KEMENTERIAN PERUSAHAAN PERLADANGAN DAN KkomoditI

MPOB

27th MPOB **TOT 2021**

TRANSFER OF TECHNOLOGY

SEMINAR & EXHIBITION



TECHNOLOGY ADVANCEMENT FOR PRODUCTION OF HIGH VALUE PALM PRODUCTS

Biomass to Value Addition Product Transformation

Research Focus Area : Sustainability Development
Program : Value Addition

TECHNOLOGY HIGHLIGHTS

MPOB TT538 Ligno-Ripper Machine for Processing of Fibrous Biomass

MPOB TT457 Refining Technology of Palm Sludge Oil (PSO) for Industrial Application

DESCRIPTION OF TECHNOLOGIES

PRE-TREATMENT TECHNOLOGIES FOR OIL PALM BIOMASS (OPB)

A novel machines function as a pre-treatment process to produce short-length (2-6 inches) and semi-dried (50%-60% moisture) oil palm biomass (OPB) fibres for various value added products (bio-compost, bio-composite, energy pellets and animal feed).

Current technology is not suitable for producing OPB fibres as raw material due to high moisture (trunk and frond) and high oil content in EFB result in low strength and physical properties of the bio-composite.

Conventionally, the processing of oil palm biomass requires several processes such as chipping, shredding, hammer mill and debarking which contributes to high maintenance cost and processing time.

ADD VALUE OF PSO VIA NEW REFINING PROCESS

- Technology aims to upgrade PSO recovered from ponds through refining technology and add value to the process by recovering value-added products from PSO.
- The refining consists degumming, discolourisation and deodourisation processes. Strong bleaching agents are introduced to enhance the discolourisation process.
- The bleached PSO is subjected to deodourisation for the removal of very short chain acids (VSCA).

NOVELTY/ HIGHLIGHTS



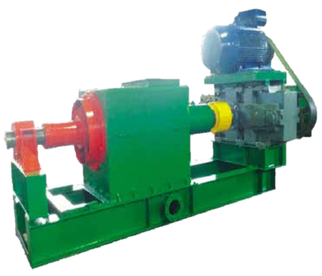
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LIGNO RIPPER

Cutting the biomass into short length using shearing process through a combination of two fin cutters, fixed knife and different size of dye plat.

The clock wise rotation of the shaft brings forward the short length fibres to the fixed dye plat, extrudes the fibre and cuts them into smaller sizes a using cutting blade.

CAPEX = RM220000; Payback Period = 4 Years; IRR = 36%



PI 2016000817

SNIPPER PRESS

DUAL FUNCTION MACHINE involves cutting by breaking and tearing the oil palm biomass to reduce the size and pressing by squeezing the oil and moisture from the fibrous materials via Combination of bladed taper cone, cutting knives, rib press cage and screen discharge disc.

The taper shape of the cone assists the effectiveness of the pressing action. The rotation of the helical blade mounted taper cone further shears the material into even smaller pieces.

The sheared material is pressed by the bladed taper cone against the interior rigid surface of the press cage in order to extract oil and/or moisture remaining in the sheared material.

CAPEX = RM260000; Payback Period = 5 Years; IRR = 38%

Oil Palm Biomass Fibres



Empty Fruit Bunch (EFB) Fibres
Moisture: <50%, Length: 2 - 6 inches



Oil Palm Trunk (OPT)Fibres
Moisture: <60%, Length: 2 -6 inches



Oil Palm Frond (OPF)Fibres
Moisture: <55% , Length: 2 – 6 inches

Advantages Ligno Ripper and Snipper Press

Simplify process by eliminating multi-stages processing machines thus, reduce production cost and energy.



Maintenance cost REDUCED SIGNIFICANTLY from RM1.80 to RM0.30 /tonne.
Ligno Ripper capable to produces very short fibres (2 inches) for energy pellets & bio-compost.
Snipper Press produces 4-6 inches fibres, reduces oil and/or moisture content - suitable for bio-composite products (particle board, strand board & MDF) and animal feed.
Replace wood-based products with OPB thus, reduce EFB incineration and timber dependency.



Energy Pellets



Particle Board



Bio-Compost



Medium Density Fibre Board (MDF)

REFINED PALM SLUDGE OIL

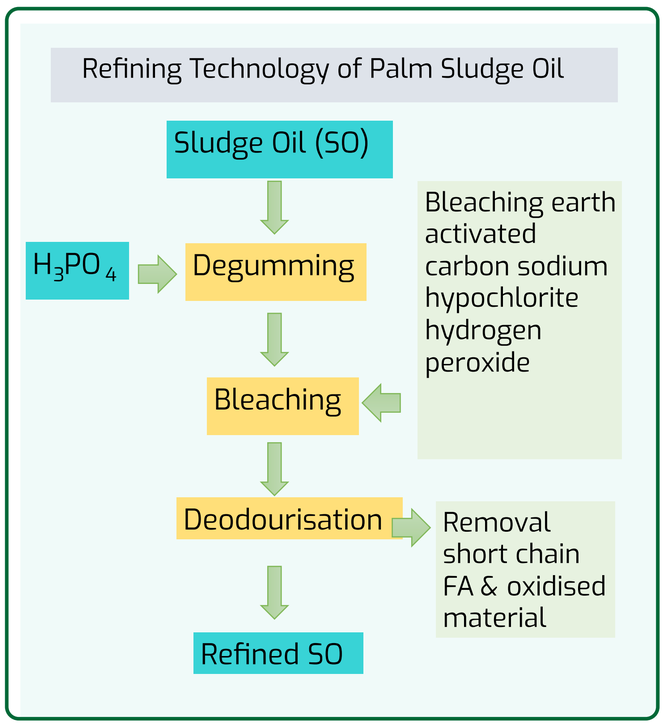
- Upgrading PSO through refining technology.
- Remove odour and reduce colour of PSO.
- Provide new applications of PSO.



Palm Sludge Oil

Economic Analysis

- PSO normally sold at 50% of crude palm oil (CPO) price.
- Refined PSO could be sold at a price equivalent to palm fatty acid distillate (PFAD) which is 75% of CPO price.





Refined Palm Sludge Oil (Lighter & Deodoured)

Advantages Refined Palm Sludge Oil

- Physical process to turn PSO into more acceptable resource from palm oil mill.
- Short chain acids produced is a valuable chemicals for industrial application.

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