

The ability to modify a waste by-product precursor, maize tassel biomass using sulfuric acid as the activating agent with specific focus on Lead(II) ion from water has been proposed. The treating of maize tassel using sulphuric acid is believed to enhance sorption capacity of Lead(II) ions. For this, batch adsorption mode was adopted for which the effects of initial pH, adsorbent dosage, contact time and initial concentration were investigated. Consequently, it was found that the adsorbent capacity depends on pH; since it increases up to 4.5 and then decreases. The highest percentage of Lead(II) ion removal was achieved in the adsorbent dosage of 1.2 g and at an initial concentration of 10 mg/L metal ion. In an attempt to determine the capacity and rate of Lead(II) removal, isotherm and kinetic data were modeled using appropriate equations. To this end, the adsorption data fitted best into the Langmuir model with an  $R^2$  (0.9997) while kinetically the Lead(II) adsorption followed the pseudo-second-order model. Furthermore, as a way to address issues related to sustainability, maize tassel is recommended since the process is considered to be a dual solution for environmental cleaning. From one side, it represents a better way to dispose the maize tassel which has no use after fertilization and on the other hand it is an economic source of carbonaceous materials.