

A Greener Approach for the Recovery of Proteins from Meat Industries

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Abstract : The adsorption of bovine serum albumin (BSA) and human hemoglobin (Hb) on naturally-occurring adsorbents was studied to evaluate the potential recovery of proteins from meat industry residues. Spent peppermint tea (PM), powdered purple corn cob (PC), natural clay (NC) and chemically-modified clay (MC) were investigated to elucidate the effects of pH, adsorbent dose, initial protein concentration, presence of salts and heavy metals. Equilibrium data were fitted according to isotherm models, reporting a maximum adsorption capacity at pH 8 of 318 and 344 mg BSA/g of PM and NC, respectively. Moreover, Hb displayed maximum adsorption capacity at pH 5 of 125 and 143 mg/g of PM and PC, respectively. Hofmeister salt effect was only observed for PM/Hb system. Salts tend to decrease protein adsorption, and the presence of Cu(II) ions had negligible impacts on the adsorption onto NC and PC. Desorption experiments confirmed that more than 85% of both proteins can be recovered with diluted acids and bases. SEM, EDX, and TGA analyses demonstrated that the adsorbents have favorable morphological and mechanical properties. The long-term goal of this study aims to recover soluble proteins from industrial wastewaters to produce animal food or any protein-based product.

Keywords : adsorption, albumin, clay, hemoglobin, spent peppermint leaf

Conference Title : ICSWRA 2019 : International Conference on Solid Waste Recycling Applications

Conference Location : Paris, France

Conference Dates : December 30-31, 2019