EFFECT OF SOIL CONDITIONERS ON AGGREGATION AND HYDRAULIC CONDUCTIVITY OF A STRUCTURELESS SOIL UNDER SUBHUMID CONDITIONS

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ABSTRACT

The investigations were carried out to study the effect of krillium, peatmoss and organic matter on aggregation and hydraulic conductivity (HC) of Qutbal, a structureless Soil. Krillium, copolymer was most effective in inducing aggregation compared to other soil conditioners. In case of peatmoss and organic matter, more aggregation was observed compared to control treatment. The aggregation increased as quantity of soil conditioner increased and highest aggregation of 86.2 percent was observed with application of 1.0 percent krillium per 100g soil. The lowest HC of 3.2 cm hr^{-1} was recorded for untreated soil and maximum HC of 13.2 cm hr^{-1} was observed in case of krillium amended soil. Hydraulic conductivity was related to aggregation and soil depicted an increase in HC as aggregation improved with type and quantity of soil conditioner tested in the study. The effect of different aggregating material on aggregation and HC characteristics of Qutbal soil is discussed in the text of the paper.

INTRODUCTION

Soil aggregation is an important physical property and is related to soil structure. Soil structural conditions affect water infiltration, hydraulic conductivity, surface crust, seedling emergence, root penetration, microbial activity, nutrient uptake and soil water plant relationship. Moreover structureless soils are usually prone to runoff produce aggregation at a rapid rate and the result was a group of binding materials that consists of chemical soil conditioners, such as Vinyl acetate maleic acid (VAMA), hydrolysed polyacrylonitrile, isobutylene maleic acid co-polymer and other like substances. These materials were considered to have ameliorating effect on soil structure and improved aggregation and moisture retention characteristics of soil. In 1951 Monsanto Company introduced VAMA (Krillium) soil conditioner that stabilized soil structure and increased water infiltration properties of the soil (Moldenhauer, 1976). The field application of these conditioners remained a mystery unsolved because of their high cost and availability. In order to resolve the research controversy pertaining to use and explore possibility of adoption of these materials on large scale, a series of international symposiums in 1972, 1973, 1975 and Finally in 1976 (ISSS, 1976) were held. The research conducted so far and prevalent use of soil conditioners were focal points of delibrations. It was concluded that use of soil conditioners was beneficial under specific soil conditions for high value crops. In saline-sodic soil conditions water content were