**CHARACTERISTICS OF VARIOUS SUGARCANE BIOMASS-DERIVED**

**BIOCHARS FROM LABORATORY AND BARREL TECHNIQUES**

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Biochar has been proposed as a valuable source to ameliorate and enhance soil quality. Economically and technically viable methods for biochar production have become a timely need. This study focused on evaluating the barrel technique for biochar production by comparing its characteristics to laboratory produced biochar. Different sugarcane biomass (bagasse, trash, and mini mill waste) derived biochar was prepared from a muffle furnace by pyrolyzing at 300, 450 and 600 °C for 2 h. The biochar was characterized by the amount of yield, pH, EC, bulk density, proximate and ultimate analysis, SEM and FT-IR characterization. The experimental data indicated that yield and volatile matter content have decreased, whereas pH, EC, moisture, ash, and fixed carbon content increased with increasing pyrolysis temperature. The bulk density of all the biochar was in the range of 0.18 to 0.27 g cm-3. The yield, EC, bulk density, and volatile matter content of barrel biochar showed similarities to 600 °C pyrolyzed biochar. The moisture and ash content of barrel biochar was significantly higher than that of 600°C pyrolyzed biochar. The fixed carbon content of muffle furnace pyrolyzed biochar was in the range of 45.1 to 79.3%, and barrel biochar also found to be in the observed range. Alkaline pH was observed in all the biochar, except in bagasse pyrolyzed at 300 °C, which has pH = 6.51. The presence of condensed aromatic rings in the biochar was indicated by the low molar ratio of H/C (0.17-0.29). Biochar samples exhibited heterogeneous, highly porous structures. Many FT-IR spectrum bands corresponding to the muffle furnace pyrolyzed biochar has disappeared in the barrel produced biochar. The study concluded that barrel technique is a viable option for biochar production in the context of physicochemical characteristics and economic feasibility. Based on the outcomes of the study, research can be extended towards potential application in the sugarcane growing soils.

***Keywords:*** *biochar, characterization, physicochemical properties, sugarcane biomass, pyrolysis temperature*