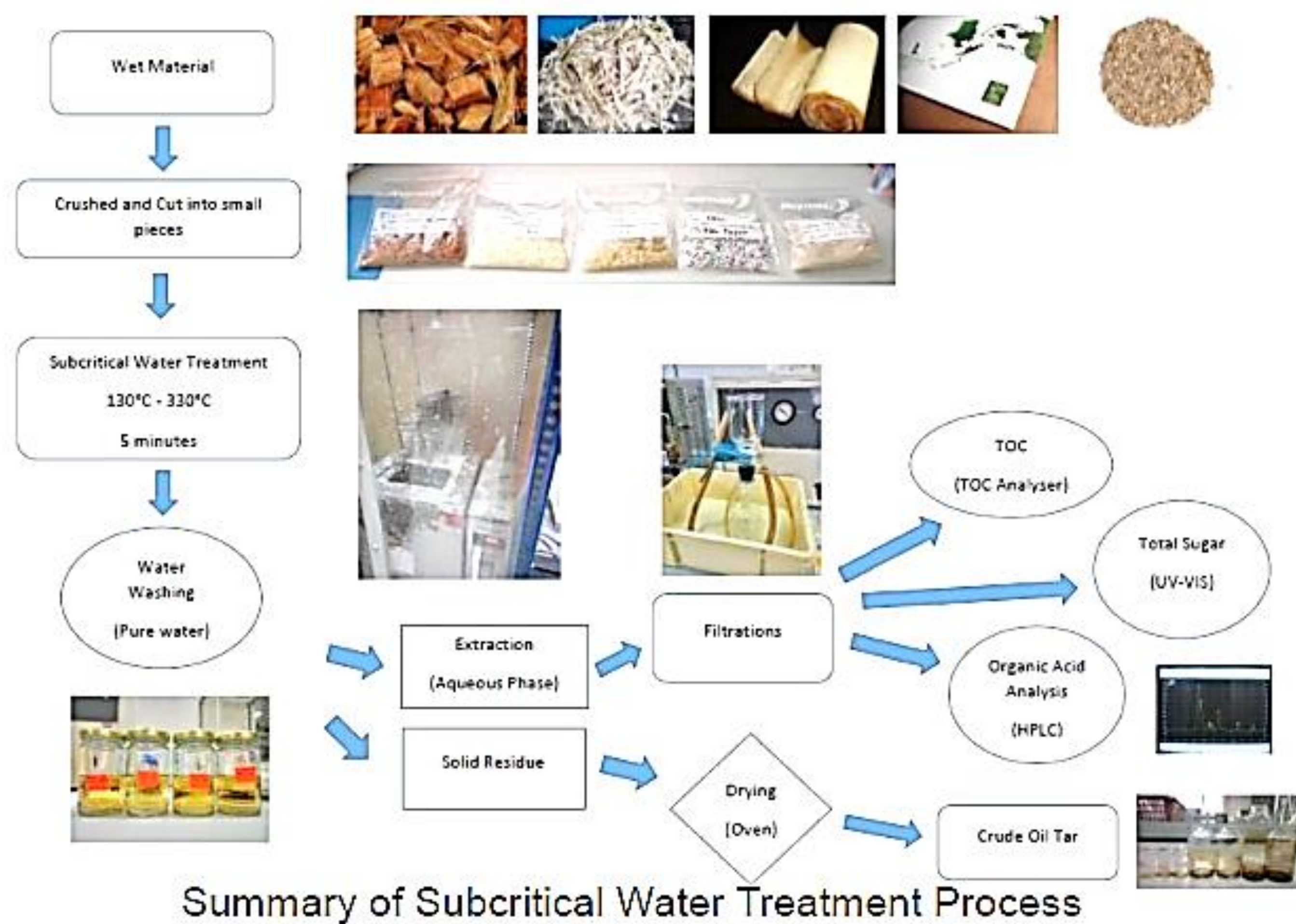


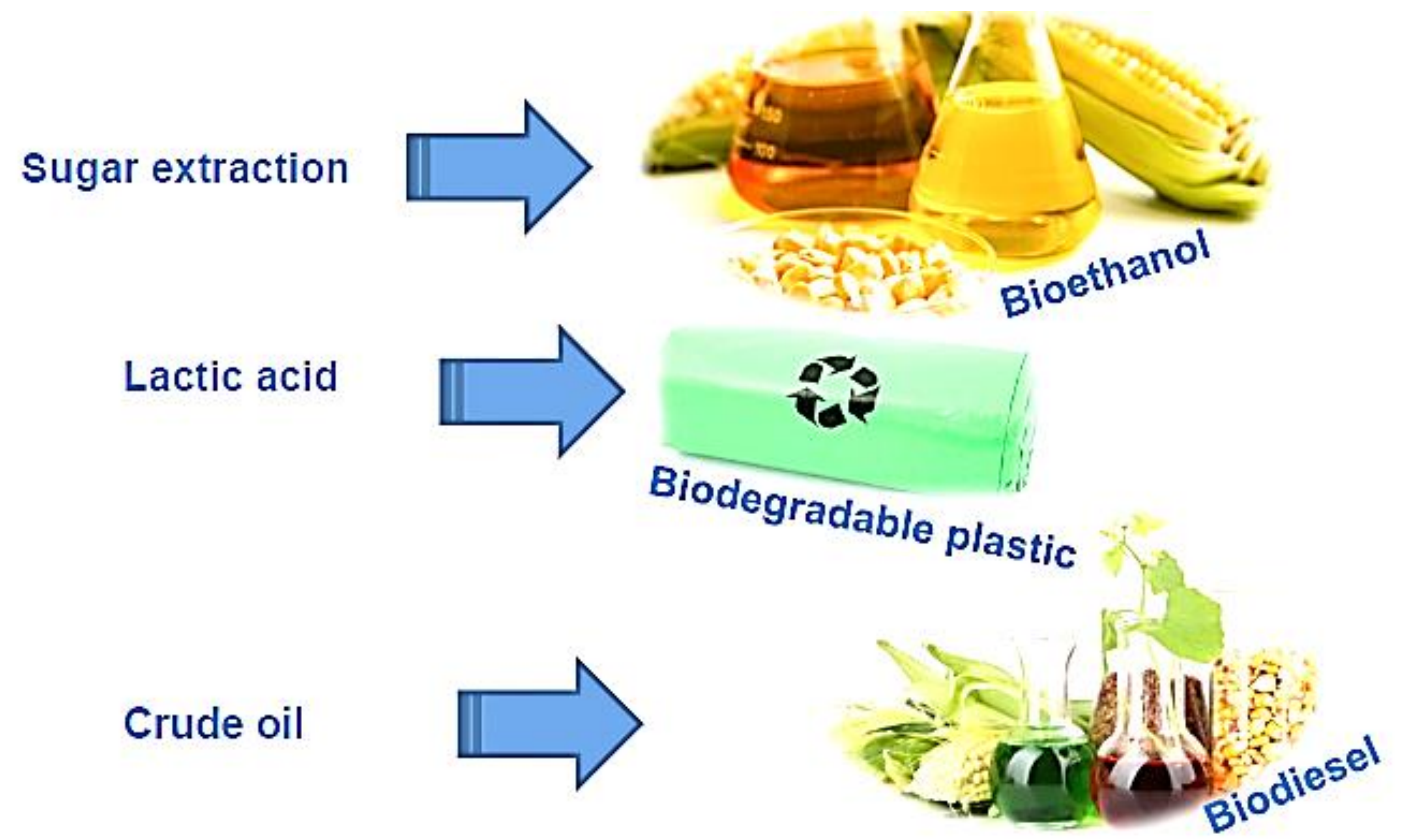


Extraction of valuable materials from sugar cane, kenaf and paper waste through sub-critical water reaction

PI 2018704083 (A Method For Extracting Sugar , Tar and Organic Acid From An Agricultural Waste)



Summary of Subcritical Water Treatment Process



BRIEF TECHNOLOGY

- This technology can convert major agriculture waste especially in our country (banana stem, coconut husk, sugarcane bagasse, kenaf and paper) to valuable materials using completely harmless water. Totally **free toxic** organic solvents.
- It is lower process cost, mild operating conditions and environmental sustainability. Short period of extraction (5 min).

CURRENT ISSUES

- The reaction time is the imitation. This research limits reaction time to determine the optimum highest yield. Increasing the reaction time will increase the cost of manufacturing.

INVENTIVENESS & NOVELTY

- Method for producing valuable materials containing sugar, organic acid and tar starting from sugar cane, banana stem, coconut, kenaf and paper and paper waste **ONLY** with water under two variables, temperature and residence time to control.

USEFULNESS & APPLICATION

- This technology can convert plant-based wastes (organic matters) to valuable materials. Lignocelluloses that contains sugar to **bioethanol**. Lactic acid to **bio-plastics**. The crude oil (tar) can be used as **biodiesel / biofuel**.
- Feedstock can be obtained from abundant agricultural waste, heating temperature is not very high (< 330 °C), and shorter extraction time (reaction) at 5 min. Low electrical usage.

IMPACT OF THE PRODUCT

- The feedstock for the product is extracted from abundant agricultural waste which can support highly demand of lactic acid and as feedstock for bioethanol.

MARKET POTENTIAL

- High cost of petrochemical (rising price, limited fossil fuel) feed stocks drive demand for **lactic acid**. Lactic acid market worth 3.82 billion USD by 2020
- Brazil is the largest world's bio-ethanol exporter produced from sugar cane. Second is US.
- Our country can produce **bio-ethanol** from sugarcane but using different technology, sub-critical water technology which is green technology and low cost.

TRL : 5 - Validation in real environment



Project Leader : Dr. Nordin Bin Hj. Sabli
 Team members : Prof. Dr. Yoshida, Dr. Shamsul
 Dept./Faculty : Chemical and Environmental Engineering, Faculty of Engineering
 Email : nordin_sab@upm.edu.my
 Phone : 603-9769 4429
 Expertise : Sub-critical water treatment technology

#UNSDG



www.sciencepark.upm.edu.my