



## Adsorption characteristic studies of phosphorus onto laterite

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### ABSTRACT

Soil has been widely used in many wastewater treatment systems, and proved to be an effective substrate for phosphorus removal and retention. It is significant to study its adsorption characteristics by using appropriate theoretical models. In this study, laterite (or red soil) was selected as an example to investigate the adsorption characteristic of phosphorus onto soil with the Langmuir, Freundlich, and Redlich–Peterson isotherms by both the linear and non-linear regression methods. The adsorption experiment was conducted at the temperatures of 283, 288, 298, and 308 K, respectively, to choose the appropriate method and obtain the credible adsorption parameters for soil adsorption equilibrium studies. The results showed that the non-linear regression method would be a better way to compare the better fit of isotherms for the adsorption of phosphorus onto laterite. Both the two-parameter Freundlich and the three-parameter Redlich–Peterson isotherms had higher coefficients of determination for the adsorption of phosphorus onto laterite at various temperatures. In addition, a relationship between Freundlich isotherm parameters and Redlich–Peterson isotherm parameters was presented.

*Keywords:* Adsorption; Isotherm; Non-linear regression; Soil; Temperature

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