Abstract

Olive mill wastewater (OMWW) and olive husk are byproducts of the manufacture of olive oil in olive mills. They are considered as a big issue because of the high production within a limited period of year, in addition to the high level of organic and inorganic content, especially the phenolic compounds which are classified as toxic and poor biodegradation compounds. Locally, the OMWW is immediately discharged into valleys or to the soil, increasing the danger of contamination of soil, surface water resources, and groundwater aquifers. Thus, treating the OMWW is an urgent need.

This work aims to mitigate the impact caused by the discharge of untreated olive mill wastewater OMWW. By combination between chemical treatment using aluminum sulfate aided with lime, and sand filter with activated carbon. The obtained results indicated that the coagulation sedimentation (using aluminum sulfate aided with lime at pH=6.8) reduced the concentration of organic load represented by Chemical oxygen demand (COD), Total dissolved solids (TDS), and Total suspended solid (TSS) from 13192, 21070, and 1170 to 10272, 14657, and 816 mg/L, respectively. The sand filter processes showed more efficient removal of organic load than the coagulation-flocculation sedimentation process. After that, the study conducted a sand filtration test using two applications—fine coal and activated carbon—to evaluate their effectiveness in treating olive mill wastewater (OMWW). Activated carbon was applied in two configurations within the sand filter: one sequence began with activated carbon and moved towards larger gravel sizes, while the other started with larger gravel sizes and concluded with activated carbon. The results showed that both methods successfully reduced pollutant concentrations. Activated carbon exhibited superior performance compared to fine coal, especially in the configuration starting with activated carbon and progressing to larger gravel sizes, as the residual concentration of COD, TDS, and TSS after two stages of the sand filter was 7456, 11272, and 120 mg/l. So, the final effluent couldn't be discharged safely to the Nablus wastewater plant as it didn't meet the feed specifications.