عنوان مقاله:

Adsorption of humic acid from aqueous solutions onto shellfish ash: Kinetic and isotherm studies and artificial neural network modeling

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خلاصه مقاله:

Background: Natural organic matters such as humic acid react with chlorine and produce disinfection by products such as trihalomethanes that are carcinogenic. In this study, shellfish ash was used as a novel adsorbent for removal of humic acid. Methods: The present study was performed under various laboratory conditions including pH, adsorbent dose, contact time, and initial concentration of humic acid. Residual concentrations of humic acid in the samples were determined by a UV-Vis spectrophotometer at 254 nm wavelength. Artificial neural network (ANN) modeling studies were also performed. Results: Elemental analysis showed that the shellfish ash was 98% pure calcium. It was indicated that the maximum adsorption capacity was achieved in acidic conditions (pH = 3) and pHzpc was found to be 10.3. The adsorption data followed the Langmuir model (R2 > 0.9). The adsorption of humic acid followed the pseudo-second-order kinetic (R2 = 0.999). ANN modeling also provided the accurate prediction of humic acid adsorption for testing data (R2 = 0.989). Conclusion: According to the results, shellfish ash is recommended as an effective biosorbent for removal of organic pollutants such as humic acid.

کلمات کلیدی:

Adsorption, Humic substances, Kinetics, Shellfish, Neural network