ABSTRACT

Phosphorus (P) is an essential nutrient for plant growth, but its availability is often limited in soil. P availability is influenced by several factors, one of which is soil pH. This study aims to determine the levels of available P in various types of highland soils in Central Aceh Regency using two analytical methods, namely the Olsen method and the Bray method. This study was conducted through surveys and laboratory analysis on seven types of soil: Alluvial, Andosol, Grumosol, Mediterranean, Podzolic, Brown Podzolic, and Red Yellow Podzolic. This study used a survey method consisting of four stages, namely the preparation stage, preliminary survey, main survey, data analysis and presentation of results. Soil samples were taken at a depth of 0-20 cm and 20-40 cm for each type of soil in the minipit. The results showed that the highest levels of available P were found in Alluvial soil, at 93.43 ppm (Olsen) and 116.55 ppm (Bray1), respectively, while the lowest levels were found in Podsolic (Bray) and Mediterranean (Olsen) soils. In general, the levels of available P were higher in the topsoil (0–20 cm) than in the bottom layer (20–40 cm). The Bray method showed better effectiveness in soils with slightly acidic pH, while the Olsen method was more suitable for soils with neutral to alkaline pH. This study provides important recommendations for the selection of phosphorus analysis methods based on soil characteristics and pH to support soil fertility management in highland areas.

Keywords: available phosphorus, Bray1 method, Olsen method, soil type, upland