

A STUDY OF SOLUBLE PHOSPHATE CONTENT IN ANIMAL WASTES

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Fertilizers are an important factor in modern-day agriculture. Phosphorus (P) is one of the essential and un-substitutable nutrients for plants and animals; but the reserves of phosphate rock—the major source of P, are finite. P rich animal wastes, such as bone meal (BM) and cattle manures (CattleM) are potential P sources in plant production systems. However, the solubility of P and its availability to plants in these forms are in question. We characterized P solubility in BM, CattleM and dairy manure (DairyM) by Hedley fractionation method. Up to 81% of P was water-soluble in DairyM, but only about 3 and 15% was soluble in BM and CattleM products, respectively. Of the P in BM and CattleM, 90 and 75%, respectively, was soluble only in 1M HCl. Additions of the sparingly soluble P sources BM and CattleM increased the acid-soluble P concentrations in the experimental soil, with BM having the strongest effect. However, the acid-soluble P fraction decreased with time. Although the immediate bioavailability of P in sparingly soluble P sources was lower than that in DairyM and super phosphate (SP), literatures suggest that use of animal wastes as a long-term P supply for perennial plants could be encouraged. In order to ensure environmentally and economically sustainable methods of using these sparingly soluble P sources in plant production systems, the availability of P for plants in these products needs to be further clarified.

Keywords: *Bone meal, Cattle manure, Dairy manure, Fertilizers, Sparingly soluble, P availability*