Biosorption of Ni (II) Using Alkaline-Treated Rice Husk

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Abstract— Rice husk has been widely reported as a good sorbent for heavy metals. Pretreatment of rice husk minimizes cellulose crystallinity and increases the surface area thus ensuring better adsorption capacity. Commercial base and natural base-treated rice husk were used to investigate the potential of Ni (II) adsorption from synthetic wastewater in batch systems. Effects of process variables such as pH, contact time, adsorbent dose, initial Ni (II) concentration were studied. Optimum Ni (II) adsorption was observed at pH 6 within 60 min of contact time. Experimental data showed increased amount of adsorbed Ni (II) with increasing adsorbent dose and decreased percent of adsorption with increasing initial Ni(II) concentration. Kinetic isotherms (Langmuir, Freundlich) were also applied. Biosorption mechanism of rice husk was analyzed using SEM/EDS, FT-IR, and XRD. The results revealed that natural base produced from agro industrial waste could be used as efficient as commercial bases during pretreatment of rice husk in removing Ni(II) from wastewaters within 15 min.

Keywords—adsorbent, biomass, heavy metal, nickel removal.

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