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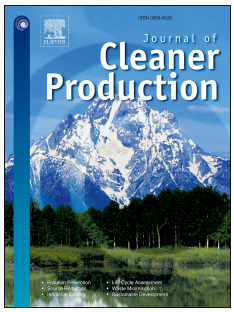

Life Cycle Assessment of activated carbon production from coconut shells

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Life Cycle Assessment of activated carbon production from coconut shells

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ABSTRACT

Activated carbons have excellent performance in a number of process applications. In particular, they appear to have the most favorable characteristics for adsorption processes, thanks to their high porosity and large surface area. However, a comprehensive assessment of the environmental impacts of their manufacturing chain is still lacking. This study evaluates these impacts taking the specific case of activated carbon produced from coconut shells in Indonesia, which is the major coconut producer county. Coconut shells as raw materials are utilized for activated carbon production due to their abundant supply, high density and purity, and because they seem to have a clear environmental advantage over coal-based carbons, particularly in terms of acidification potential, non-renewable energy demand and carbon footprint. Life Cycle Assessment and process analysis are used to quantify all the environmental interactions over the stages of the life cycle of an activated carbon manufacturing chain, in terms of inputs of energy and natural resources and of outputs of emissions to the different environmental compartments. Estimates for the environmental burdens over the life cycle have been obtained by developing mass and energy balances for each of the process units in the production chain. The results indicate the operations with the greatest effects on the environmental performance of activated carbon production and hence where improvements are necessary. In particular, using electrical energy produced from renewable

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