

Environmental Potential of Biochar from Wood Biomass Thermochemical Conversion

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Abstract : Soil polluted with hydrocarbons spills is a major global concern today. As a response to this issue, our experimental study tries to put in evidence the option to choose for one environmentally friendly method: use of the biochar, despite to a classical procedure; incineration of contaminated soil. Biochar represents the solid product obtained through the pyrolysis of biomass, its additional use being as an additive intended to improve the quality of the soil. The positive effect of biochar addition to soil is represented by its capacity to adsorb and contain petroleum products within its pores. Taking into consideration the capacity of the biochar to interact with organic contaminants, the purpose of the present study was to experimentally establish the effects of the addition of wooden biomass-derived biochar on a soil contaminated with oil. So, the contaminated soil was amended with biochar (10%) produced by pyrolysis in different operational conditions of the thermochemical process. After 25 days, the concentration of petroleum hydrocarbons from soil treated with biochar was measured. An analytical method as Soxhlet extraction was adopted to estimate the concentrations of total petroleum products (TPH) in the soil samples: This technique was applied to contaminated soil, also to soils remediated by incineration/adding biochar. The treatment of soil using biochar obtained from pyrolysis of the Birchwood led to a considerable decrease in the concentrations of petroleum products. The incineration treatments conducted under experimental stage to clean up the same soil, contaminated with petroleum products, involved specific parameters: temperature of about 600°C, 800°C and 1000°C and treatment time 30 and 60 minutes. The experimental results revealed that the method using biochar has registered values of efficiency up to those of all incineration processes applied for the shortest time.

Keywords : biochar, biomass, remediation, soil, TPH

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