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J Earth Sci Clim Change 2018, Volume 9
DOI: 10.4172/2157-7617-C2-043

Optimization condition of solid waste vegetable oil industry modification in Arsenite and Rrsenate removal and its prediction using artificial neural network

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Arsenic usually is built up in the body through drinking water and food contaminated with arsenic and causes increased risks of cancer in the skin, lungs, liver, kidney and bladder. This study is the laboratory scale that investigates the influence of pH, contact time and Fe^{2+}/H_2O_2 on modification of solid waste vegetable oil industry in arsenic removal were investigated. An artificial neural network model for arsenic removal during adsorption process under experimental conditions was derived and validated. It was observed that the arsenic removal efficiency was influenced by two of these parameters. Fe^{2+}/H_2O_2 is an important factor that affects both As(III) and As(V) removal ($P<0.01$). pH is another factor that affects significantly the As(V) and As(III) removal ($P<0.05$). It was observed that the maximum As(III) removal by the modified solid waste vegetable oil industry was obtained at pH 2, Fe^{+2}/H_2O_2=0.04 and 30 minutes of contact time (81%) whereas, the maximum As(V) removal was obtained under the conditions of pH 5, Fe^{+2}/H_2O_2=0.04 and 30 minutes of contact time (75%). The efficiency of Arsenic removal of the ANN model was compared with experimental value; error was small and within acceptable range. This study shows that Fenton is an effective method for modification of solid waste vegetable oil industry in removal of As(III) and As(V) from aqueous solution. The simulative results showed that the application of ANN to Arsenic removal is feasible and has the high efficiency and precision.

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