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VASANTDADA SUGAR INSTITUTE
Manjari (Bk.) Tal. : Haveli, Dist. : Pune - 412 307, Maharashtra, India.

Page No. 346

Name of the meeting: **Technical Committee Meeting**

Date of Meeting: 20 November 2020

Time: 9.30 AM

Sr. No.	Name	Designation	Signature
1	Mr. Narendra Murkumbhi	Chairman	-sd-
2	Mr. Dilip Walse Patil	Member	-sd-
3	Mr. Shankarrao Kolhe	Member	-sd-
4	Mr. Vijaysingh Mohite Patil	Member	-sd-
5	Mr. Jayant Patil	Member	-sd-
6	Mr. Balasaheb Thorat	Member	-sd-
7	Mr. Indrajit Mohite	Member	-sd-
8	Mr. Vishal Patil	Member	-sd-
9	Mr. Diliprao Deshmukh	Member	-sd-
10	Mr. Arvind Gore	Member	-sd-
11	Mr. Madan Bhosale	Member	-sd-
12	Mr. Arun Lad	Member	-sd-
13	Mr. Ganapatrao Tidke	Member	-sd-
14	Mr. Rohit Pawar	Member	-sd-
15	Director General, VSI	Member	-sd-



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Reply to be sent on the name of Institute and not on individual's name.





वसंतदादा शुगर इन्स्टिट्यूट

पंजाब (ड.), ता. हवेली, जि. पुणे - ४१२ ३०४, महाराष्ट्र

पान क्र.:

346

संस्थेचे नांव : एफिसिअल कॅम्पिगि समा.

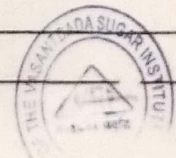
क्रमांक :

दिनांक : १० नोव्हें. २०१२ वेळ : स. ९-३० पत्थक : वि. एस्. जाय्. काय विद्या, मंडळारि पुणे

अ.क्र.	नांव	संस्थेचे नांव व हुदा	सही
१	मा० नरेंद्र सुरकुंबी	उपस्थ	
२	मा० विरपि वलसे पाटील.	सदस्य	
३	मा० रांकराव केवळे.	सदस्य	
४	मा० विजयसिंह मोहिते पाटील.	सदस्य	
५	मा० जयंताशक पाटील.	सदस्य	
६	मा० काकासाहेब मोरान	सदस्य	
७	मा० इंद्रजित मोहिते.	सदस्य	
८	मा० विगाड पाटील.	सदस्य	
९	मा० दिलीपराव देवमुख	सदस्य	
१०	मा० अरंजिराव गोरे.	सदस्य	
११	मा० मदन मोसले.	सदस्य	
१२	मा० अरुण लाड	सदस्य	
१३	मा० गणपतराव निडके.	सदस्य	
१४	मा० अशोक पवार	सदस्य	
१५	मा० महासंचालक, वि. एस्. जाय्.	सदस्य	

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Proceedings of the Technical Committee Meeting

The Technical Committee meeting was held on 19th November, 2020 for the review of completed experiments during 2019-20; ongoing technical performance of each experiment and future research program for 2020-21 of each Department and Section. Following members were present during this meeting-

1. Shri. Narendra Murkumbi, Chairman
2. Shri. Vijaysinha Mohite-Patil, Member
3. Shri. Shivajirao C. Deshmukh, Director General, VSI,
4. Dr. Indrajit Mohite, Member
5. Shri. Vikas Deshmukh, Director, Agriculture Sciences and Technology, VSI

Shri. Shivajirao Deshmukh, Director General, VSI, Pune welcomed Shri. Narendra Murkumbhi, Chairman of the Technical Committee and Members of the Technical Committee. The following is the proceeding of the meeting

1. Sugar Engineering Department

Shri. R. A. Chandgude, Head, Sugar Engineering Dept. briefed about R& D project activities.

Following need based applied R&D projects of 2019-20 were discussed-

Sr. No.	Project title	Engineers associated	Duration of the Project
1	Best practices of power saving in sugar and co-generation plants. (Jawahar SSK)	R A Chandgude, P G Patil, D N Shitole, U A Kulkarni, P U Deshmukh	Continued from last year
2	Study of distillery spent wash incineration boilers with alternative supporting fuels	R A Chandgude, P G Patil, U A Kulkarni, P U Deshmukh, S P Nalawade, A B Kotkar, S S. Sripatnala AT & Bio fuels Dept.	Continued from last year (2 years)
3	Study of 100TBD sugar beet pilot project at Baramati Agro Ltd.,	R A Chandgude, S B Thorat, P G Patil, P U Deshmukh, S P Nalawade, A B Kotkar, R P Takale, Sugar Technology Dept.	Continued from last year (2 years)
4	Optimization of imbibition to improve mill performance	R A Chandgude, S S. Sripatnala, D N Shitole, P U Deshmukh, P G. Patil and Sugar Technology Dept	2 years

Project 1: Best practices of power saving in sugar and co-generation plants.

In last technical committee meeting which was held on 28th February 2020, Hon'ble Chairman of technical committee suggested to study the steam% on cane and power consumption per tonne of cane for M/s Jawahar SSK under research project "Best practices of power saving in sugar and co-generation plants.

Head, Sugar Engineering Department presented in detailed on steam % on cane and power consumption of Jawahar SSK and also discussed on previous study carried out on power consumption per tonne of cane with Jawahar SSK.



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Conclusion:

Hon'ble Chairman and committee members appreciated the work done under this project and concluded the project. Also advised to circulate the findings and recommendations to all member sugar mills.

Project 2: Study of distillery spent wash incineration boilers with alternative supporting fuels

The project activities and work done presented on "Study on distillery spent wash incineration boilers with alternative supporting fuels" for travelling grate incineration boilers with bagasse as supporting fuel. The committee reviewed the data presented on both fluidized bed combustion and travelling grate incineration boilers with coal & bagasse as supporting fuel respectively.

Conclusion:

The committee suggested to make the outline for performance parameters for both the technologies in brief after deriving conclusion of research study.

Project 3: Study of 100TBD sugar beet pilot project at Baramati Agro Ltd.,

Conclusion:

The committee suggested to study this project at 50%, 75% and 100% capacity utilization with sugar beet juice for ethanol production.

Project: 4 Optimization of imbibition to improve mill performance.

In the crushing season 2020-21 necessary data shall be collected & analyzed. Findings of this project shall be presented before next technical committee meeting.

Proposed R & D projects for year 2020-21

The following R & D projects has been proposed for approval before committee

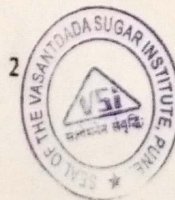
Sl. no.	Project title	Period of the Project	Engineers associated
1	Study of combustion control system of bagasse fired boiler for sugar and cogeneration plants.	2 year	R A Chandgude, D.N. Gare, P G Pati S.B. Thorat P U Deshmukh, S Nalawade, D.N. Shitole, S.C Kaduskar, A B Kotkar.
2	Study the performance of milling and sugar processing for manual Vs mechanically harvested cane.	2 year	R A Chandgude, S B Thorat, U.A. Kulkarni, P G Patil, P U Deshmukh S P Nalawade, D.N. Shitole, A B Kotkar & Sugar Technology Dept.

Project-1 Study of combustion control system of bagasse fired boiler for sugar and cogeneration plants

Committee suggested to ensure the installation of all control system components in combustion control loop in the selected sugar mills and also suggested to calibrate all instruments before collection of data.

The committee approved the project for further study.

Project: 2 Study the performance of milling and sugar processing for manual Vs mechanically harvested cane



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Committee suggested to survey papers published in various international journals and conference proceedings about mechanical Vs manual harvested cane impact on milling and sugar processing.

The committee asserted to submit the said literature study before technical committee within 15 days.

2. Sugar Technology Department

The highlights of R & D Projects carried out by department during the year 2020-21 were presented by Dr. V .P. Sidanale, Senior Sugar Technologist. All the technologists of sugar technology department were present during this presentation. The progress of all the projects was presented by concerned principle scientist of each project.

The details of each project and comments given by Hon'ble Chairman and members of technical committee are as follows.

Project No.1: Clarification of intermediate molasses for better keeping quality of sugar & minimize the scaling problem at distilleries.

The work carried out during the year 2020-21 of this project was presented by Mr. R. R. Patil. He told that the plant scale trails are going to conduct during crushing season 2020-21 at M/s Kranti Agrani Dr. G.D.Bapu Lad SSK and M/s Dr. Patangrao Kadam Sonhira SSK. Presentation regarding installation of clarifier and other necessary modifications are given by him. Tentative starting of trials is also informed. The committee expressed happiness on the work done so far in this project.

Project No.2: Reduction of conductivity, ash % and colour in sugar at centrifugal station.

The data on this project was presented by Dr .V. P. Sidanale. During presentation Committee enquired the reasons of higher sugar colour achieved by many sugar factories during crushing season 2019-20. The committee also asked the necessary changes are to be made while diverting BH molasses for ethanol production. He discussed the reduction in total steam saving while diverting BH molasses as well as necessary modifications required at evaporator to get desired syrup brix. The committee was kin to understand the objectives of this project and how the sugar colour is affected due to diversion of BH molasses. Finally the committee advised to continue the work in more sugar mills with exhaustive technical data and final conclusions are to be drawn based on it.

Project No.3: Reduction of sugar loss in filter cake and optimization of operation of rotary vacuum filter.

The progress of work under this project was presented by Dr. V. P. Sidanale. He told that preliminary study was conducted during last crushing season. For further studies during this crushing season two sugar mills viz. M/s Malegaon SSK and M/s Dr. Patangrao Kadam Sonhira SSK are selected. The off season visits to these mills are paid to carry necessary modifications required to take individual vacuum filter in line. The indent of flow meters is given; the tentative work of study will be started in the month of Jan 2021. Finally, committee informed that being sugar loss took place in filter cake is going to be controlled. This is important project and concrete conclusions are expected from this study.

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Project No.4: Effect of Juice composition on clarification.

The status of project was presented by Dr R.N. Bhosale. He briefed the data of different parameters of cane juice collected for two sugarcane varieties during crushing season 2019-20. The committee asked the difference between the study taken during last crushing season and planned for ensuing crushing season. Is there any changes made in both the studies and after taking data how it will be implemented in sugar processing. All these queries are cleared by sugar technology department. Dr. Bhosale also presented this year work plan. The committee suggested continuing the project till getting the concrete results.

Project No. 5: A study on shelf life of white sugar with respect to storage at varying relative humidity and temperature.

The status of project was presented by Dr R.N. Bhosale. He informed that both the stability chambers are not working properly from Feb 2020. After doing AMC with the supplier and repairing many times by replacing some of parts the working performance of the machines is not improved. The issue was discussed in detailed and committee agreed to give legal notice to the supplier and to continue this project one new stability chamber is to be purchased immediately. The committee also suggested to select proper stability chamber and supplier. The enquiry of proper stability chamber is to be made exhaustively, if required imported suppliers are to be verified instead of local manufactures. The committee suggested that being the important topic, continuing the project till getting the concrete results.

Project No. 6: Study of nature of scale with respect to quality of water used for cultivation of cane in the basin of Mula, Mutha and Nira rivers

The status of project was presented by Mr. S. D. Borawake. He briefed that this is new project started by the approval of committee since April 2020. Two visits are paid to M/s Sant Tukaram SSK and M/s Nira Bhima SSK for collection of soil, raw water and scale data. The analysis work is in progress. The detail work plan for the year 2020-21 was presented by him. The committee suggested being new topic, continuing the project till getting the concrete results.

Committee appreciated the presentation done by Sugar Technology Department.

List of approved R & D Projects from Sugar Technology Department for year 2020-21

1. A study on shelf life of white sugar with respect to storage at varying relative humidity and temperature.
2. Need of clarification of intermediate molasses for better keeping quality of sugar & minimize the scaling problem at distilleries- plant scale.
3. Reduction of conductivity ash % and colour in sugar at centrifugal station.
4. Reduction of sugar loss in filter cake and optimization of operation of rotary vacuum filter.
5. Effect of juice composition on clarification.
6. Study of nature of scale with respect to quality of water used for cultivation of cane in the basin of Mula, Mutha and Nira rivers

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3. ALCOHOL TECHNOLOGY & BIOFUELS DEPARTMENT

The R & D programme of the Department of Alcohol Technology & Biofuels for the year 2019-20 and 2020-21 was briefed by Dr. K. S. Konde, Technical Adviser and Associate Professor, Department of Alcohol Technology & Biofuels. He informed the committee regarding completion of two projects of 2019-20 and six ongoing projects in the year 2020-21. He also informed regarding the acceptance of proposal of a new project by RGSTC. The list and the details of the discussions on these projects are given below,

1. Recovery of potash from incineration boiler ash and its utilization in agriculture

(PSA to Gol)

Comments:

- Mr. D. A. Patil informed regarding the completion of the project with its detail achievement along with developed process for potash recovery.
- He informed regarding the next phase planning for pilot scale trials on potash recovery.
- Mr. Patil also informed to the committee regarding the filing of an Indian patent (202021049490).
- Mr. Patil informed to the committee regarding the earlier positive interest shown by R. K. Agro for technology transfer.
- Hon. D.G., VSI, informed committee members about current status of project. He also told that R. K. Agro has not signed the MOU and NDA with VSI due to his certain reservations. R. K. Agro is expected to come back to VSI on future action plan on this technology.
- Mr. Patil requested for suggestions from the committee members regarding the Technology Transfer. Committee member suggested to look for member sugar mill for its Technology Transfer.

2. Evaluation of pilot scale plant performance of molasses pre-clarification to improve alcoholic fermentation.

Comments:

- Mr. S. A. Patil informed regarding the completion of the project with its detail achievement.
- He summarized outcome of pilot scale trials for pre-clarification of C- Molasses and B-Heavy molasses.
- Mr. Patil also informed about one published Indian patent (201821039366) and one filed US Patent (16/850,281) for the developed technology.
- He also informed regarding the earlier positive interest shown by M/s. E.I.D. Parry (India) Limited, Nellikuppam, Tamilnadu to re-locate the pilot plant at their distillery unit with their own expense. However, EID Parry is now not willing to adopt this technology and has kept above proposal on hold.
- Mr. Patil requested the advice of technical committee members regarding either commercialize this Technology or licensing this technology to Technology Providers on royalty basis.
- Committee advised to look for member sugar mills for commercialization of this technology.

3. Valorising waste from sugarcane industries via innovations in pre-treatment, bio-transformations and process intensification (Indo-UK collaborative project)

Comments:

5



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- Dr. K. S. Konde started his presentation with the explanation of vWaproject concept and the role of VSI in the project.
- He told that lactic acid concentration of 98 g/l. and 100 g/l. was achieved using 2G (alkali treated enzyme hydrolyzed bagasse) and synthetic media, respectively.
- He also explained about the achievement of 170 m³ biogas production per ton of PMC.
- Dr. Konde also informed regarding feasibility of the recycling of 50% alkali used during pretreatment of bagasse for the process of lactic acid production.
- Dr. Konde also informed regarding four papers published in different International Journals, submission of one manuscript and one chapter and filing of one provisional patent (No: 202021008352) as the output of the project.
- Dr. Konde also informed to the committee about the pilot scale trials (50 M³) of anaerobic digestion to be conducted at Nira Bhima SSKL and butanol recovery work under progress.
- The committee members allowed to continue the project.

4. Second generation ethanol production through enzymatic route and/or using genetically modified microbial strains

Comments:

- Dr. K. S. Konde described about the objectives and current status of the project.
- He explained about the optimization of 2G ethanol process from bagasse on 30 L scale with yield of 158 L/MT of dry bagasse.
- Dr. Konde informed regarding the advantage of using 2G spent wash for biogas production. He informed regarding the achievement of 250 M³ per ton of xylose (170 M³ per ton of VS) on 10 L digester scale which will definitely improve the process economics.
- Dr. Konde informed to the committee regarding the 50-60% production cost which is due to mainly use of imported enzymes. He informed regarding the collaboration with Ion Exchange India Pvt. Ltd. for designing of the lab scale enzyme recovery unit and further installation of the unit before December 2020.
- The committee members approved for the above mentioned proposed work.

5. Biomethanation of cellulosic waste (VSI)

Comments:

- Mr. R. V. Burase explained the process for pretreatment and biomethanation from cellulosic waste.
- He informed regarding the biogas yield which is 165M³ per ton of bagasse at 200 L scale.
- He explained the cost economics of production of CBG from PMC and SCB.
- He informed to the committee regarding the future work on optimization of co-digestion of PMC and bagasse for biomethane production on 20L scale.
- He told that two pilot AD digesters (50 M³) will be installed at Nira Bhima SSKL. Funding of Rs. 35 lakhs has been approved by Nira Bhima SSKL. The MoU was signed between VSI and Nira Bhima SSKL for pilot scale AD trials. Bagasse and PMC pilot scale AD trials will be conducted after installation of AD at Nira Bhima SSKL.
- The committee approved for the above mentioned proposed work and its continuation.

6. Microbial process for gluconic acid production



- Dr. S. Behera started his presentation with project objectives and applications of gluconic acid.
- He informed regarding the purchased of the fungal cultures and joining of Research Assistant from July 2020.
- Dr. Behera informed that Gluconic acid is being produced from sugar/molasses/sugar cane juice using the fungal strains of *Aspergillus niger*.
- The committee members suggested to speed up the project work for its completion within the time and approved the continuation of project.

7. Process development for invert sugar production

- Dr. S. Behera started his presentation with project objectives and applications of invert sugar.
- He informed regarding the experiment on the optimization process for inversion of sucrose and sugarcane juice using acid and invertase enzyme. He told that they got 98% of inversion efficiency by using both the methods.
- He also informed regarding the success in purification of invert sugar through separation of acid.
- He further informed that enzymatic syrup inversion study will be undertaken. Validation of sugar and syrup inversion will be conducted on 5 L scale.
- The committee approved for the above mentioned proposed work and continuation of project.

8. Water mining-Next generation water-smart management systems: Large scale demonstrations for a circular economy & society

- Dr. K. S. Konde informed to the committee regarding the start up of the project from September 2020.
- He also informed regarding the involvement of 10 technical universities (including VSI) and 29 technology partners from different countries. VSI is the only Indian partner in this project.
- He informed regarding the kick-off meeting of Water-Mining project which was held on 26-27th October 2020.
- He also told that testing and operation of lab scale demo unit and pilot scale unit at sugar mill/VSI (India) will be accounted in the budget of TU Delft, Netherlands.
- Dr. Konde informed to the committee that VSI will be involved in the project for case study application.
- The committee members approved for continuation of project. Committee appreciated the project by highlighting scope for VSI in future collaboration with EU.

9. Green solvent assisted recovery of wax from press mud cake and use of dewaxed pressmud for biocomposting (vermiculture) to make green fertilizer

- Dr. K. S. Konde informed to the committee regarding the project presentation which was given to Project appraisal committee (PAC), RGSTC on 11th March 2020.
- He also informed regarding the revision of the project proposal by incorporating economic viability which was submitted to RGSTC on 1st June 2020. VSI has submitted project proposal to RGSTC by revising the cost from Rs.91.93 lakhs to Rs. 70.37 lakhs.
- He also informed that project was approved by RGSTC and the project is in the final grant approval stage.



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- Dr. Konde also presented about the objectives of the project.
- The committee members aligned for conducting the project after receiving grant approval.

4. Environment Science

Dr. Deepali Nimbalkar presented the work of the department. At the beginning, the Chairman, asked about the flue gas generation from spent wash incineration plants. The committee also reiterated the issue with the comment that after ZLD the focus would shift to emissions from incineration and this would create problems for the industry in future. The committee was informed that a research proposal on the issue was being prepared and asked the department to take up this work.

Dr. Nimbalkar presented the work done on following two ongoing projects

- **Integrated treatment system for sugar mill effluents with a focus of spray pond overflow:**

Treatment with optimum dose of chitosan followed by algal shows better results as compared to bacterial treatment.

Experiments were also carried out at BARC and some experiments are in progress.

Experiments are in progress using advanced nano-oxidation technology for the treatment of sugar effluents – if successful this could help in reducing the footprint of sugar ETP

The committee allowed to continue the project

- **Assessment of workplace air quality in various sections of a sugar mill/allied units:**

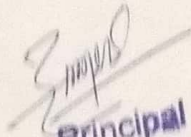
Periodical sampling of indoor air pollutants at M/s. Shreenath Mhaskoba SKL for particulate matter, for PM₁₀ and PM_{2.5} in Sugar manufacturing unit and Distillery unit. CO₂ sampling was done in fermenter section when fermenter is closed and opened for adding TRO. PM₁₀ values were found higher at sugar-packaging house, mill section, wet scrubber area, finish products storage tank area and PM_{2.5} values was high at most of the sampling locations due to suspended particles, lighter than air hence efforts need to be taken to reduce these. At the fermentation area when fermenters are opened for adding TRO, CO₂ emission from tank are higher than closed tanks.

Further Study: Monitoring of areas for PM₁₀ & PM_{2.5} in different sugar mills. Earlier study had revealed the high levels of SO_x in sugar godown /storage therefore monitoring of areas with high levels of SO_x in different sugar mills and distilleries is to be done. BOLD questionnaires will be collected from workers who are exposed to these polluted areas in forthcoming season

The committee permitted to continue the work. It is also asked to study the CO₂ emission from fermentation in comparison with boiler emissions

The committee approved a new project was proposed on "Assessment of noise levels in various sections of a sugar mill/allied units" with the following objectives

- Monitoring the noise levels in different units of a sugar mill & distillery
- Analysis the impact of high noise levels and identification of measures to minimize its impact


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