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EFFECT OF ORGANIC RESIDUES INCORPORATION ON AVAILABLE P AND K CONTENTS OF SOIL

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ABSTRACT

The organic residues play significant role in the improvement of soil environments and nutrient availability for better crop production. The efficiency of manures, crop residues, industrial by-products and city sweeps was studied. 250 kg of soil was mixed with each of farmyard manure (FYM), cotton sticks, maize stalks, pressmud and city sweeps as separate treatments, except control and were filled in each drum having three replications. Moisture level was maintained at field capacity and soil samples were taken at 3 months interval for assessing the available P and K contents in soil. The organic residues were applied @ 7.5 x 10^3 and 15 x 10^3 mg kg^{-1} with 0 and 25 mg N kg^{-1} of soil. FYM and pressmud significantly improved available P in soil (11.9 and 11.5 mg kg^{-1}), respectively over control (6.4 mg kg^{-1}). FYM, cotton sticks and maize stalks displayed significant increase in extractable K content of soil (231, 231 and 227 mg kg^{-1}), respectively against control(167mg kg^{-1}). Application of nitrogen @ 25 mg kg^{-1} of soil with each rate of organic residues further increased both P and K levels in soil. The sampling intervals did not improve the K contents.

INTRODUCTION

Use of organic residues improve the soil physical condition and nutrient availability (Hornick and Parr, 1987). Different sources of organic matter have their relative potential contribution. Amongst the organic materials, farmyard manure is commonly used which upon decomposition releases essential plant nutrients (Chaudhry *et al.*, 1981; Bhriguvanshi, 1988; Gupta *et al.*, 1988 and More, 1994). Crop residues also contribute to soil fertility status upon need of supplementing chemical fertilizers by organic materials. The concern of organic residues in soil can be well exploited on the soil health, availability of nutrients and ultimately on the productivity of crops. The present work was therefore conducted with a view to study the effect of organic residues on the availability of P and K in soil.

MATERIALS AND METHODS

A pot experiment was conducted in wire-house of Soil Chemistry Section at Ayub Agricultural Research Institute, Faisalabad during 1993 and 1994. The soil texture (Day, 1965) was clay loam having Walkley-organic-C 3.2 x 10^3 mg kg^{-1}, $NaHCO_3$-P (Watanabe and Olsen, 1965) 4.9 mg kg^{-1} and NH_4OAC-K (Richard, 1954) 130 mg kg^{-1}. The organic residues used were farmyard manure (FYM), cotton sticks, maize stalks, pressmud and city sweeps, each added @ 7.5 x 10^3 and 15 x 10^3 mg kg^{-1}. Each organic residues treatment was further complexed with nitrogen levels (@ 25 mg kg^{-1} of soil) added in the form of urea and compared with treatments without application of N. The experimental design was CR with factorial arrangements having 3 repeats. About 1 to 2 cm chopped crop and other organic residues were well mixed in 250 kg processed dry soil and filled in 60 plastic drums (300 kg capacity) except 3 control. The moisture in the plastic drums was kept at field capacity level. The P and K contents of each organic residues and physio chemical characteristics of soil are given in Table-1 and 1.1. Four soil samplings were done at an interval of three months from the start of experiment at soil depth of 0-15 cm for available P and