Abstract

Steel industries is one of the most growing sectors, in 2023, steel industries produced approximately 1.9 billion tonnes of steel globally. Although the steel sector plays an important role in growth and economy, it severely impacts the environment. For the production of 1 tonne of steel, the blast furnace emits 1.8 tonne of CO_2. In compliance with the Paris Protocol on climate change, the steel industries are shifting towards more greener steel considering biomass as a possible alternative to non-renewable fuels. Although biomass is a carbon-neutral fuel, its incorporation with coal for coke production will affect the properties of coke that are necessary to study for the proper functioning of the blast furnace.

For the study coal was blended with beechwood biomass and beechwood biochar separately at a blend ratio of 5,10,15,20%, with 5% corn starch as a binder. The resultant blends were pyrolyzed at 950°C, to obtain biocoke. The HHV of biocoke was 30.8 kJ/kg, which was comparable to coke. The TGA analysis revealed that biocoke had a combustion range of 400-600°C, which lies in the combustion range of coke. The addition of biomass/biochar hindered the swelling properties, and increased biocoke's porosity and strength.

Keywords: *Biomass, Biochar, Biocoke, Coke, Pyrolysis*