

DEVELOPMENT OF A SOIL PHOSPHORUS RAPID FIELD ANALYSIS METHOD AND APPLICATION TO ARCHAEOLOGICAL SITES.

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Phosphorus is often used as an archaeological indicator of human activity. Many elements are added to the soil by pre-agricultural humans, but P is persistent and a sensitive indicator. In this study, we looked to develop a rapid extraction and testing method for P analysis that could be easily carried out in field with simple equipment and minimally hazardous reagents. Initial test development was completed with a well characterized soil. Replicate samples were extracted at room temperature with a 1 M sulfuric acid solution for 15 min. After dilution to bring solution concentrations into range, solutions were analyzed using the ascorbic acid method with a Vernier colorimeter. For this sample, precision was found to be 8% and accuracy against a boiling sulfuric acid digestion was found to be 80%. The method was applied to samples from the Sinking Pond and McKendry archaeological sites. Results found soil P to range from 113 mg kg⁻¹ to 1010 mg kg⁻¹. Recovery accuracy was similar to the well characterized soil, but not as precise. This is likely due to the use of a measuring spoon, as opposed to an electronic balance, to measure an aliquot of soil for extraction, and variations in soil moisture of field soils. Despite the decreased precision in the field samples, the method represents an improvement of field analytical methods and may be a valuable real-time field mapping tool.