

## **Characteristics of phosphate rock materials from China, Indonesia and Tunisia and their dissolution in Indonesian acid soils**

### **ABSTRACT**

Dissolution of phosphate rock (PR) in soils is a primary concern for P in the PR to be available for plant. The dissolution of three PR materials, China (CPR), Ciamis (IPR) and Gafsa (GPR), in eight acid Indonesian soils (pH in water 4.1-5.7) was tested in a closed incubation system. Experiment was conducted in Soil Chemical Laboratory, Universiti Putra Malaysia and Indonesian Center for Agricultural Land Resources Research and Development from January to April 2002. The dissolution was determined from the increase in either 0.5 M NaOH extractable P ( $\hat{P}$ ) or 1 M BaCl<sub>2</sub>-triethanolamine (TEA)-extractable Ca ( $\hat{Ca}$ ) in soils amended with PR compared with control soil. Dissolution of the IPR was the highest (30-100%) followed by GPR (17-69%) and then by CPR (20-54%). The maximum dissolution followed the order: Bogor Ultisols > Bogor Oxisols > Subang Inceptisols > Bogor Inceptisols > Sukabumi Oxisols > Lebak Ultisols > Sukabumi Inceptisols > Lampung Ultisols. PR dissolution indicated a positive correlation with P retention capacity. The results implied that the extent of PR dissolution for the three PR sources (China, Indonesia and Tunisia) increased with increasing P retention capacity of the soils. PR dissolution can be based on a calibration curve of  $\hat{Ca}$  meaning that if  $\hat{P}$  is high then the amount of PR dissolution measured by  $\hat{Ca}$  in PR materials is also high.

**Keyword:** Phosphate rock; Acid soils; Chemicophysical properties; Dissolving