Biowaste to Biosorbent

Chai, Leslie Jia Le

In Malaysia, 1.44 million tons of chicken was consumed in the year 2014 and chicken bones are the by-product of it. Therefore in this study, the feasibility of chicken bones to be used as a biosorbent to remove heavy metals from the waste water released by the factory focusing on the galvanization industry was investigated. I have therefore investigated the effect of contact time on the adsorption of iron (Fe) and zinc (Zn), the functional group responsible for the adsorption, the adsorption isotherms and the capability of chicken bones to remove heavy metals from the real galvanization waste water sample. An atomic adsorption spectrophotometer was used to detect the concentrations of heavy metals and a Fourier transform infrared spectroscopy was used to detect the functional group. The findings of this study can be summarized as follows: (i) Chicken bones powder with contact time of 2 hours with the iron solutions was able to achieve maximum percentage of adsorption which is 100% and zinc solutions needed 12 hours of contact time to achieve 72.77% of adsorption. (ii) Galvanization wastewater from local factory shows 89.235% of adsorption of Iron and 95.431% adsorption of Zinc after 12 hours treatment with chicken bones. Statistics shows that there is a significant decrease in the concentration of Iron and Zinc as $P<0.05$. (iii) FTIR Analysis spectra shows that there are difference in absorbance before and after adsorption. (iv) The adsorption of Iron and Zinc both fits best to Langmuir isotherms. I conclude that there is a great perspective of application of chicken bones as biosorbent for heavy metals in industrial effluent.

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