

MSME IDEA HACKATHON 4.0Reference No. :- **INC24DJH056789**

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5. HI/BI Name	Haldia Institute of Technology
6. Problem Statements	Sustainable Development
7. Idea Sector	Power, Renewables, Electricals, Power Electronics, Energy Efficiency and any related sub-sector
8. Title of proposed idea/innovation	Fuel grade Bio-ethanol from agricultural waste.
9. Briefly explain newness/uniqueness of the innovation	Conversion of agricultural waste to fuel grade bio-ethanol in a shortest route using selective hydrolytic enzyme and modified fermentation techniques are considered as newness of the proposal. Beside bio-fuel production carbon dioxide has been targeted towards its recovery and reuse in the hydrolysis and fermentation unit to maintain the pH level for microbial growth and it is aimed to zero CO2 emission in environment. Simultaneous fermentation and separation to produce fuel grade bioethanol is the another key innovation of the project work.
10. Concept & Objective	The adoption of government policies to blend 20 ethanol in petroleum fuel is encouraged to develop new processes for production of fuel grade bioethanol as a part of sustainable development. Agricultural residues are used for long term feed stock for the Bio-ethanol production due to its low cost and higher availability. Depending on the feedstock utilized for bio-ethanol production, sugar-based raw materials for fermentation are known as first-generation bio-ethanol. In contrast, lignocelluloses for fermentation are known as second generation bio-ethanol. Microorganisms are used to convert cellulosic biomass to fermentable sugar to manufacture ethanol, the biological conversion of cellulosic biomass to fermentation for ethanol generation is carried out by using microorganisms that are both inexpensive and readily available. Bio-ethanol production is thus cost-effective, environmentally benign, and renewable. This proposal aims to fabricate a prototype of fermentor of modified version and to encourage the utilization of agricultural residues and convert them from a source of environmental pollution to a raw material used to produce high quality graded bio-ethanol production as a main desired product from agricultural waste with the help of cost effective hydrolysis and anaerobic fermentation process.

11. Specify the potential areas of application in industry/market in brief	Bio-ethanol production will be probably the most successful biofuel because it has plenty of usable forms (heat, power, electricity vehicle fuel).The main credits of the usage of Bio-ethanol are: (i) It is an alternative fuel for reducing the risk of Carbon dioxide emission in to the environment thereby climatic change is reduced (ii) It is partially substitute the oil needs by using as a renewable energy (iii) Because of their oxygenated capability, it is blended with regular fuel to reduce the air pollutant emission in automobiles by means of complete combustion of the gasoline/diesel. Moreover the ethanol can be used as the solvent in pharmaceutical industries. So this kind of project approach is helpful to produce bio-ethanol in efficient way to meet the future challenges.
12. Briefly provide the market potential of idea/innovation	Since bio-ethanol has a wide range of applications, its output is predicted to expand significantly because of rising investment and its economic and environmental benefits in decreasing carbon emissions from energy, which contribute to climate change. New ethanol facilities will be erected in the next several years, and production will reach 150 billion liters by 2025. Besides being used in various sectors, numerous methods for producing raw materials as renewable resources have been devised . Brazil and the United States produce the most bio-ethanol worldwide. Since 1975, Brazil has made ethanol from sugarcane as automobile fuel, whereas the United States has produced ethanol from corn. Most of the bio-ethanol generated worldwide is derived from sugar cane and corn. Many countries seek to increase the use of bio-ethanol and reduce their dependence on fossil fuels through their politicians in the search for renewable energy sources, to address environmental and economic issues affecting our planet. Raw materials for bio-ethanol synthesis include sugar- and starch-rich crops. These raw materials may include rice, sweet corn, potatoes, wheat straw, barley, wheat, and sugar by-products such as molasses and date residues, as well as forest remnants. Ethanol production from agricultural waste is cost-effective and ecologically benign.
13. Uploaded Proposal	View/Download