A Method To Produce Carbon Catalyst From Oil Palm Mill With Improved Characteristic

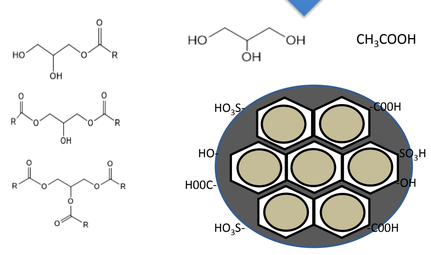
PATENT NO. PI 2020002505

Palm kernel shell

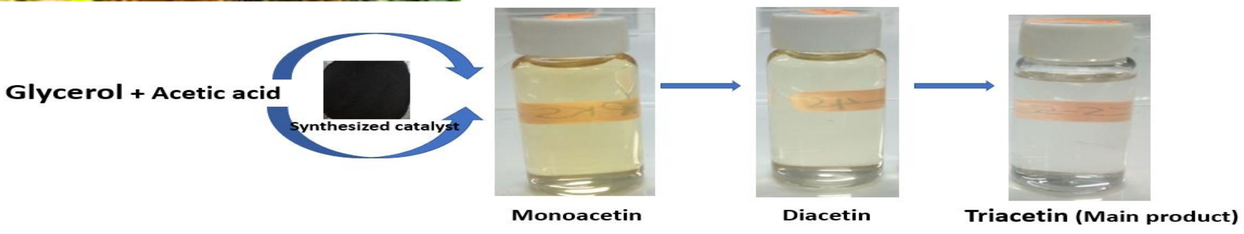
Carbonization

Biochar

Sulfonation
Conc H_2SO_4

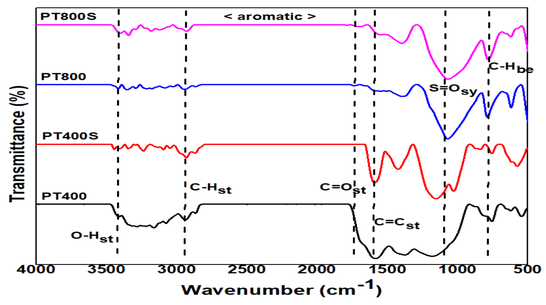


PKS derived solid acid catalyst

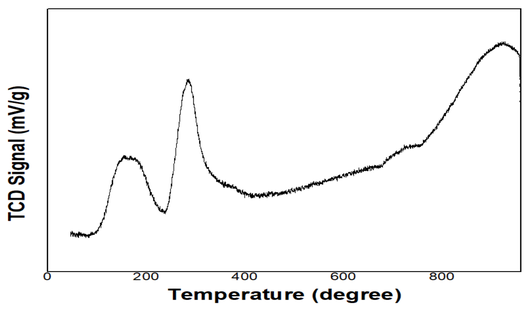


CHARACTERIZATION

FTIR



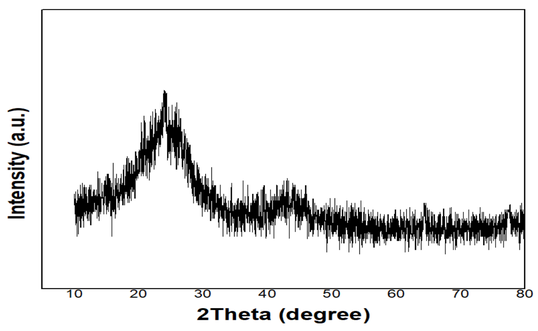
TPD



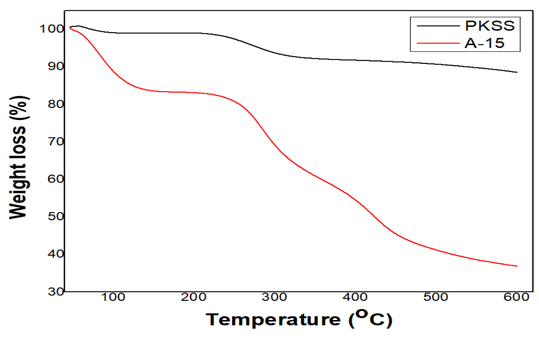
☑ High oxygen funtionalities

☑ High acidity

XRD



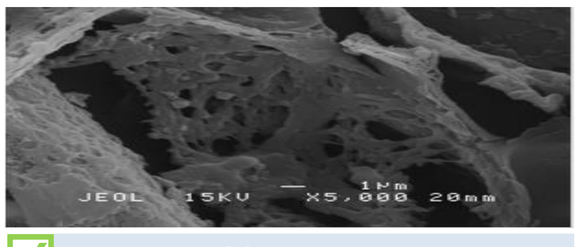
TGA



☑ Amorphous carbon

☑ High thermal stability

SEM



☑ Many pores

TECHNOLOGY

The invention involves the synthesis of carbon catalyst derived from oil palm wastes via pretreatment, carbonization and sulfonation processes. The resultant material is an excellent catalyst in triacetin production from glycerol.

PROBLEM STATEMENT & CURRENT ISSUES

- Homogenous catalyst (sulfuric acid) currently in use is corrosive, highly toxic and difficult to separate.
- Commercial solid catalyst such as Amberlyst - 15, zeolite are thermally unstable, narrow pore size, expensive and lead to low triacetin selectivity.
- Glycerol glut due to massive biodiesel production.

INVENTIVENESS & NOVELTY

- The derived catalyst is cost effective and is of wastes to wealth application. Malaysia generate a lot of oil palm wastes and it conversion to other application such as catalyst with improved characteristic is novel.
- The produced catalyst also transform glycerol (by product) to green fuel additive.

USEFULNESS & APPLICATION

- Improve the selectivity of triacetin at a minimal cost.
- Potential to catalyze acid based reactions and removal of contaminants.

IMPACT OF THE PRODUCT

- Low cost production
- Simple production process
- Simple catalyst recovery
- Material cheaply available
- Environmentally friendly
- Easily disposable
- Water resistance
- Improve selectivity of triacetin

MARKET POTENTIAL

- The triacetin product is of high market value because of its green technology as fuel additive.
- Wastes minimization and utilization of the oil palm waste materials.
- Uilization of glycerol and thereby improving biodiesel economy.
- Improve environmental sanitation

TRL : 5 - Validation in real environment

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