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Activated coconut coir for removal of water hardness

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ABSTRACT

Phosphoric acid activated coconut coir (ACC) has been used as an efficient and low cost filter material for water softening applications. The material has efficiently removed total hardness and calcium hardness from both artificial and natural hard water whereas the Mg hardness removal efficiency was relatively lower than the other two hardness values. The optimum conditions for maximum hardness removal were; ACC dose 80.00 g L^{-1}, stirring time 30 min and settling time 2 h. Under the optimized conditions, the maximum removal efficiencies of total, Ca and Mg hardness, were approximately 46%, 66% and 30%, respectively from artificial hard water. More efficient softening was observed when the hard water was boiled to remove the temporary hardness prior to filtering through the ACC medium. It was also, observed that the hardness removal efficiency was higher when two layers of ACC together with a sand layer were used. The results indicate that ACC has potential in future water softening applications.

Keywords: Activated coconut coir; Hardness; Water softening; Temporary hardness; Permanent hardness

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