VALORIZATION OF GREENHOUSE BIOMASS WASTE USING PYROLYSIS

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Pyrolysis can be a promising and relevant technique for valorization of biomass waste obtaining biochar, which can be further used as a soil amender, can enhanced soil carbon sequestration, reduce greenhouse gas emissions and nutrient leaching, increase soil fertility, resulting in agronomic, environmental, and economic benefits.

Chrysanthemum morifolium is a perennial floral species dating back to ancient China, which can be used both for gardening and exhibitions. After the flowers have passed or are harvested, the plants are cut about 10-20 cm above the growing medium, in order to prepare them for the cold season. These cuttings result in significant amounts of plant waste material, sometimes even woody at the base. The aim of the research was to study the effect of pyrolysis on yield and relevant physicochemical characteristics of biochar obtained from greenhouse waste in order to be further applied as soil amendment.

Waste material of *Chrysanthemum morifolium* was harvest in the autumn of 2020 from the University of Agronomic Sciences and Veterinary Medicine of Bucharest Greenhouse, cut in small pieces (stem, leaves, flowers) and dried at room temperature for a few days.

Slow pyrolysis of chopped material was performed in a fixed bed reactor, in the presence of CO_2 as a carrier gas. Process experimental factors were as follows: heat flux (6-10 kW/m^2), carbon dioxide superficial velocity (0.004-0.008 m/s) and material particle size (0.015-0.033 m).

Both the plant waste material and biochar were characterised in terms of dry matter, loss on ignition, SEM, total carbon and nitrogen, bulk density, water retention capacity, pH, electrical conductivity, and mineral content. The effects of process factors on biochar yield and physicochemical characteristics as well as on pyrolytic oil yield were evaluated by statistical analysis. The results obtained indicated that greenhouse waste can be successfully valorized by slow pyrolysis.

Keywords: *biomass waste; biochar; pyrolysis; physicochemical characterization; waste valorization.*

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