Removal of Boron and Arsenic from Petrochemical Wastewater by Using Aquatic Booster as Adsorbent.

ABSTRACT

The potential to remove boron and arsenic from petrochemical wastewater by using aquatic booster was investigated in batch experiment process and the results were measured by inductively coupled plasma mass spectrometry (ICPMS). The main parameters influencing arsenic and boron adsorption onto the aquatic booster were contact time, size of particle, agitation speed, and dosage. The initial concentration of boron and arsenic was fixed by changing contact time (120-480 minutes), agitation speed (0-120 rpm), aquatic booster dosage (0-55 g/L), and size of particle (2 mm, 1 mm, and 0.60 mm). The adsorption efficiency of arsenic and boron increases with longer contact time as well as more aquatic booster dosage and higher agitation speed. However, it tends to achieve equilibrium once the active sites of the adsorbent are fully occupied. On the other hand, adsorption efficiency decreases with larger adsorbent particle size. The equilibrium time for both boron and arsenic is 390 minutes. The removal efficiency for boron is around 60.36% by 35g/L dosage, 80 rpm and a particle size of 0.60 mm at of 390 minutes. As for the arsenic, the condition where it gives the removal percentage around 71.83% is that particle size of 0.6 mm, 300 minutes contact time, agitation speed of 80 rpm and dosage of 45g/L. The modeling study shows that the adsorption isotherms for both metals onto aquatic booster are Freundlich type.

Keyword: Mixed agricultural waste adsorbent; Petrochemical wastewater; Heavy metal adsorption