Optimizing Wastewater Treatment Using Biochar-Based Column Filtration System.

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Wastewater treatment for water reuse has received considerable attention owing to water resource shortage. One of the most effective wastewater treatment methods involves the use of column filtration systems (CFS). Biochar-based column filtration systems (BCFS) for wastewater treatment have gained attention in the last decade. In this study, decanted wastewater was treated by using a biochar-based column filtration system. The biochar using in this study was produced from exhausted olive pomace at a temperature of 590℃ and maintained for a residence time of 2h with a heating rate of 10℃/min. Four BCFS were constructed on the basis of the volume ratio of biochar in common sand (0%, 10%, 25%, and 50%) to explore the influence of biochar dosage on the treatment performance. The results showed that the biochar added to BCFS provided higher removal efficiencies for ammonium (54.6%–75.2%), COD (44.7%-56.3%), total phosphorus (36.6%-42.9%), orthophosphate (37.7%-43.1%), and total suspended solids (84.7%-93.1%). The BCFS with 10% biochar showed the best removal performance toward the NH4+ (75.2%), COD (56.3%), TP (42.9), PO43- (43.1), and TSS (93.1%), compared with control column filtration system (CCFS) for ammonium (53.6%), COD (32.3%), total phosphorus (27.3%), orthophosphate (31.9%), and total suspended solids (79.2%) respectively. Moreover, this performance in eliminating these pollutants is accompanied by a release of nitrate, nitrite, and sulfate pollutants by all CFS.
Based on this preliminary study, the efficiency of BCFS in removing pollutant from wastewater is optimal with the small amount of biochar (10%).

Keywords: Biochar; Wastewater treatment; Column filtration systems; Optimization

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'The removal of phenolic compounds using Navicula permitis algae: a potential treatment method for olive mill wastewater'

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