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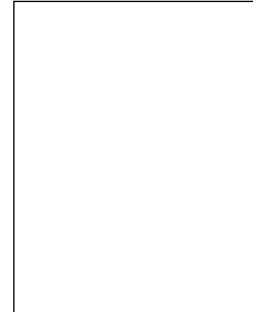
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## Assessment of potential nutrient release from phosphate rock and dolostone for application in acid soils

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### ABSTRACT

The aim of this study was to evaluate the feasibility of using phosphate rock and dolostone as fertilizer and amendment, respectively, for application in tropical acid soils. The dissolution of different particle-size fractions by water and citric acid was studied. Laboratory column experiments were run following a completely randomized design, by using 0.063–0.25, 0.25–0.5, and 0.5–2 mm particle-size fractions of both rocks. Each rock particle-size was subjected to exhaustive dissolution with distilled water, citric acid solution at pH 4, and citric acid solution at pH 2, with the following extraction times: 1, 3, 5, 7, 12, 24, 72, 144, 240, and 360 h. The dissolution of both rocks depended on particle-size, leaching solution and extraction time. The dissolution rate of rock-forming minerals augmented as the specific surface area increased, corresponding to a decrease in particle-size. In all cases, the kinetics of release was characterized by two phases: 1) a first stage of rapid release that lasted 24 h, which would ensure short-term nutrient release, and 2) a second stage of slow release (after 24 h), representing the long-term nutrient release efficiency. Both rocks are suitable as slow release fertilizers in strongly acid soils and would ensure the replenishment of P, Ca, and Mg. A combination of fine and medium particle-size fractions should be used to ensure high nutrient release efficiency. Much work has to be done to assess the overall impact of considerable amounts of fresh rocks in soils.

**Key Words:** citric acid, soil fertility, rock weathering, nutrient release

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