

# Utilization of bivalve shell-treated *Zea mays* L. (maize) husk leaf as a low-cost biosorbent for enhanced adsorption of malachite green

A.A. Jalil, S. Triwahyono, M.R. Yaakob, Z.Z.A. Azmi, N. Sapawe, N.H.N. Kamarudin, H.D. Setiabudi, N.F. Jaafar, S.M. Sidik, S.H. Adam and B.H. Hameed

**Abstract** : In this work, two low-cost wastes, bivalve shell (BS) and *Zea mays* L. husk leaf (ZHL), were investigated to adsorb malachite green (MG) from aqueous solutions. The ZHL was treated with calcined BS to give the BS-ZHL, and its ability to adsorb MG was compared with untreated ZHL, calcined BS and Ca(OH)<sub>2</sub>-treated ZHL under several different conditions: pH (2–8), adsorbent dosage (0.25–2.5 g L<sup>-1</sup>), contact time (10–30 min), initial MG concentration (10–200 mg L<sup>-1</sup>) and temperature (303 – 323 K). The equilibrium studies indicated that the experimental data were in agreement with the Langmuir isotherm model. The use of 2.5 g L<sup>-1</sup> BS-ZHL resulted in the nearly complete removal of 200 mg L<sup>-1</sup> of MG with a maximum adsorption capacity of 81.5 mg g<sup>-1</sup> after 30 min of contact time at pH 6 and 323 K. The results indicated that the BS-ZHL can be used to effectively remove MG from aqueous media.

**Keywords:** Low-cost adsorbent, Bivalve shell, *Zea mays* L, Malachite green, Isotherm

<http://dx.doi.org/10.1016/j.biortech.2012.06.066>