for conducting research in relevant discipline.
2. No. of seats have been increased in Alcohol Technology, Sugar Engineering and Quality Control courses from academic session 2022-23 to cope up with the requirement .
3. Short Duration Customized Training Programmes and Executive Development Programmes are regularly conducted on areas of processing, by-product utilization, energy & water conservation, effluent treatment, quality control, project management and modernization etc.
4. Institute has MoU's with other institutes situated in Egypt, Nigeria and Indonesia for conducting training programmes for their in service personnel and other academic purposes.



# DETAIL OF COURSES

## (Academic year 2022-23)



(No. of seats in brackets)

Research Programme/ Fellowship Courses	Post Graduate Diploma Courses	Certificate Courses
Fellowship of National Sugar Institute in Sugar Technology or Sugar Chemistry	ANSI (Sugar Technology) Associate-ship of National Sugar Institute in Sugar Technology. (66)	SECC Certificate Course in Sugar Engineering. (17)
Fellowship of National Sugar Institute in Sugar Engineering	ANSI (Sugar Engineering) Associate-ship of National Sugar Institute in Sugar Engineering. (40)	SBCC Certificate Course in Sugar Boiling. (63)
Fellowship of National Sugar Institute in Fermentation Technology	DIFAT Diploma in Industrial Fermentation and Alcohol Technology ( 50)	CCQC Certificate Course in Quality Control (30)
	DSPMM Diploma in Sugarcane Productivity & Maturity Management (20)	
(For research/fellowship, no. of seats are as per availability of faculty and scholars already working under them)	DIPC Diploma in Instrumentation & Process Control (17)	
	DQCES Diploma in Quality Control and Environmental Science. (22)	



# MAN-POWER TRAINED (Till Academic year 2022-23)



Name of the Courses	Indian	Foreign	Total
Ph.D.	140	1	141
Fellowship of National Sugar Institute in Sugar Technology or Sugar Chemistry/Sugar Engineering/Fermentation Technology	53	01	54
Associateship of National Sugar Institute in Sugar Technology	3504	80	3584
Associateship of National Sugar Institute in Sugar Engineering	752	29	781
Post Graduate Diploma Course in Sugarcane Productivity & Maturity Management*	349	05	354
Post Graduate Diploma Course in Industrial Instrumentation & Process Automation*	58	1	59
Post Graduate Diploma in Industrial Fermentation and Alcohol Technology	1292	15	1307
Certificate Course in Sugar Engineering	419	17	436
Certificate Course in Sugar Boiling	2552	32	2584
Certificate Course in Quality Control	152	--	152
Total	9271	181	9452

\*Earlier conducted as Certificate Course.





# Customized Training Programmes



- ▶ # Institute also conducts Executive Development Programmes / Refresher Courses / Short Term Training Programmes etc. for enhancing the knowledge of in-service personnel working in Indian sugar factories & distilleries about the recent technological developments.
- ▶ # Institute organizes Customized Training Programmes for the technocrats of other countries too. Such training Programmes were organized for Trainee Engineers & Technologists of NSDC Nigeria, M/s West Kenya Sugar Co. Ltd., Kakamega, Kenya, Distillery Personnel of M/s Army Welfare Project (Centennial and Gelephu Distilleries), Bhutan, Faculty of Sugar Research Institute, Sri Lanka, Technologists & Engineers of M/s Suntia Gold Estate Ltd., Nigeria and in-service Chemical Engineers of M/s Yemen Company for Sugar Refining, Yemen.







## Seminars/Conferences/ Workshops



- # The institute continuously endeavors to bring about a change in the technological and economical scenario of the sugar and allied industries by addressing their problems, creating awareness about newer technologies and suggesting ways & means for value addition through by-product utilization.
- # To do so the institute regularly organizes various Seminars / Workshops / Brain Storming Sessions at institute and various other places to create awareness and to discuss & deliberate on various such important issues.
- # Students of the institute also get chance to attend these seminars and conferences and thus hear views of eminent experts to enrich their knowledge.





# FUNCTIONS OF THE INSTITUTE



## CONSULTANCY :

1. To render technical consultancy to sugar factories and ethanol units etc. on various technical matters viz. setting up of new plant, expansion and modernization, productivity enhancement, energy & water conservation, effluent treatment and value addition etc.
2. Due to the technical manpower provided and consultancy rendered by the institute, the Indian Sugar Industry is now at par with advanced sugar producing countries in respect of technical efficiencies, loss of sugar during processing & sugar quality etc.
3. Institute also carries out validation of sugar diversion process in sugar factories and ethanol units.
4. Validation of sugar and ethanol units is also carried out for effluent treatment on behalf of CPCB.
5. Institute also undertakes performance assessment of co-generation plants on behalf of MNRE.

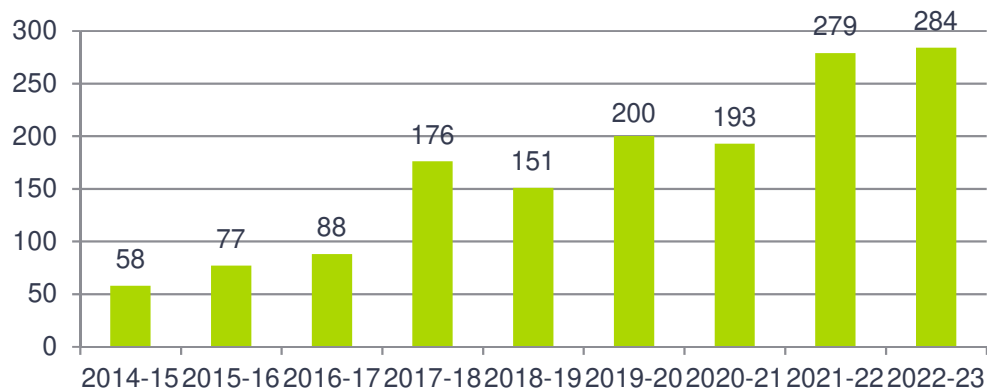


# FUNCTIONS OF THE INSTITUTE



## CONSULTANCY :

Besides, technical advice to sugar and ethanol units on various matters, analytical services are also being offered by the institute through its NABL/BIS accredited laboratory and during 2022-23, over 80 units availed the services.



■ No. of Consultancies



# FUNCTIONS OF THE INSTITUTE



## RESEARCH:

1. R&D work is being carried out at the institute on development of newer processes for sulphur-less sugar production, development of value added products from by-products and on innovative techniques for reducing fresh water consumption in sugar and ethanol units.
2. Based on research activities, research papers are published in National and International journals of reports and also presented in various National and International conferences. The efforts have been recognized by conferring prestigious Noel Deer Gold Medal, Bansi Dhar Gold Medal and Industry Excellence Award etc.
3. Many patents on development of Vanillin, Alkyl Levulinate, Graphene Oxide from bagasse and on innovative technique for effluent treatment etc. filed during the last couple of years.



## Current Research Topics



- ☐ Comparative study of different varieties of sweet sorghum and sugar beet for assessment of productivity and ethanol yield.
- ☐ Use of intermediate molasses as “Edible Molasses” after clarification.
- ☐ Studies on use of “Reverse Osmosis” technique for concentration of sugarcane juice.
- ☐ Utilization of Sodium Meta bi-sulphite (SMBS) as an alternate to Sulphur di-oxide gas for clarification of sugarcane juice.
- ☐ Studies on Pre- clarification of sugarcane juice through centrifugation.





# Current Research Topics



- ☐ Utilization of CO<sub>2</sub> from distillery fermenters for clarification purposes.
- ☐ Production of bio-char from bagasse and its utilization in sugar melt and waste water purification.
- ☐ Production of liquid sugar/ low G.I. liquid Sugar directly from sugarcane juice.
- ☐ Fortification of sugar with vitamin “A” and other nutrients by co-crystallization.
- ☐ Utilization of potash rich ash from incineration boilers of distilleries for production of bio-fertilizer.
- ☐ Development of cost effective technologies for waste water treatment.





## RESEARCH PAPERS & PATENTS



### Patents filed during last five years:

- **Development of “Electro-coagulation Process” for purification of waste water.**
- **Method for “determination of phosphate in cane juice” by a novel method.**
- **Production of “Graphene oxide” from by product of sugar factory.**
- **Technology for production of “Bio-methane & Bio-CNG from filter cake.**
- **Production of “surfactants from bagasse”.**
- **Production of “fortified amorphous sugar through co-crystallization”.**



# FUNCTIONS OF THE INSTITUTE



## DEVELOPMENT OF SUGAR STANDARDS:

On behalf of Bureau of Indian Standards while new standards are formed, existing standards for various sugars are also reviewed from time to time.

The institute also issues set of sugar standards, in physical form, for every sugar season for marketing of plantation white sugar in the country.





## FACILITIES DEVELOPED RECENTLY...



- ▷ Conversion of conventional class rooms to SMART class rooms.
- ▷ Wi-Fi Campus.
- ▷ Construction of Auto-cad, Environment Science and Instrumentation Engineering laboratories. Renovation of other laboratories to perform analysis as per ICUMSA and AOAC protocols.
- ▷ Construction of “Analytical Laboratory” having NABL and BIS Accreditation.
- ▷ Addition of “Mini Sugar Refinery” at the Experimental Sugar Factory of the institute.
- ▷ Construction of a “Special Sugar Division” to train students on production of flavoured and other sugars.
- ▷ Setting up of a Nano Ethanol Unit and Nano Brewery.
- ▷ Creation of Library facilities at hostels.
- ▷ Construction of new hostels and training centre.





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YOU