

Abstract

This work presents a first approach concerning the valorization of *Tectona Grandis* tree by-products, from East Timor through their transformation into high activated carbon (AC) by chemical activation with KOH and K_2CO_3 . The better ACs, Teak-KOH-1-1-700 and Teak- K_2CO_3 -1-2-700, presented a high A_{BET} (995 and 1132 $m^2 \cdot g^{-1}$) and micropore volume (0.43 and 0.5 $cm^3 \cdot g^{-1}$), respectively. Both ACs were tested on the removal of four pesticides, from the liquid phase. Both ACs performed better than existing commercial types, presenting a maximum adsorption capacity of 1.88, 1.67, 1.10 and 0.89 $mmol \cdot g^{-1}$, for 4-chloro-2-methylphenoxyacetic acid, 2,4-dichlorophenoxyacetic acid, diuron and atrazine, respectively. Pesticide adsorption from diluted and concentrated solutions confirms that diffusion is the limiting factor. The possibility of implementing a production unit for ACs in East Timor is very promising for that country. It presents an opportunity for job creation, biomass waste reduction and a contribution to environmental sustainability, thereby following the principles of a circular economy.

Keywords:

Tectona Grandis; East Timor; activated carbon; chemical activation; pesticide removal; circular economy