

# Biosorption of Chromium (VI) Ions using Sustainable Eggshell Impregnated Pandanus amaryllifolius Roxb. Adsorbent

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## Abstract:

The conventional methods used nowadays is cost inefficient and non-ecofriendly. Thus, biosorption using waste was proposed in this study. The aim of this study is to remove chromium (VI) ions using raw eggshell and hybrid eggshell-pandan biosorbent. The result obtained showed that hybrid sorbent had higher efficiency in removal of chromium (VI) ions. The experimental results had indicated that the optimum conditions for the raw eggshell sorbent to achieve the optimum removal percentage of 17.78% were 140 minutes of contact time, 0.5 g of sorbent, room temperature, pH 5 and 0.8 mg/L solution. While for hybrid sorbent, the optimum removal percentage achieved 37.88% when the contact time is 140 minutes, with 0.5 g dosage, 50°C, pH 4 and 0.8 mg/L solution. The study showed that the adsorption of Cr (VI) ions onto the hybrid sorbent follows pseudo-second-order kinetic model of Lagergren, Freundlich isotherm model and the thermodynamic study showed negative values of Gibb's energy, positive value of enthalpy (16.68 KJ/mol) and entropy change (0.0473 KJ/mol). In short, hybrid eggshell-pandan sorbent is a good biosorbent to removal Cr (VI) ions from solution.

**Keywords:** Eggshell; Pandan; adsorption; Cr (VI) Ions; Biosorbent

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