



Impact of Lignocellulosic Biochar Physical-Chemical Properties on its Wettability

Luiza Usevičiūtė and Edita Baltrėnaitė

Vilnius Gediminas Technical University, Research Institute of Environmental Protection, Environmental Protection and Water Engineering, Vilnius, Lithuania (luiza.useviciute@vgtu.lt)

Mechanism which influences lignocellulosic biochar's wettability is still not well understood, since different studies showed it's different wetting behaviour according to the rising pyrolysis temperature. Two main factors, which affect biochar's wettability, are the feedstock and pyrolysis conditions. This study investigated how different primary feedstocks (such as pine wood, birch wood, pine bark, birch bark and hemp) and pyrolysis conditions (two different temperatures (450 °C and 700 °C) and two holding times (1 and 2 hours)) influence wettability of produced twenty biochar types. Wettability of biochar types was investigated using water drop penetration time test. Besides, some other biochar's physical-chemical properties were investigated: ash content, pH, electrical conductivity, elemental composition (C, H, N, O), H/C and O/C ratios, bulk density and water holding capacity. It was shown that low temperature (450 °C) biochar was more hydrophobic compared to high temperature (700 °C) biochar produced from different feedstocks. Highest difference of biochar's wetting behaviour was seen in the case of pine bark and birch bark feedstocks. In this study multiple regression analysis was used to find out which biochar property is the most related with it's wettability. It was found that biochar's wettability can be predicted the best by the oxygen content and O/C elemental ratio.