

BIOSORPTION OF ORGANIC AND INORGANIC POLLUTANTS FROM SIMULATED WASTEWATER BY USING EQUISETUM HORSETAIL

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ABSTRACT

Through easy and environmental friendly processes, equisetum horsetail was used to produce biosorbent materials. This equisetum based biosorbent was investigated for the removal of Hg^{2+} and furfural from simulated waste water using granule equisetum horsetail. Many isotherm models were used for single component and binary system. Langmuir model gave the best fitting for the single system ($R^2_{\text{Fu}} = 0.9946$ and $R^2_{\text{Hg}^{2+}} = 0.9935$), while the binary system was fitted successfully with extended Langmuir model ($R^2_{\text{Fu}} = 0.9977$ and $R^2_{\text{Hg}^{2+}} = 0.9969$). For kinetic study, Pseudo-first order, pseudo-second order, intra-particle diffusion and Elovich were chosen. From the results, the pseudo-second order model was well fitted for Hg^{2+} and furfural ($R^2_{\text{Fu}} = 0.9942$ and $R^2_{\text{Hg}^{2+}} = 0.9910$). The biosorption thermodynamic indicated that the biosorption of furfural and Hg^{2+} onto biosorbent was exothermic reaction. Desorption of Hg^{2+} and furfural from simulated wastewater was obtained when using 0.1M NaOH and HCl.

KEYWORDS: Granule Equisetum Horsetail, Isotherm, Single System, Langmuir Model, Desorption