

3.5.1. Number of functional MoUs/linkages with institutions/industries in India and abroad for internship, on-the-job training, project, student/faculty exchange and collaborative research during the last five years

Activities under MoU with COEP & CMET

Activity scope:

1. To promote research interaction between both parties in the different area/subject
2. Mutually discussion and selecting need based on applied research project

Activity details:

- ✓ The activity under both MoU with COEP is belongs to the year 2021-2022 after signing of MoU on 4th January 2022.
- ✓ The activity under both MoU with CMET is belongs to the year 2022-2023 after signing of MoU on 21st July 2022.
- ✓ After signing MoU with COEP & CMET, project was effectively started.
- ✓ Research under the following objectives with COEP was undertaken
 1. To collect data for ethanol fermentation
 2. To develop model for fermentation process using collected data & AI techniques
 3. To monitor fermentation process using AI
 4. To validate & implement AI strategy for distillery fermentation using lab scale learning
- ✓ Research under the following objectives with CMET was undertaken
 1. To develop protocol for nano-catalysts based hydrogen production for different feedstock (spent wash, bagasse, press mud cake, methane from biogas)
 2. To evaluate the efficiency and yields of developed Nano-catalysts for different feedstock for hydrogen production
- ✓ Other communicated with COEP & CMET related to project like report sending, meeting, minutes of meeting etc. is attached with this report.

MINUTES OF MEETING

Date: 29/04/2023

Venue: Vasantdada Sugar Institute, Pune
Date : 24th April 2023

A meeting was convened at VSI, Pune by the Hon. Advisor Sir & Hon. DG Sir, with all HODs on 24th April, 2023 for taking review of the on-going collaborative R & D projects with COEP and C-MET.

Following Members Present for meeting

VSI

- Shri. Shivajirao Deshmukh, Advisor
- Shri. Sambhaji Kadupatil, Director General
- Shri. SC Gurav, IAO
- Shri. Shivaji Khengare, CA
- Shri. RA Chandgude, TA & Head, SE
- Dr. KS Konde, TA & Head, AT & Biofuels
- Dr. Deepali Nimbalkar, Head, Environmental Science
- Dr. PS Deshmukh, Head, Soil science & Micronutrient unit
- Shri. PP Shinde, Scientist & Head, Agriculture Engineering
- Shri. DN Gare, Head, Instrumentation
- Shri. ST Chavan, Technical Advisor, ST
- Shri. S. Panda, ST
- Shri. Dr. Shuvashish Behera, Scientist, AT & Biofuels

The minutes of meeting is attached for approval please.

Handwritten initials
29/4

Handwritten signature
29/4/2023

Submitted for approval please

Handwritten initials
29/4

Handwritten signature
29/4



Handwritten signature

Vasantdada Sugar Institute
Pune
29/4/2023

Summary of R & D Projects ongoing with COEP & CMET

#	Particulars	Qty
A)	No. of sanctioned projects ongoing with COEP in GC meeting on 21/01/2023	13
B)	No. of sanctioned projects ongoing with CMET in GC meeting on 21/01/2023	02
C)	Total Projects (I)	15
D)	No. of Projects on HOLD ongoing with COEP	03
E)	No. of newly sanctioned projects with COEP in GC meeting on 30/03/2023	02
F)	Total Projects Sanctioned with COEP (A+E)	15
G)	Total Projects Sanctioned with COEP & CMET (E+B) $(f+L)$	17

Type text here



[Signature]
Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Haveli,
Dist. Pune - 412 307

Details of Stipend paid to RA Students:

Total 04 RA Students stipend paid till date against 03 Projects as below,

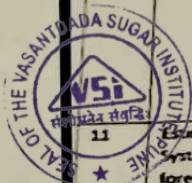
Project No.	Name of Project	VSI Dept.	Name of RA Students	Note For Payment From SE Dept.	Stipend Paid
1.	Investigation of combustion, performance and emission characteristics of an alcohol fuelled (ethanol & methanol) CRDI diesel engine.	SE & AT	Mrs. Pradnya Patil (S. Y. M. Tech)	On 14/02/2023, Against Manpower Rs. 99,200/- (For 08Month, Rs. 12,400/- month)	Rs. 49600/- For the period 01/10/22 to 31/01/2023 for 4 months.
2.	Study of the Combustion Control System of Bagasse Fired Boiler for Sugar and Cogeneration Plant.	SE	Mr. Anirudha Deepak Govekar (M. Tech)	On 14/02/2023 Against Manpower Rs. 99,200/- (For 08Month, 12,400/- month)	Rs. 49600/- For the period 01/10/22 to 31/01/2023 for 4 months.
3.	Development of Bulging rate of tube testing system & predicting remaining life of tube placed in high temperature zone.	SE	1) Mrs. Sweta Vinayak Deshmukh (PhD Student) 2) Mr. Chakarwari Pralahad Khtele (M Tech)	On 14/02/2023, Against Manpowers Rs. 4,46,400/- (For 10Month, 25,000/- & 12,400/- month)	Rs. 37500/- For the period 15/12/22 to 31/01/2023 for 1.5 months Rs. 18600 For the period 15/12/22 to 31/01/2023 for 1.5 month
				Total stipend paid	Rs. 1,55,300/-

PROJECT-WISE STATUS

Sr. No	Name of Project	VSI, Dept.	Associated Member	Mode of execution	Project Duration/ Start & completion Date	Discussion, Instructions & Remarks
1	Life Assessment of Roller Chain for Sugar Industry	SE- R A Chandgude	Dr. P.S. Shinde	One S. Y. M Tech student is working (Mr. S R Ingale)	1 Year 01/10/2022	<ul style="list-style-type: none"> ➤ Discussed on progress and next activity ➤ Completed the first part of the project, which involved the static analysis of each part of the roller chain using FEA (Finite Element Analysis) (Ansys) as well as theoretical formulation ➤ In second part of the project, focus on performing wear analysis of the roller pin and roller. This analysis is being conducted using both experimental techniques and FEA analysis on ANSYS ➤ For Experimental analysis COEP has identified Pin on Disc Machine which is available in COEP. ➤ The experiments performing on Pin on Disc machine is going on. ➤ In addition to the experimental analysis, conducted FEA of wear analysis by modelling the pin on disc in Ansys. ➤ The simulation to determine wear rate is going on and will present the results.
2	Treatment of sugar industry /distillery effluent using microbial fuel cell with bio electrode	ES- Dr. D.S. Nimbalkar	Prof. P.A. Sadgir Dr. Archana Thosar	Ph.D student is working	2 Year 01/10/2022 & completed up to 30th Sep. 2023	<ul style="list-style-type: none"> ➤ Experiments using sugar effluent in microbial fuel cell are in progress for the past two weeks. Max voltage of 135 mV was generated however COD reduction is less than 25 % during this period ➤ COEP has communicated the details of items to be purchased for the project. Chemicals and glassware have been indented. Other items like MFC reactors and other electrical consumables are to be indented in this week.
3	Optimization of salt removal from Saline water using bio-physio-chemical processes.	ES- Dr. D.S. Nimbalkar	Dr. P. A. Sadgir		1 Year 01/10/2022	Project on HOLD
4	Online colour measurement of clear juice using AI techniques	ST- Dr. R.V. Dani & Svi. Kakarla Gangadharan(ST)	Dr. M.S. Sutaone Dr. Archana Thosar Dr. P.P. Bartakke Dr. Sanjeev Tambe	M.Tech student is working. Two B.Tech students are working	2 Year 01/10/2022 & 30/09/2024	<ul style="list-style-type: none"> ➤ All the required material was received and handed over to COEP team for further necessary activity ➤ Total online measurement equipment's will be ready in all respect for juice analysis purpose up to 28/04/2023 as per discussion held with Dr. Archana Thosar- Dean R & D. COEP



Principal
Vasantdada Sugar Institute
Manjari (B.K.) Tal. Haveli,
Dist. Pune - 422 307



Principal
Vasantdada Sugar Institute
Manjeri (Sk.), Tal. Havelli,
Dist. Solapur - 412 307

9	Nano-catalyst assisted hydrogen production in sugar and distiller	AT. Dr. K.S. Konde	CMET	RA appointed & is working	2 Year 10-01-2022	<ul style="list-style-type: none"> ➤ Compositional analysis of feedstock materials such as Press Muds Cake (PMC), spent wash and bagasse is in process ➤ Feedstock samples submitted to CMET for preliminary study ➤ Project was effectively started from 1st Dec 2022 through appointment of RA ➤ Procurement of photo catalytic reactor status Purchase order released on 20th Feb 2023 and it will be installed by 30th April 2023 ➤ Initial experiments on spent wash decolorization were carried out to observe the activity of nanocatalyst (uncalcined TiO₂) provided by C-MET
10	Development of Bulging rate of tube testing system & predicting remaining life of tube placed in high temperature zone.	SE- RA Chandgude	Dr. P.R. Dhamangaonkar Dr. S. P. Butee	PhD student is working (Mrs. Sweta Deshmukh)	1 Year 15/12/2022 & 14/12/2023	<ul style="list-style-type: none"> ➤ Discussed on existing condition of progress ➤ Experimental Testing on metal samples of the tube will starts after getting Experimental Set up. ➤ Also Hon. Adviser suggested to identify the solution to reduce internal & external scaling of tube and avoid bulging. Also he suggested to use quality material. ➤ Hon. DG sir suggested to identify particular point in tube where bulging will accours. ➤ Equipment Purchase Status: 1) For Tube test set up - Negotiation was done with Lowest Vender & will release the PO shortly. ➤ 2) Thermal camera Accessories and software was received at COEP on 29/03/2023 and conduct the demo for same.
11	Estimation of Roof-top solar system in sugar mills & forecasting solar power generation.	SE- RA Chandgude	Prof. V.N. Pande Prof. A.G. Thosar Dr. Arti Tare	One M. Tech student is working (Mrs. M.V. Khaire)	1 Year 15/12/2022	<ul style="list-style-type: none"> ➤ For data collection, COEP RA student was visited at VSI on 27/03/2023 ➤ COEP used the data in which various parameters available and trained model, then tested it and from this model forecasted the day generation. The obtained RMSE value is 0.0058722. with this algorithm, estimate one day before prediction. ➤ Now the work is going on NWP technique to forecast ahead of 15 days. ➤ For forecasting the accurate value, metrological data is necessary
12	Solar PV cleaning system	SE- RA Chandgude	Prof. V.N. Pande Prof. A.G. Thosar Dr. Arti Tare	One M. Tech student is working (Mrs. M.V. Khaire)	1 Year 15/12/2022	<ul style="list-style-type: none"> ➤ For site survey of solar panel system, COEP RA student was visited at VSI on 27/03/2023. ➤ The COEP has decided the design to develop a cleaning system using pneumatic and hydraulic system because it will clean dry dust particles as well as sticky dust or debris. ➤ Now the prototype development is in progress.
13	Analysis of data collected by Remote advisory system & Machine learning	SE- RA Chandgude	Prof. S.D. Agashe Dr. D.N. Sonawane Dr. Archana Thosar		1 Year 15/12/2022 &	<p>Project on HOLD with COEP.</p> <p>But VSI project is going on.</p> <p>New software development is being done using Plant SCADA. This has functionalities for Trends, Alarms, and Notifications via Email, SMS, and</p>

						Events, with real-time data availability over the Internet. At present VSI/Strretto is setting up Server Grade computers for this purpose. With its Internet information server(IIS) functionality, monitoring of Screens using standard HTML format from any Mobile/Tablet/PC is possible.
14	To make charcoal from bagasse & sugarcane trash					Project on HOLD
15	Development of miniaturized NPK sensor using nanostructured materials.	SOIL- Dr. P Deshmukh	CMET		3 Year 01/10/2022	<ul style="list-style-type: none"> ➤ Potassium sensor developed by CMET at lab level. ➤ Validate the potassium reading sensor with traditional laboratory level at lab level (VSI) ➤ Action Pending: 1) Project submitted for funding to Ministry of Electronics and Technology (MeitY), New Delhi. Remark :1) Funds not received. 2) Manpower problem at CMET Institute.
16	Performance of enhancement of Rotary Rack Machine for sugar cane trash collection.	Agronomy Engg. - P P Shinde	Dr. N K Chaugule- Head & Asst Prof.	PhD student is working (Mr. Ghatge Krishna)		<ul style="list-style-type: none"> ➤ This project is sanctioned in GC meeting dt.30/03/2023. ➤ Prototype is developed by COEP. Further modifications are needed. ➤ The field trails will be conducted in coming crushing season.
17	Manufacturing of Construction Bricks from the Ash and Residue remaining after Recovery of Potash from Incineration Boiler ESP Ash	AT- Dr. K S Konde				<ul style="list-style-type: none"> ➤ This project is sanctioned in GC meeting on 30/03/2023. ➤ Team will visit Jaywant Sugar in the Month of May to see brick manufacturing facility from incineration boiler ash.

Principal
Vasantdada Sugar Institute
Manjeri (Bk.), Tal. Haveli,
Dist. Pune - 412 307



(S C Gurav)
Internal Audit Officer

(Sambhaji Kadupatil)
Director General

MINUTES OF MEETING

Date: 29/03/2023

Venue: Vasantdada Sugar Institute, Pune

Date :27th March 2023

A meeting was convened at VSI, Pune by the Hon. Advisor Sir, with all HODs on 27th March, 2023 for taking review of the on-going collaborative R & D projects with COEP and C-MET.

Following Members Present for meeting

VSI

Hon. Shri. Shivajirao Deshmukh, Advisor

Shri. S C Gurav, IAO

Dr. R V Dani, Head, ST

Shri. R A Chandgude, Head, SE

Dr. K S Konde, TA & Head, AT & F

Dr. Deepali Nimbalkar, Head, Environmental Science

Dr. P S Deshmukh, Head, Soil science & Micronutrient unit

Shri. D N Gare, Head, Instrumentation

Shri. R P Takale, Sr. Electrical Engineer (SE)

The minutes of meeting is placed below for approval please.

Submitted for approval please.

New
1/4

D/T

Deepali



Gomes
Principal
Vasantdada Sugar
Institute, Tal. Haveli,
Dist. Solapur - 412 307

PROJECT-WISE STATUS

Sr No	Name of Project	VSI, Dept.	Associated Member and Mode of execution	Project Duration/ Start & completion Date	Discussion, Instructions & Remarks
1	Life Assessment of Roller Chain for Sugar Industry	SE- RA Chandgude	Dr. P.S. Shinde Ph.D student is working	1 Year 01/10/2022	<ul style="list-style-type: none"> Discussed on progress and next activity For Experiments COEP have identified Pin on Disc Machine which is available in COEP The experiments performing on Pin on Disc machine is going on Starting work on FEA analysis of wear rate of roller pin and bush
2	Treatment of sugar industry Millinery effluent using microbial fuel cell with bio electrode	ES- Dr. D.S. Nimbalkar	Prof. P.A. Sadgir Dr. Archana Thosar Ph.D student is working	2 Year 01/10/2022 & completed up to 30th Sep 2023	<ul style="list-style-type: none"> COEP is yet to communicate the details of items to be purchased for the project. Sugar effluent for further experiments was brought from a sugar mill since crushing season will soon end however this is yet to be collected by them from VSI. They have also not taken the bagasse and ash brought for the bioelectrodes despite repeated reminders. Advisor spoke to Prof. Thosar regarding lack of communication regarding this project from their end and asked to expedite work on the project It was decided that all above points will be communicated to COEP by email at the earliest.
3	Optimization of salt removal from Saline water using bio-physio-chemical processes	ES- Dr. D.S. Nimbalkar	Dr. P. A. Sadgir Ph.D student is working	1 Year 01/10/2022	Project on HOLD
4	Online colour measurement of Beer juice using AI techniques	ST- Dr. R.V. Dani & Shri Kakarla Gangadhararam(ST)	Dr. M.S. Sutaone Dr. Archana Thosar Dr. P.P. Bartakke Dr. Sanjeev Tambe M.Tech students are working Two B.Tech students are working	2 Year 01/10/2022 & 30/09/2024	<ul style="list-style-type: none"> Two RA appointed for the project work in the Sugar Tech department. All instruments, Camera & required accessories etc. purchase process completed and material is received and handed over to COEP team for further necessary activity. Fabricated box for assembly of camera is prepared. Automation work is in progress at M/s Softhard automation Pvt. Ltd., Pune Assembly of the camera on fabricated box completed and trial will be conducted from 6th to 15th April 2023 at Ajinkyatara SSK Ltd., Satara
5	Optimization of combustion, performance and emission characteristics of an alcohol fueled (ethanol & methanol) CFI diesel engine.	SE- RA Chandgude & AT- Dr. K.S. Konde	Prof. M.R. Nandgaonkar & Dr. S.V. Lahane One M.Tech student is working	1 Year 01/10/2022 & 30/09/2023	<ul style="list-style-type: none"> CFD simulation of injection system is going on. After getting experimental facility, COEP will perform the experiments. Equipement Purchase status: PO for Dual fuel injection system placed on 16th March 2023 to M/s Medhaan Center for Automotive Research, Hoshiyarpur (Punjab) As per PO, the equipment may be received up to first week of April 2023. (Delivery period as per PO 2-3 week)



Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Haveli,
Dist. Pune - 412 201

6	Study of the Combustion Control System of Bagasse Fired Boiler for Sugar and Copperation Plant	SE-RA Chandgude	Prof. M.R. Nandgaonkar & Dr. S.V. Lahane One M.Tech student is working	1 Year 01/10/2022 & 30/09/2023	<ul style="list-style-type: none"> As per mail dt 16/03/2023 from COEP, the unit cost of online weighing of bagasse & moisture enquired recently from the supplier will be around Rs. 90 Lacs which should be borne by VSI. However, initially the COEP had agreed upon portable instrument for the measurement of %CO₂, %O₂ and %CO in flue gases which was procured by the Institute at cost of Rs. 1.12 Lacs. Also it is informed that the similar kind of bagasse weighing system has been installed in M/s IPCL; Mudhol which needs to be studied by arranging combined visit of SE/DE/EE. In order to guide proposed online bagasse weighing system to be installed in Babanrao Shinde sugar mill. Accordingly, the online meeting shall be conducted with COEP.
7	Distillery fermentation process modelling and optimization using Artificial Intelligence (AI) methods	AT-Dr. K.S. Konde	Three B.Tech students working	1 Year 01/10/2022	<ul style="list-style-type: none"> BH-molasses based ethanol fermentation (60 batches) is carried out on lab scale at VSI. Data based on 31 batches were sent to COEP. To create additional data, ethanol fermentation work on sugar syrup based ethanol fermentation is under progress on lab scale at VSI. Work on lab scale will be completed in end October 2023. If validation is successful on lab scale, demonstration work will be done on plant scale in next season.
8	Development of lab scale soft sensor for Neera quality using artificial intelligence (AI)	AT-Dr. K.S. Konde	Prof. Archana Thosar Dr. Shilpa Metkar Dr. Rashmika Patole	1 Year 01/10/2022 & completed on or before March 2024.	<ul style="list-style-type: none"> VSI has collected & completed compositional analysis of Neera samples (15 control samples & 44 local market samples). Collection of more Neera samples is on the pipeline which will be tested to make a database. Respective data has been shared with COEP. COEP will use these data for model development.
9	Nano-catalyst assisted hydrogen production in sugar and distillery	AT-Dr. K.S. Konde	CMET	2 Year 10-01-2022	<ul style="list-style-type: none"> Compositional analysis of feedstock materials such as Press Mud Cake (PMC), spent wash and bagasse is in process. Feedstock samples submitted to CMET for preliminary study. Project was effectively started from 1st Dec 2022 through appointment of RA. Procurement of photo catalytic reactor status: Purchase order released on 20th Feb 2023 and it will be installed in 2nd week of April 2023. Initial experiments on spent wash decolorization were carried out to observe the activity of nanocatalyst (uncalcined TiO₂) provided by C-MET.
10	Development of Bulging rate of tube testing system & predicting remaining life of tube placed in high temperature zone.	SE-RA Chandgude	Dr. P.R. Dhamangaonkar Dr. S.P. Butee PhD student is working	1 Year 15/12/2022 & 14/12/2023	<ul style="list-style-type: none"> Discussed on existing condition of progress. Experimental Testing on metal samples of the tube will start after getting Experimental Set up. Equipment Purchase Status: 1) Tender for Tube test set up was published on 17th March 2023 and the last date of submission is 28/03/2023. 2) Order for thermal camera Accessories and software is placed on 16th March 2023. Same material will deliver on 29/03/2023 at COEP and will conduct the demo for same.
11	Estimation of Roof-top solar System in sugar mills & forecasting solar power generation	SE-RA Chandgude	Prof. V.N. Pande Prof. A.G. Thosar Dr. Arti Tare	1 Year 15/12/2022	<ul style="list-style-type: none"> Discussed on project. For data collection, COEP RA student will visit at VSI on 27/03/2023. Plan to visit jointly VSI & COEP at Sonhira SSK Ltd, Wangi, Sangli for Roof-top solar System.

Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Haveli
Dist. Pune - 412 307



12	Solar PV cleaning system	SE- R A Chandgude	Prof. V N Pande Prof. A G Thosar Dr. Arti Tare	1 Year 15/12/2022	<ul style="list-style-type: none"> ➤ Discussed and suggested to follow up with Dr. Archana Thosar Madam for cleaning system due to Summer season. ➤ For site survey of solar panel system, COEP RA student will visit at VSI on 27/03/2023.
13	Analysis of data collected by Remote advisory system & Machine learning	SE- R A Chandgude	Prof. S D Agashe Dr. D.N. Sonawane Dr. Archana Thosar	1 Year 15/12/2022 &	Project on HOLD
14	Development of miniaturized NPC sensor using nanostructured materials.	SOHL- Dr. P Deshmukh	CMET	3 Year 01/10/2022	<ul style="list-style-type: none"> ➤ Potassium sensor developed by CMET at lab level. ➤ Validate the potassium reading sensor with traditional laboratory level at lab level (VSI) ➤ Action Pending: 1) Project submitted for funding to Ministry of Electronics and Technology (Meity), New Delhi. ➤ Remark :1) Funds not received. 2) Manpower problem at CMET Institute.
15	Performance of enhancement of Rotary Rack Machine for sugarcane trash collection.		New Project.		This project is sanctioned in GC meeting dt.30/03/2023.



Type text here

[Signature]
Sous. Mr. (SE)

[Signature]
(S C Gurav)th
Internal Audit Officer

[Signature]
(Sambhaji Kadupatil)
Director General

[Signature]
Principal
Vasantdada Sugar
Manjari (Bk.), Tal. Haveli,
Dist. Pune-412 307

Date: 15/03/2023

MINUTES OF MEETING

Venue: Vasantdada Sugar Institute, Pune
Date : 13th March 2023

A meeting was conveyed at VSI, Pune by the Hon. Advisor Sir, Hon. DG Sir VSI, Pune and HODs on 13th March, 2023 for taking review of the on-going collaborative R & D projects with COEP and C-MET.

Following Members Present for meeting

- VSI
- Hon. Shri. Shivajirao Deshmukh, Advisor
- Hon. Shri. Sambhaji Kadupatil, Director General
- Shri. S C Gurav, IAO
- Shri. Shivaji Khengare, CA
- Dr. R V Dani, Head, ST
- Shri. R A Chandgude, Head, SE
- Shri. R V Godage, TA, AT & F
- Dr. Deepali Nimbalkar, Head, Environmental Science
- Dr. P. Deshmukh, Head, Soil science & Micronutrient unit
- Shri. P P Shinde, Head, Agri Engineering & Workshop



[Signature]
Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Haveli,
Dist. Pune - 412 307

The minutes of meeting is placed below for approval please.

[Signature]
Team (SE)

[Signature]
16/3

Pl. modify &
submit.
[Signature]
DG

Modified minutes are placed below for approval M

[Signature]
20/3

[Signature]
20/3

PROJECT-WISE STATUS

Sr. No	Name of Project	VSI, Dept.	Associated Member and Mode of execution	Project Duration/ Start & completion Date	Work done so far	Reason of delay
1	Life Assessment of Roller Chain for Sugar Industry	SE- RA Chandgude	Dr. P.S. Shinde & Prof. M.R. Nandgaonkar Mr. Suraj Ingale Ph.D student is working	1 Year 01/10/2022	<ul style="list-style-type: none"> > First part of the project: Static analysis of each part of roller chain is completed using FEA (Ansys) as well as theoretical formulation. > In second part of project, working on to perform wear analysis of roller pin and roller using experimental technique as well as through FEA analysis on ANSYS. > For Experiments COEP have identified Pin on Disc Machine which is available in COEP. > From coming Monday will perform the experiments on Pin on Disc machine. > The M Tech student working on this project have completed his ANSYS class & started working on FEA analysis of wear rate of roller pin and bush. 	<p>Remark:</p> <p>Communication of RA students of COEP with VSI is poor.</p>
2	Treatment of sugar industry /distillery effluent using microbial fuel cell with bio electrode	ES- Dr. D.S. Nimbalkar	Prof. P.A. Sadgir Dr. Archana Thosar Ph.D student is working	2 Year 01/10/2022 & completed up to 30th Sep 2023	<ul style="list-style-type: none"> > Microbial fuel cell set up with bioelectrodes has been established. > Sugar effluent provided by VSI was analysed and experiments with the same in MFC started. > Initial voltage of 0.2 V and maximum voltage of 0.4 V is observed when sugar effluent is used as anolyte and distilled water is used as catholyte. > This set up has been running for around one month however the analysis of treated effluent for parameters like COD, BOD or other parameters after/during experiments has not been done till now. Hence it is difficult to estimate treatment efficiency. Use of other catholytes is also being explored. 	<ul style="list-style-type: none"> > The project was started in November 2022. However, requisition and details of items to be purchased have not been received from COEP. They have informed that process for inviting quotations for electrodes and data acquisition system has been initiated. > Demand for stipend has also not been sent by COEP. > The student needs to take more inputs from VSI regarding effluent analysis to determine treatment efficiency.

Emmed
Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Havelli,
Dist. Pune - 412 307



Optimization of salt removal from Saline water using bio-physio-chemical processes	ES- Dr. D.S. Nimbalkar	Dr. P. A. Sadgir, Ph D student is working	1 Year 01/10/2022	Project on HOLD	
Online colour measurement of clear juice using AI techniques	ST- Dr. R.V. Dani & Shri. Kakarta Gangadharan (ST)	Dr. M.S. Sutaone Dr. Archana Thosar Dr. P.P. Bartakke Dr. Sanjeev Tambe M.Tech students are working Two B.Tech students are working	2 Year 01/10/2022 & 30/09/2024	<ul style="list-style-type: none"> > First Step: VSI has identified three nos. of member sugar mills during the season 2021-22 for clear juice analysis. Total 194 samples have been collected & ICUMSA colour analysis was done in factory laboratory along with image of each sample by camera. Co-relation of ICUMSA colour and Image resolution was done at COEP. > Second step: During first step manual collection of the sample was done. In second stage automation of the sample collection is proposed and accordingly following works carried out. 1) Glass apparatus to collect the clear juice sample was purchased from M/s. Hudke Technologies, Pune. 2) Order for cameras and required accessories has been placed through online. 3) Logic for auto collection of clear juice sample in glass apparatus is finalized with M/s. Softhard automation Pvt. Ltd., Pune. 4) Order for fabricated box is given to M/s. Softhard automation Pvt. Ltd., Pune for assembly of the programmable camera, to capture image of clear juice sample automatically collected in glass apparatus. 5) 2 Nos. research associates has been recruited from 15th Feb 2023 in sugar tech laboratory of VSI and they are trained for ICUMSA analysis of Juice, Sugar and Molasses. > Third Step: All material is received at VSI except imported camera. Imported camera from China received at New Delhi. It is expected to deliver at VSI by 20th March 2023 after submission of KYC documents. Fabricated box will be ready at Bhosari on 16th March 2023. We will complete the assembly of the camera on fabricated box and will start trials Malegaon SSK and Someshwar SSK sugar mills from 23 March 2023 to till month end. From April 1st week onwards we will continue this trial at Gandevi Sugar Gujarat. After end of season 2022-23, clear juice will be prepared at VSI sugar tech laboratory using sugarcane from VSI field and data will be collected. After all the Data collected during factory & VSI laboratory trials will be submitted to COEP. Based on the data submitted by VSI, COEP will develop softsensor in technical collaboration with VSI. <p>The project will be completed before 31st May 2024.</p>	<p>Identification of vender for</p> <ol style="list-style-type: none"> 1) customized glass apparatus 2) Automation of the clear juice sampling apparatus & 3) Finalisation of specifications for special imported camera was done by COEP. However VSI assisted COEP for the identification of vender & procurement of customized glass apparatus for clear juice sampling.



[Signature]
Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Haveli,
Dist. Pune - 412 307



Principal
Vasantdada Sugar Institute
 Manjari (Bk.), Tal. Haveli
 Dist. Pune - 412 307

5	Investigation of combustion performance and emission characteristics of an alcohol fueled (ethanol & methanol) CRDI diesel engine	AT-Dr. K.S. Konde	Prof. M.R. Nandgaonkar & Dr. S.V. Lahane Ms. Pradnya P. Patil, One M.Tech student is working	1 Year 01/10/2022 & 30/09/2023	<ul style="list-style-type: none"> CFD simulation of injection system is going on. Without experimental facility, cannot perform the experiments. Equipment Purchase status: Submitted Indent of Dual fuel Injection system with Technical specifications. The same is proprietary item so its offer has taken from concern party. PO placed on 16th March 2023. 	Rather poor communication of RA students of COEP with VSI.
6	Study of the Combustion Control System of Bagasse Fired Boiler for Sugar and Cogeneration Plant.	SE-RA Chandgude	Prof. M.R. Nandgaonkar & Dr. S.V. Lahane Mr. Aniruddha D. Govekar, One M.Tech student is working	1 Year 01/10/2022 & 30/09/2023	<ul style="list-style-type: none"> We have visited sugar factory namely, Daund, Sangamner, Sant Tukaram, Someshwar but nowhere the facility of mass of bagasse is available. Without mass of bagasse it's very difficult to proceed. Still we have collected some samples of bagasse and doing some characterization and also theoretical calculations of combustion. So the study will be carried out in the sugar mill where bagasse weighing arrangement is available. The bagasse weighing is main hurdle in the project. 	
7	Distillery fermentation process modelling and optimization using Artificial Intelligence (AI) methods.	AT-Dr. K.S. Konde	Three B.Tech students working	1 Year 01/10/2022	<ul style="list-style-type: none"> BH-molasses based ethanol fermentation (60 batches) is carried out on lab scale at VSI. Data based on 21 batches were sent to COEP. To create additional data, ethanol fermentation work on sugar syrup based ethanol fermentation is under progress on lab scale at VSI. Work on lab scale will be completed in end October 2023. If validation is successful on lab scale, demonstration work will have done on plant scale in next season. 	
8	Development of lab scale soft sensor for Neera quality using artificial intelligence (AI)	AT-Dr. K.S. Konde	Prof. Archana Thosar Dr. Shilpa Metkar Dr. Rashmika Patole	1 Year 01/10/2022 & completed on or before March 2024.	<ul style="list-style-type: none"> VSI has collected & completed compositional analysis of Neera samples (4 control samples & 19 local market samples). Collection of more Neera samples is on the pipeline which will be tested to make a database. Respective data has been shared with COEP. COEP will use these data for model development. 	
9	Nano-catalyst assisted hydrogen production in sugar and distillery	AT-Dr. K.S. Konde	CMET	2 Year 10-01-2022	<ul style="list-style-type: none"> Compositional analysis of feedstock materials such as Press Mud Cake (PMC), spent wash and bagasse is in process. Feedstock samples submitted to CMET for preliminary study. Project was effectively started from 1st Dec 2022 through appointment of RA. Procurement of photo catalytic reactor status: Purchase order released on 20th Feb 2023. Initial experiments on spent wash decolorization were carried out to observe the activity of nanocatalyst (uncalcined TiO₂) provided 	



					by C-MET.	
10	Development of Bulging rate of tube testing system & predicting remaining life of tube placed in high temperature zone.	SE- R A Chandgude	Dr. P.R. Dhamangaonkar Dr. S. P. Butee Ms. Shweta V Deshmukh - PhD, Mr. Chakraward P Khotole- M Tech students is working	1 Year 15/12/2022 & 14/12/2023	<ul style="list-style-type: none"> ➤ Prominent Triggering factors involved in Bulging Tube are found. ➤ Simulation of Research Problem done. •Mathematical Modelling done. ➤ Conceptual Design of Experimental setups done. ➤ Experimental Testing on metal samples of the tube will starts after getting Experimental Set up. ➤ EquipmentPurchase Status: 1) Purchasing Process from VSI to Manufacture the Experimental set up from Identified Vendor is in process. Its Tender will published on 17th March 2023. 2) Purchasing Process thermal camera Accessories and software is in process. Its Order is placed on 16th March 2023. 	
11	Estimation of Roof-top solar System in sugar mills & forecasting solar power generation.	SE- R A Chandgude	Prof. V.N. Pande Prof. A.G. Thosar Dr. Arti Tare	1 Year 15/12/2022	<ul style="list-style-type: none"> ➤ Plan to visit jointly VSI & COEP at Sonhira SSK Ltd, Wangl, Sangli for Roof-top solar System. ➤ COEP representative will visit to VSI to collect additional Solar data. 	
12	Solar PV cleaning system	SE- R A Chandgude	Prof. V N Pande Prof. A G Thosar Dr. Arti Tare	1 Year 15/12/2022	➤ No progress.	
13	Analysis of data collected by Remote advisory system & Machine learning	SE- R A Chandgude	Prof. S D Agashe Dr. D.N. Sonawane Dr. Archana Thosar	1 Year 15/12/2022 &	Project on HOLD	
14	Development of miniaturized NPX sensor using nanostructured materials.	SOIL- Dr. P Deshmukh	CMET	3 Year 01/10/2022	<ul style="list-style-type: none"> ➤ Potassium sensor developed by CMET at lab level. ➤ Validate the potassium reading sensor with traditional laboratory level at lab level (VSI) ➤ Action Pending: 1) Project submitted for funding to Ministry of Electronics and Technology (Meity), New Delhi. 	1) Funds not received 2) Manpower problem at CMET Institute
15	Performance of embencement of Rotary Rack Machine for sugar cane trash collection.		New Project.		This project is not sanctioned. The same project will put for the GC for approval.	-

Somesh
Principal
Vasantdada Sugar Institute
Mamori (Bk.) Tal. Haveli
Dist. Pune-412 207

Sheer
(SCGURV) 20/3
Internal Audit Officer

sd
(Sambhaji Kadupatil)
Director General

MINUTES OF MEETING

Venue: College of Engineering, Pune

Date : 7th February 2023

A meeting was conveyed at COEP, Shivajinagar Pune between VSI, Pune and College of Engineering Pune Technological University (CoEP Tech) on 07th Feb, 2023 regarding the status of collaborative on-going R & D projects.

Members Present

VSI

Hon. Shri. Shivajirao Deshmukh, Advisor
Hon. Shri. Sambhaji Kadupatil, Director General
Shri. S C Gurav, IAO
Shri. Shivaji Khengare, CA
Dr. R V Dani, Head ST
Shri. R A Chandgude, Head, SE
Dr. K S Konde, Head, AT & F
Dr. Deepali Nimbalkar, Head, Environmental
Science
Shri. P G Patil, Technical Advisor, SE

COEP Tech

HON. Shri. Prataprao Pawar, BOG Chairman
Hon. Shri. M. S. Sutaone, Vice Chancellor
Prof. Archana Thosar, Dean R & D
Dr. M R Nandgaonkar, Head (Mech. Engg)
Dr. P R Dhamangaonkar
Dr. S V Lahane
Dr. P S Shinde
Dr. Bartakke
Dr. S P Butee
Respective project students

The technical committee meeting on R & D projects was started by the welcome to all members of the COEP Tech, Pune, and Hon'ble Advisor & Hon'ble Director General, VSI, Pune by Prof. Archana Thosar, Dean R & D, COEP Tech, Pune.

Prof. Archana Thosar, Dean R & D, COEP Tech, Pune and Mr. R A Chandgude, Technical Advisor & Head, Sugar Engineering, VSI, explained about collaborative ongoing R & D projects.

Following points are discussed during the meeting with VSI and COEP Tech faculty members & respective project students.



Principal
Vasantdada Sugar Institute
Waneri (Bk.), Tal. Haveli,
Dist. Pune - 412 307

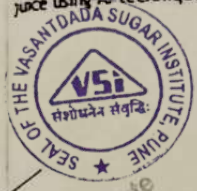
PROJECT-WISE STATUS

Sr. No.	Project Title	Status
1	Life Assessment of Roller Chain for Sugar Industry	<ul style="list-style-type: none"> ✓ The project was presented by Prof. Prakash Shinde. ✓ Static analysis of chain components was done and dynamic analysis will be carried out. ✓ It was decided to conduct wear studies on Pin on Disc machine available in COEP Tech. ✓ The project will be completed up to <u>30th Sep. 2023</u>. ✓ Suggestions:- 1) Hon. Chairman advised to have mutual interaction with the faculty/expert from metallurgy department to decide the appropriate heat treatment and materials for various parts of roller chain. 2) Project financial benefits to end user to be indicated. 3) Prof. Dr. S P Butee suggested to reduce number of components of chain. 4) Project completion schedule to be submitted. ✓ Hon. Prataprao Pawar appreciated the subject.
2	Treatment of sugar industry/distillery effluent using microbial fuel cell with bio electrode	<ul style="list-style-type: none"> ✓ The project was presented by Ms. Parveda Paranjape, PhD student working on the project. She informed about the status of work. ✓ Microbial fuel cell set up with bio lectrodes (using rice husk) has been established. ✓ Sugar effluent provided by VSI has been analyzed. ✓ Suggestions: 1) VSI Advisor suggested use of conventional electrodes is being explored. Experiments using sugar effluent will now be started.
3	Optimization of salt removal from Saline water using bio-physio-chemical processes	<ul style="list-style-type: none"> ✓ This project has been put on hold. ✓ CoEP will continue to work on it however this will be only taken up in case encouraging and practical results are obtained at lab scale.
4	Investigation of combustion, performance and emission	<ul style="list-style-type: none"> ✓ Presented: Need of the project, Concept, Experimentation and CFD simulation results for injector orientation.



[Signature]
Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Haveli
Dist. Pune - 412 307

<p>characteristics of an alcohol fuelled (ethanol & methanol) CRDI diesel engine.</p>	<ul style="list-style-type: none"> ✓ The project will be completed up to 30th Sep. 2023. ✓ Suggestions: The project will be carried out as per decided methodology.
<p>Study of the Combustion Control System of Bagasse Fired Boiler for Sugar and Cogeneration Plant.</p>	<ul style="list-style-type: none"> ✓ Presented: Objectives, need and concept. ✓ Sample results of bagasse for moisture. ✓ In meeting discussed that, The bagasse weighing is main hurdle in the project. So the study will be carried out in the sugar mill where bagasse weighing arrangement is available. ✓ The project will be completed up to 30th Sep. 2023. ✓ Suggestions: Collect mass of actual bagasse from Sugar Tech department.
<p>Online colour measurement of clear juice using AI techniques</p>	<ul style="list-style-type: none"> ✓ Dr. Bartakke from COEP, Pune made a presentation on online colour measurement of clear juice using AI techniques. ✓ He explained about work done in Phase-I & difficulties faced such as low pixel camera & variation in image acquisition set up. ✓ The VSI & COEP team has made arrangements to overcome the problems faced in Phase-I. accordingly two partners are identified M/s Soft Hard Automation Pvt. Ltd., Pune for providing automation for taking clear juice sample and M/s Hudke Technologicals, Pune to provide Borosil glass container for collection of clear juice for taking image by camera. ✓ Hon. Chairman, COEP Pune stressed need to complete project during this season. Hon. Advisor, VSI Pune explained that next season will be required to complete the project. ✓ Dr. Dani, VSI Pune explained that project will be completed in two Phases. Phase-I: Preparation of soft sensor for online colour measurement of clear juice & Phase-II: Automation to maintain desired colour of clear juice. ✓ Hon. Chairman agreed for this suggestion. ✓ Following activity plan has been approved by committee, <ol style="list-style-type: none"> 1) Creating image acquisition setup with camera, glass container & enclosure up to 20th Feb 2023. 2) Acquiring sugar cane juice images from at least four factories up to 31st March 2023. 3) Developing & deploying trained model for ICUMSA estimated up to 30th April 2023.



(Signature)
Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Havelli,
Dist. Pune - 412 307

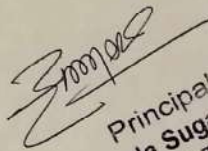
<p>Distillery fermentation process modelling and optimization using Artificial Intelligence (AI) methods</p>	<ul style="list-style-type: none"> ✓ On the basis of Lab scale ethanol fermentation data provided by VSI, COEP has developed preliminary model for Ethanol estimation for CO₂. ✓ COEP will further tune model to get accurate estimate. VSI will send lab scale data to COEP every month for model development. ✓ This project work on lab scale will get completed in end October 2023. If validation is successful on lab scale, demonstration work will have done on plant scale in next season.
<p>Development of lab scale soft sensor for Neera quality using artificial intelligence (AI)</p>	<ul style="list-style-type: none"> ✓ For this project data is shared to COEP. COEP will use data for model development. ✓ This project will be completed on or before March 2024.
<p>Nano-catalyst assisted hydrogen production in sugar and distillery</p>	<p style="text-align: center;">C- MET (Not Discussed)</p>
<p>Development of miniaturized NPK sensor using nanostructured materials.</p>	<p style="text-align: center;">C- MET (Not Discussed)</p>
<p>11 Development of Bulging rate of tube testing system & predicting remaining life of tube placed in high temperature zone.</p>	<ul style="list-style-type: none"> ✓ The project was presented by Prof. P R Dhamangaonkar & research student Mrs. Shweta Deshmukh. ✓ Failed tube data is needed. Hence it was decided to get the failed tube samples in COEP Tech Metallurgy Lab. ✓ Procurement of Bulge test machine to expedited. ✓ Prof. Dhamangaonkar explained cost impact due to boiler tube failure of thermal power station, Nashik. ✓ Hon. Prataprao Pawar & Hon. Shivajirao Deshmukh asked, the benefit for sugar industry/ end user of this project. Benefits will be given by COEP. ✓ Suggestions: 1) Hon. Prataprao Pawar suggested tube painting, ceramic coating, use of best quality material for avoiding tube bulging /failure. ✓ Hon. Prataprao Pawar sir highly appreciated the concept of problem and its applicability to the industry and work done till date.

Shweta
Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Haveli,
Dist. Pune - 412 307



12. Estimation of Roof-top solar System in sugar mills & forecasting solar power generation.	<ul style="list-style-type: none"> ✓ The presentation given by research student under the guidance of Mrs. Archana Thosar ✓ Solar power project of 200kw & 800kw Installed at VSI, Pune, its power generation data submitted to COEP. ✓ Two Sugar factory survey report submitted to COEP.
13. Solar PV cleaning system.	<ul style="list-style-type: none"> ✓ The presentation given by research student under the guidance of Mrs. Archana Thosar
14. Analysis of data collected by Remote advisory system & Machine learning.	Not Discussed
15. Performance Enhancement of Rotary Rake machine for sugarcane trash collection.	<ul style="list-style-type: none"> ✓ In meeting discussed that, In the trash collection system there is technical problems while collecting the trash as sugar cane field is not plane surface. ✓ Hon. Advisor, VSI Pune said that Rotary rake machine for sugar cane trash collection is very important for sugar mills. Cane trash will be utilised for additional boiler fuel along with bagasse. Trash has more calorific value than bagasse. (Its calorific value ranges from 3845 to 4375 kcal/kg). Also he said that, considering cost of the machine, trash collection is rather costly. So cost impact is to be checked. ✓ Hon. Chairman, COEP Pune said that the trash contains more Silica & can be considered as insulating material. Therefore, research should be carried out considering Silica usage as insulating material. VSI & COEP should check this aspect.

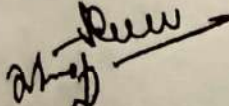
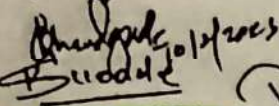
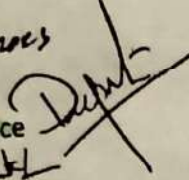
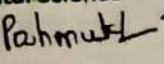



 Principal
 Vasantdada Sugar Institute
 Manjari (Bk.), Tal. Haveli,
 Dist. Pune - 412 307

The meeting concluded with vote of thanks

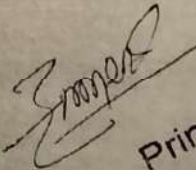

-(Sambhaji Kadupatil)
Director General

Copy to

- Shri. Shivajirao Deshmukh, Advisor
- Shri. Sambhaji Kadupatil, Director General
- Prof. Archana Thosar, Dean R & D, CoEP
- Shri. SC Gurav, IAO
- Shri. Shivaji Khengare, CA
- Dr. RV Dani, Head ST
- Shri. RA Chandgude, Head, SE 
- Dr. KS Konde, Head, AT & B 
- Dr. Deepali Nimbalkar, Head, Environmental Science 
- Dr. Preeti Deshmukh, Head, Soil Science 
- Shri. PG Patil, Technical Advisor, SE

(SC Gurav)
Internal Audit Officer




Principal
Vasantdada Sugar Institute
Manjari (Bk.), Tal. Haveli,
Dist. Pune - 412 307