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REMOVAL OF DIAZINON FROM AQUEOUS SOLUTIONS USING NANOCOMPOSITES PREPARED FROM CARBONIZED RICE HUSK

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Abstract

Increasing water consumption and its pollutants threatens primary water supply sources due to the growth of various industries and production of wastewater including agriculture. Scientists attempt to remove water pollution using recyclable materials, especially composites and recyclable polymer nanocomposites. Diazinon is a phosphorus pesticide being widely used as a pesticide in agriculture, and its residues are found in aquatic ecosystems. In this study, the efficiency of nanocomposites prepared from rice husk to remove diazinon from water was investigated. Residual diazinon concentrations were determined by high performance liquid chromatography (HPLC) instrument. The nanocomposite properties were characterized using FESEM, FTIR, XRD, DLS, zeta potential, CHN and EDX techniques. The parameters including pH, contact time, adsorbent dose, and diazinon concentration were investigated on the removal rate by nanocomposites. Isotherm models were used to study adsorption capacity of the nanocomposite. FTIR and FESEM analyses showed uniform distribution of particles in the polymer composite. The average particle size of nanocomposite was 63.57 ± 13.47 nm, and C appeared to be the most abundant atom (53.35%) in particles. The best removal conditions included pH=7 and the crossing time of 20 minutes. The removal efficacy was highest at 20 ppm of diazinon and 0.1 g of nanocomposite. The adsorption process of the nanocomposite was more consistent with the Langmuir isotherm (R2>0.98), which signifies the homogeneous adsorption of the adsorbent. The results of this study revealed that nanocomposites prepared from rice husk can be considered as a suitable adsorbent to remove diazinon from aqueous media.

Key words: aqueous solutions, diazinon, high performance liquid chromatography, nanocomposites, rice husk

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