

**Analysis of the Characteristics of Coal and Palm Oil Empty Fruit Bunch (EFB)
Mixtures as a Thermal Energy Source Supporting the CPO Clarification
Process**

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ABSTRACT

The initial clarification or purification process for Crude Palm Oil (CPO) requires sufficient thermal energy to maintain the temperature stability needed to separate oil, water, and impurities. This study aims to evaluate the characteristics of mixtures comprising coal and oil palm empty fruit bunches (OPEFB) as a thermal energy source for the CPO clarification process. Tests were conducted on pure coal, pure OPEFB, and mixtures labeled BT1, BT2, and BT3, using particle sizes of 20, 60, and 100 mesh. The parameters analyzed included calorific value, moisture content, and ash content. Pure coal (100 mesh) yielded the highest calorific value at 6,496.87 cal/g, while pure OPEFB (100 mesh) yielded 3,570.07 cal/g. Among the tested mixtures, BT3 (100 mesh) produced the highest calorific value (4,196.96 cal/g) and the lowest moisture content (8.93%), with an ash content of 7.14%. BT3 (100 mesh) was selected as the most promising mixture based on a comparative assessment of calorific value, moisture content, and the proportion of OPEFB utilized. These results represent a preliminary evaluation of fuel characteristics and do not yet demonstrate the direct impact on boiler performance or CPO quality.

Keywords : Oil palm empty fruit bunches (OPEFB), coal, fuel blend, calorific value, moisture content, ash content, CPO clarification.