

Utilization of natural food wastes as new adsorbent for precious metal ions

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Abstract

Use of protein-rich biomass as alternatives to petrochemicals has attracted a broad range of scientific and industrial interests. Protein-rich biomass is produced as a byproduct in the food and agricultural industries, and is usually inexpensive (far less than 100 US\$/kg). Owing to the high protein content (~90%), biomass is an attractive source of peptides and amino acids. We propose here a novel environment-friendly recycle system of precious metal ions such as gold and platinum ions using biomass. Protein-rich biomass tested here was soybean protein (Fuji Oil Co, Japan), chicken egg-shell membrane (Q.P. Corporation, Japan) and seasoning Pollack-roe membrane. My presentation is composed of three pieces; (1) selective adsorption of precious metal ions onto protein-rich food wastes, (2) the adsorption mechanism of precious metal ions with the food wastes, and (3) demonstration of selective recovery of precious metal ions from actual copper refining solution. A protein-rich food waste was found to have an extremely high loading potential 250g/kg-food waste for gold ions. We describe not only scientific investigations but also practicality of the strategy. The recycle system using food waste will enable selective recovery of precious metal ions from industrial wastewater without extra emissions of CO₂.