

## A performance of hybrid biosorbent 'M-Bios' of Pb(II) and Cu(II) in aqueous solutions

### ABSTRACT

'M-bios' biosorbent is a hybrid of mangrove wasted bark from charcoal industry at Perak, Malaysia and green algae from Sabah to remove heavy metals. This biosorbent is subjected to FTIR and ICP-MS. 'M-Bios' contain N – H (3421.89 cm<sup>-1</sup>, 3465.90 cm<sup>-1</sup>), C = O (1728.72 cm<sup>-1</sup>) and – OH (3531.37 cm<sup>-1</sup>, 3722.01 cm<sup>-1</sup>, 3768.36 cm<sup>-1</sup>) functional groups (weak groups) that that easily replaced by metal ions. The adsorption performances were fitted by pseudo-kinetic, Langmuir and Freundlich study. The plots obey both adsorption isotherm models, Langmuir and Freundlich by R<sup>2</sup> values. A good agreement between experimental and theoretical q<sub>e</sub> for contact time data suggested that adsorption reaction happen in aqueous solution was a rate determination of chemisorption process(pseudo second-order kinetic).

**Keyword:** Mangrove; Biosorbent; Biosorption; Algae; ICP-MS