Technology License Agreement

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

P. P. Kundu, Professor

Institute / Industry:

IIT Roorkee

Date of visit:

27-02-2020

Comments:

Huge infrastructure for generation of biohydrogen. This is just like an industry. The plant should be in operation.

Suggestions, if any:

The plant should be in operation.

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

DEEPAK PANT, Senior Scientist

Institute / Industry:

VITO, BELGIUM

Date of visit:

27/02/2020

Comments:

Very impressive Pilot Plant. Very well maintained & fully equipped. The performance are quite impressive as well.

Suggestions, if any:

It should be maintained & used more frequently.

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. Abhilasha Singh Mathuriya
Associate Prof. & Head Life Sc. Sharda University, NCR

Institute / Industry:

Sharda University, KP-III, Greater Noida

Date of visit:

27/02/2020

Comments:

Its one of the finest possible fermentation technology the plant is very impressive, controlled & Compact. Most suitable for Comptable waste-treatment and biohydrogen production. I thank Prof. Das to giving this technology demonstration.

Suggestions, if any:

Please guide the scientists, who are intekisted in this very burning area.

Signature 27/02/2020

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Soumya Pandit

Institute / Industry:

Ex-AP, Amity University, Mumbai; currently Assistant Professor

Date of visit:

26.02.2020

Comments:

It is a great opportunity to work under the guidance of Prof. Das. It is really worthy to learn Bioprocess from Prof Das's class. His way of approach towards solving a problem is unique, simple and effective. The 1ok l capacity $PhotH_2$ reactor is a product of his enormous hard endevour, which has potential to create green & clean energy resource in India & abroad. I'm grateful to Sir and wish him all the best for future.

Suggestions, if any:

As a student, I request IIT to take care of such a high quality of bioreactor.

Soumya Pandit

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Prof. Warren D. Seider

Institute / Industry:

Univ. of Pennsylvania, Philadelphia, PA

Date of visit:

1/8/20

Comments:

An excellent process plant for biological growth to produce biohydrogen facultative bacteria from organic waste. Thank you for very interesting and effective tour and presentation

Suggestions, if any:

Warren D. Seider

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. S. Sarkar, Head Env. Res. Grp

Institute / Industry:

R&D. Tata Steel Ltd

Date of visit:

05/08/2019

Comments:

1. It is a good research work with a prospect demo pilot plant.
2. Operation/utilities all are taken care.
3. Reactors are well designed.

Suggestions, if any:

1. Mass balance & Energy balance to be demonstrated.
2. Feed materials availability to be ensured.

Sar.

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

A/Prof Greg Martin

Institute / Industry:

University of Melbourne

Date of visit:

9/7/2019

Comments:

Thank you Prof. Das. What an excellent example of biochemical engineering. An innovated idea brought to life at a real scale. I very much appreciate the opportunity to see the plant. Thanks again!

Suggestions, if any:

Keep up the great work. I look forward to hearing about the industrial implementation.

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. Chitralekha Nag Dasgupta, CSIR Pool Scientist

Institute / Industry:

CSIR- National Botanical Research Institute

Date of visit:

18/06/2019

Comments:

This is an excellent work. This is huge and very nice, I am truly amazed to see this work.

Suggestions, if any:

Chitralekha

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Gajendra Singh.

Institute / Industry:

Dhampur Sugar mills Ltd. Bijnor

Date of visit:

8/5/19

Comments:

very good facility in Biohydrogen energy and based on Advanced technology.

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Prof. Chiranjib Bhattacharjee, Dean, FET, JU

Institute / Industry:

Jadavpur University, Kolkata

Date of visit:

03/05/2019

Comments:

It is an excellent work by Prof. D. Das & his team. He has incorporated all the controll mechanism in the process. Just wonderful.

Suggestions, if any:

None, as such.

Bhattacharjee
3/5/19

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. U. C. Banerjee Prof & HOD

Institute / Industry:

NIPER, Sector 67 SAS Nagar 160062 (Pb)

Date of visit:

25/4/2019

Comments:

It is a wonderful system of hydrogen generation by biological means. It not only gives a technical idea but may be a very good demonstration unit.

Suggestions, if any:

Future experts to work on this desirable

Signature

25/4/2019

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr Shreenivas Ashrit

Institute / Industry:

R&D, Tatasteel Limited, Jamshedpur.

Date of visit:

24/4/19

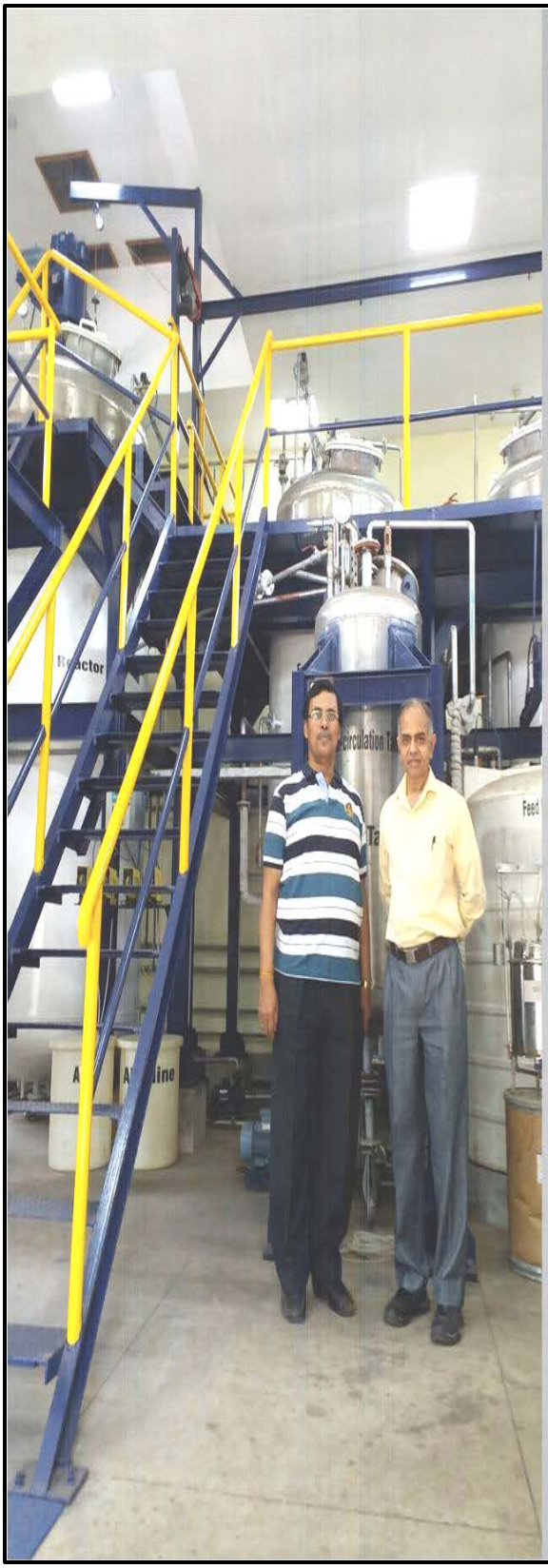
Comments:

It was very nice to see such a fantastic facility in IIT Kharagpur. It is future of hydrogen production in india for sure

Suggestions, if any:

We would like to take it forward in Tatasteel Ltd. Jamshedpur.

Signature



BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

DR VIKRAM M PATTARKINE
CEO
PEACE USA

Institute / Industry:

PEACE USA, Pennsylvania, USA

Date of visit:

11/4/2019

Comments:

Thank you very much for the tour of your EXTREMELY IMPRESIVE facility. Enjoyable and learning experiance!

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr Suraj Kan Sevda,
Technical officer

Institute / Industry:

BSBE, IIT Guwahati

Date of visit:

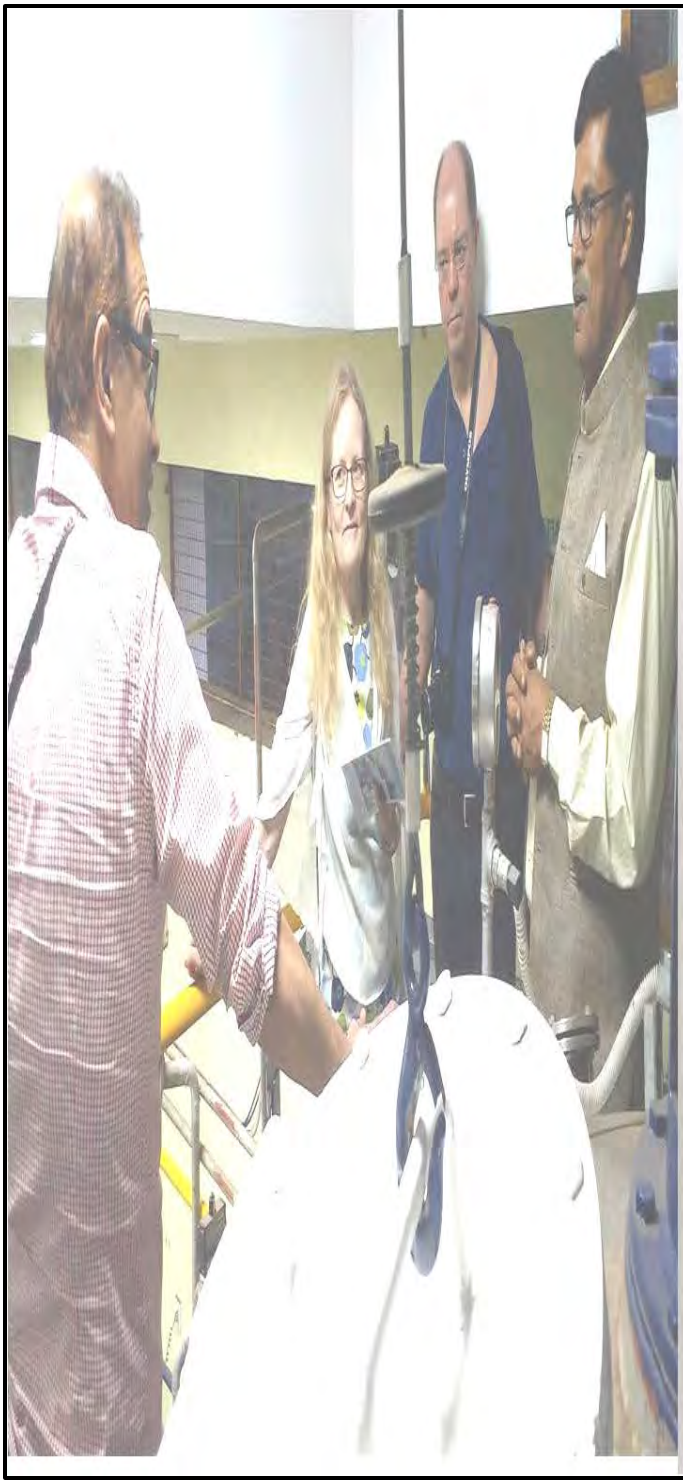
22/2/2018

Comments:

It is really nicely designed Bio H_2 production unit I ever seen in any institute in the world. The design and control system is very well done. This plant give a nice experience & we feel that what we read in the books. I really appreciate your & Dr effort to make this.

Suggestions, if any:

Signature



BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Golam Sarwar, University Lecturer

Institute / Industry:

Aalto University, School of chem Eng.

Date of visit:

18.2.2019

Comments:

Excellent pilot plant for BFO the Productions. Bio the could be a promising chem. now & future.

Suggestions, if any:

Raw material flexibility

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Mangor Monde. Aalto University

Institute / Industry:

Department of Built Environ

Date of visit:

18/2/2019

Comments:

Interesting

Suggestions, if any:

Need to introduce accepted analysis

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Vijay Goel, Chairman

Institute / Industry:

Dhampur Sugar Mills Ltd.,

Date of visit:

1st Feb 2019

Comments:

A wonderful pilot plant to test production of H2 from wastes. The plant has been operated at a very economical level. I do hope and pray & that it helps in giving India a pioneer technology

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Wen-chien Lee

Institute / Industry:

National chung Cheng University

Date of visit:

12 Jan, 2019

Comments:

Thanks to Prof Das for showing us this pilot plant. It is indeed a great facility for biohydrogen production.

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

CHEN-YAW CHIU

Institute / Industry:

Ming-CHI University of Technology, Biochemical Engineering Research Center

Date of visit:

2019/1/12

Comments:

1. It's a great achievement for biohydrogen pilot plant

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. Jonny Blaker University of Manchester

Institute / Industry:

University of Manchester School of Materials

Date of visit:

4/11/17

Comments:

Very impressive pilot plant facility
Enjoyed the thorough explanations
Very many thanks!

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

DR. SHYAMAL ROY, PHD(IIT), POSTDOC(USA)
RAMAN FELLOW

Institute / Industry:

ASSISTANT PROFESSOR, CHEMICAL ENGG. DEPT,
JADAVPUR UNIVERSITY, KOL-32

Date of visit:

13/12/2018, EVENING

Comments:

The work done by respected Prof. D. Das, IIT-Kgp is a one of the finest work as an academic person. Hopefully this work will be transformed into commercialization very soon.

Really, Superb!

Suggestions, if any:

Please visit different reputed universities / institutes all over the world to ~~s~~ share the great achievement.

SR Roy, 13/12/20

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Abhijeet Singh - Dehradun (Uttrakhand)

Institute / Industry:

Techno Industrial Marketing

Date of visit:

14/Nov/18

Comments:

Great work by IIT. Very innovative, would love to work with such organization.

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

SANJOY GHOSH, IIT Roorkee

Institute / Industry:

IIT Roorkee

Date of visit:

31st May, 2018

Comments:

The plant is very much innovative. The New Ideas are working. Indegreen the technology is built up. I wish that it should be commercialized soon.

Suggestions, if any:

Economic analysis must be done. It must be Commercialized.

Signature 31/5/18

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Professor Kinta Banerjee

Institute / Industry:

Indian Institute of Technology Kharagpur - 721302

Date of visit:

31st May 2018

Comments:

After going through the pilot plant for hydrogen production, I am extremely happy to see the facilities to be established at IIT Kharagpur premises. It's an active plant for hydrogen production. The lab developed technology has been proven and thus this technology should be immediately commercialized.

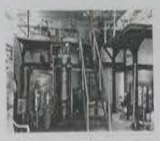
Suggestions, if any:

IIT IPR division alongwith IT division should take immediate action for advertisement and contact industry alongwith for commercialization.

Signature 31/5/18

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur



Name & Designation:

Virendra Swarup Bisaria
Professor

Institute / Industry:

I.I.T. Delhi

Date of visit:

27-2-2018

Comments:

Impressed to see the facility for production of biohydrogen from sugar-containg wastes by consortia of acidogenic bacteria.
Best wishes for its commercialization.

Suggestions, if any:

VSBisaria 27/2/18

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. Tamal Mondal, Professor

Institute / Industry:

National Institute of Technology, Durgapur

Date of visit:

02nd May 2018

Comments:

I am lucky to visit such a Bio-hydrogen production unit. The total process has been developed from Lab Scale - Pilot Scale - Commercial stage is very useful to learn and to get time with an eminent person like Professor D. Das. It will be very much encouraging and to me to see the dream for process development of such production unit. I Congratulate and convey my heartiest thanks to Prof D. Das for his grand success in bio-hydrogen production.

Suggestions, if any:

Kindly visit our Institute and deliver a talk of such a successful Journey. We will be always happy if we get such opportunity.

Signature

02/05/2018

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

T.R. Sreekrishnan, DBEB, IIT Delhi

Institute / Industry:

Institute (IIT Delhi)

Date of visit:

14 | December | 2017

Comments:

Excellent facility to demonstrate the feasibility for biological hydrogen produ..

Suggestions, if any:

Signature

14/12/2017

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. Amit Ghosh, Assistant professor

Institute / Industry:

IIT Kharagpur

Date of visit:

29/05/2018

Comments:

For the first time I have seen 10,000L bioreactor and I am really impressed with arrangment and facilities available in the pilot plant. The facilities are world class and it is well maintained here.

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. S. Venkata Mohan
CSIR-IICT, Hyderabad

Institute / Industry:

CSIR-IICT, Hyderabad

Date of visit:

22nd June 2017

Comments:

State of Art facility to produce biohydrogen from any feed stock. It also possess all the requirements which need in future to take up to Commercial scale. The Pilot plant facility also Can take the pure culture to Evaluate the production. Congratulations to Dept. Dost and team

Suggestions, if any:

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S. Venkata Mohan

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Prof. M. M. Ghangrekar

Institute / Industry:

IIT Kharagpur

Date of visit:

1st September

Comments:

Very nice pilot plant infrastructure with complete automation. congratulations Prof. Das, Wishing a very positive outcome from this research for benefit of society.

Suggestions, if any:

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

DIPESH PHERWANI, SCIENTIST

Institute / Industry:

Ministry of New and Renewable Energy

Date of visit:

22 June, 2017

Comments:

This plant was created under one of the technology mission mode projects supported by MNRE in the field of Hydrogen. The creation of such an elaborate facility in IIT campus is a comendable achievement. The outputs of this project should enable commercialization of biohydrogen technology in the near future.

Suggestions, if any:

The operation of the plant should be continued as it is a national facility. Optimization and exploration of alternatives to increase the ~~feed~~ feasibility of the process should be carried out.

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr D K Tuli
DBT chair Prof. IOC R&D Faridabad

Institute / Industry:

DBT – IOC

Date of visit:

22/6/17

Comments:

Very good efforts specially in academic set up. Very good support by the research scholars and a good lead by Prof. Das

Wishing success.

Suggestions, if any:

may find ways to run the plant even after the project ends.

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Prof. S. N. Upadhyay
Emeritus Professor

Institute / Industry:

Indian Institute of Technology (BHU) Varanasi

Date of visit:

June 22, 2017

Comments:

The research group at IITKgp under the leadership of Prof Debabrata Das has done a commendable work and generated extensive scientific data of lasting value. The pilot plant facility created under the project is an excellent facility

Suggestions, if any:

Efforts should be made to run this unit for longer duration

S N Upadhyay

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

Dr. Ligy Philip, Professor, Dept. of Civil Engineering, IIT Madras

Institute / Industry:

IIT Madras

Date of visit:

1 sept. 2017

Comments:

Very good demonstration unit. well maintained and recently constructed. Lot of scope for energy generation from waste using this technology

Suggestions, if any:

Ligy Philip

Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

DR. DOLLY WATTAL DHAR
Principal Scientist and Incharge CCUBGA, IARI, New Delhi

Institute / Industry:

CCUBGA, ICAR- IARI
New Delhi

Date of visit:

13/6/2017

Comments:

Excellent facility developed for biohydrogen production using microbial consortia. Will certainly have future application in the area of biofuel utilization. Good luck for the leader and his group.

Suggestions, if any:

Future collaboration with industrial partners will help the energy sector of the nation

Dolly Wattal Dhar
13/7
Signature

BIOHYDROGEN PILOT PLANT

Indian Institute of Technology Kharagpur

Name & Designation:

DR. RANJANA CHOWDHURY

Institute / Industry:

CHEMICAL ENGINEERING DEPARTMENT. JADAVPUR UNIVERSITY

Date of visit:

02.05.2017

Comments:

The Biohydrogen pilot plant set up at IIT, Kharagpur is really a great outcome of the research endeavor of Prof. D. Das of Department of Biotechnology. It should be considered as one of the pioneering stepping stone in the field of bio-based energy in India.

The plant design is also well thought.

Suggestions, if any:

Attempts should be made to couple a utilization unit for the hydrogen generated in the plant to carry forward the research effort towards a sustainable energy solution.

R. Chowdhury

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Signature