



## Removal of phosphate from water using raw and activated laterite: batch and column studies

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Received 23 March 2013; Accepted 5 May 2013

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### ABSTRACT

This paper describes the removal of phosphate from wastewater using raw laterite (RL) and activated laterite (AL) according to batch and column adsorption experiments. Single factor experiment was performed to identify the optimal activation conditions. The results showed that sample prepared by heating the laterite at 700°C for 2 h (AL) had the optimal performance. The effect of various factors such as pH, dosage, and coexisting ions on the performance of the two kinds of laterite was investigated. The activated materials exhibited higher phosphate removal over broader pH range compared with the raw ones. Langmuir model fitted the isotherm adsorption data well and the maximum adsorption capacities of the RL and AL were calculated to be 0.90 and 1.86 mg/g, respectively. Pseudo-second-order model fitted the kinetics data well, indicating that the adsorption was mainly related to chemical adsorption. Column experiments were carried out with constant influent concentration and bed depth and various initial phosphorus concentrations to evaluate the practical application of laterite to the continuous removal phosphate from water.

*Keywords:* Phosphate removal; Raw laterite (RL); Heat-activated; Activated laterite (AL); Column adsorption

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*Presented at the Fifth Annual International Conference on “Challenges in Environmental Science & Engineering—CESE 2012” Melbourne, Australia, 9–13 September 2012*