

# ADSORPTION OF NI(II) AND CO(II) IONS FROM AQUEOUS SOLUTION USING ACTIVATED CARBON BASED ON COFFEE AND COCOA SEED HUSK BIOMASS

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## Abstract

The aim of this research is to relate surface chemistry and textural characteristics of activated carbon (AC) in the adsorption of Ni and Co ions present in single, bi and multi-elemental solutions, which simulates the wastewater from mineral processing in acid leaching technology. The chars were treated with Na<sub>2</sub>S solution before activation process for pore development. Batch adsorption test were done as function of heavy metal concentration, adsorbent doses, temperature and adsorption time. The adsorption behavior was evaluated through isotherm models, thermodynamics and kinetics parameters. At 25 °C Langmuir maximum adsorption capacity ( $q_m$ ) for Ni and Co ions is bigger for the ACs without chemical pre-treatment. The adsorption of the metallic species is an endothermic and spontaneous nature, with the combination of physical and chemical forces. The kinetic behaviour is explain by a “surface enhancement” associated with highly energetic and heterogeneous surface. In multi-element solutions containing Ni(II), Co(II), Mn(II) and Mg(II) ions, the adsorption is enhanced for ACs pore development.

**Keywords:** Adsorption mechanism, coffee husk, cocoa seed husk