

## **Phenol-rich bio-oil derivation via microwave-induced fast pyrolysis of oil palm empty fruit bunch with activated carbon**

### **ABSTRACT**

In the present study, oil palm empty fruit bunch (EFB) was subjected to microwave-induced fast pyrolysis. It has been demonstrated that EFB pyrolysis with activated carbon (AC) as microwave susceptor significantly increases the bio-oil yield (38.26 wt%) at an optimized temperature of 500 °C as compared to the EFB pyrolysis without AC (1.89 wt%). The EFB bio-oil produced at 500 °C (EPO500) was characterized to be enriched with oxygenated compounds (92%) and high nitrogenous compounds (8%) with an overall low carbon to hydrogen ratio (0.1) that prohibits its direct usage as a transportation fuel. The EPO500 was also determined to have a higher selectivity of phenol compound at 42.95% with total phenolic derivatives up to 67.5%. The high phenolic content of EPO500 achieved at the highest possible yield indicates its potential to be used for the production of renewable phenolic resins. Hence, the present work of microwave-induced pyrolysis of EFB presents itself as a promising method to produce highly selective mono-phenol rich bio-oil from biowaste.