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Abstract	:	Biomass-derived fuel presents a promising avenue for reducing our reliance on fossil fuels. Nevertheless, raw biomass poses obstacles like excessive moisture content, insufficient heating value, and challenging grindability. Consequently, numerous scientists have delved into creating biocoal from biomass, positioning it as a feasible substitute fuel for power plants. To grasp the characteristics of biocoal, researchers have initiated an investigation into its physical and chemical attributes. This exploration involves techniques including bulk density, proximate and ultimate analyses, and utilizing oxygen bomb calorimetry. Moreover, a series of experiments was conducted in which oil palm trunk biocoal (OPTC) was co-combusted with sub-bituminous coal (SBC) at different temperatures ranging from 600°C to 900°C and blending ratios of 20%, 50%, and 80% OPTC. The investigation unveiled that OPTC underwent transformations during the pyrolysis process, resulting in changes to its chemical composition, increased energy content, and modifications in mass and density. Notably, emissions from these combustion tests remained within acceptable limits. Among the various mixtures assessed, the blend consisting of 20% OPTC and 80% coal exhibited the most promising performance. This combination demonstrated higher combustion efficiency and notably lower emissions of CO₂, NO_x, and SO₂ compared to using 100% coal. An analysis of the ash generated during combustion using X-ray diffraction (XRD) revealed the presence of both SBC and OPTC components, with silicon-based compounds being predominant.