

## Pyrolysis Of Empty Fruit Bunch (EFB) Palm in Production of Biochar

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### Structured Abstract

**Background:** Malaysia is one of the largest producers of palm oil in the world. Every part of the palm oil tree can be used in any application, including Empty Fruit Bunches (EFB). Due to its potential as an energy source, palm oil Empty Fruit Bunch (EFB), the most significant solid waste in the palm oil sector, was chosen as a biomass sample. In this case study, Biochar is a solid form of carbon that is produced through the process of Pyrolysis. Biochar has several unique properties that make it an attractive material for a variety of applications, including its high carbon content, and porous structure. Some of the potential uses of biochar include solid fuel, adsorbent material, soil amendment and energy storage. This biochar will be analysed chemically and physically to determine its quality and quantity.

**Methods:** In this study, Empty Fruit Bunch (EFB) was pyrolyzed through a temperature of 500 °C, 600 °C and 700 °C to determine product yield analysis. Physiochemical properties of biochar sample were determined by proximate and ultimate analysis according to ASTM method to determine the moisture content, volatile matter, Ash, and Fixed Carbon. CHNS Analyzer was used to determine percentage of Carbon, Hydrogen, Sulphur Nitrogen. FTIR and SEM instruments were used to study surface functionality and morphologies.

**Results:** The results show that when increasing temperature from 500-700 °C, percentage yield of biochar declining from 38.72% to 23.51%. Increasing temperature of EFB shows that Ash has a highest percentage 74.31% compared to Moisture content, Fixed Carbon, and Volatile matter in proximate analysis. Ultimate analysis shows that at highest temperature of Biochar, Carbon content was the highest (70.32%) compared to the other chemical compound. FTIR spectra shows that raw EFB and Biochar samples have a different appearance of functional group appearance such as Hydroxyl. SEM results show porosity of the raw EFB and Biochar in three temperatures.

**Conclusion:** Highest temperature of Biochar in 700 °C has the best quality in application of use such as soil amendment due to its physiochemical properties.

**Keywords:** Empty Fruit Bunch, Pyrolysis, Biochar, Palm Oil, Biomass

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