



Influence of pyrolysis temperature in the pore size distribution of biochar

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Biochar, the product of pyrolysis of biomass in the absence of oxygen, added to soil, has been explored in the last years to mitigate global warming. The biochar's nature could come from crop and tree residues, urban organic waste materials, and pig slurry, among others. A rising body of work quantifies the effect of pyrolysis conditions, mainly temperature, on chemical and physical biochar properties. One of these characteristics is porosity that is related with properties as water holding capacity. Besides quantifying the macro and micro-porosity, other parameters can be extracted from the pore size distribution (PSD). This work aims to extract scaling parameters from it to differentiate the biochar properties.

Biochars were prepared from pig manure at three different pyrolysis temperatures: 300 (BPC-300), 450 (BPC-450) and 600°C (BPC-600). Mercury injection porosimeter (MIP) was used to determine PSD of biochar for equivalent pore diameter from 1 mm to 0.005 mm.

The multifractal formalism was employed to extract the scaling parameters. Mass exponent function and multifractal spectra showed that this method is suitable for mercury injection curves. The results show that with higher temperature applied in the pyrolysis process to obtain the biochar, the PSD multifractal characteristics decrease, pointing out a lower complexity in the PSD.