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In vivo eflects of phosphorus sources with and without FYM and biofertilizers on availability of phosphorus in calcareous black soil

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ABSTRACT

An incubation study was conducted to know the effects of differential water soluble phosphorus in fertilizers (nitrophosphates) with and without FYM and biofertilizers on availability of phosphorus in calcareous black soil. Single super phosphate containing 100 percent WSP (water soluble phosphorus) showed higher available phosphorus (22.224 kg ha^{-1}) as against different sources of phosphorus studied. All phosphatic fertilizers with FYM and biofertilizers showed higher phosphorus availability over fertilizers alone. Further highest available phosphorus (22.985 kg ha^{-1}) was observed with application of single super phosphate containing 100 per cent WSP +FYM +biofertilizers. There was decreasing trend in phosphorus availability with increasing incubation period.

Key words : Sources, Available, Phosphorus, FYM, Biofertilizers.

Phosphorus is one of the essential elements for plant growth and development but its availability and nutrition to the crops is limited by different ways. Initial available phosphorus content of soil is very low and the native precipitated phosphorus compounds are mostly insoluble and unavailable for plant uptake besides more fixation of phosphorus applied through fertilizers in the calcareous soil. As such phosphorus availability is influenced by its solubility in water. Organic manures and micro organism also play an important role in making it available and increasing uptake of phosphorus (Misra and Das, 2000).

In view of these facts a study was conducted to assess the effect of differential water soluble phosphorus (WSP) fertilizers with and without FYM and biofertilizers on the availability of phosphorus in calcareous black soil.

MATERIALS AND METHODS

An incubation trial was conducted *in vivo* using nitrophosphates having differential WSP with and without FYM and biofertilizers at Mahatma Phule Krishi Vidyapeeth, Rahuri. Representative soil sample (0 to 15 cm) having pH 8.15, EC0.37 d sm^{-1} organic carbon 0.58 percent, $CaCO_3$ 8.7 percent, CEC 48 Cmol (p^+) Kg^{-1} and available N, P and K, 234, 7.9 and 280 $kgha^{-1}$, respectively was used for incubation study. The experiment was planned in completely randomized design with the following treatments;

T_1 : control,
T_2 : (15:15:15) nitrophosphate – 30 per cent Water Soluble Phosphorous (WSP),
T_3 : (15:15:15) nitrophosphate – 50 per cent WSP,
T_4 : (20:20:20) nitrophosphate –60 per cent WSP,
T_5 : Single super phosphate (0:16: 0) –100 per cent WSP,
T_6 : (15:15:15) nitrophosphate - 30 per cent WSP + FYM + biofertilizer
T_7 : (15:15:15)– 50 per cent WSP + FYM+ biofertilizers,
T_8 : (20:20:0) nitrophosphate –60 per cent WSP +FYM + biofertilizers and
T_9 : (0:16:0) 100-per cent WSP+FYM+ biofertilizers.

120: 60: 40 kg N, P_2O_5, k_2O per hectare dose of fertilizers was applied through different sources of phosphorus fertilizers, urea and muriate of potash; FYM @ 10 Mg ha^{-1} and biofertilizers @ 25 g kg^{-1} of seed were used. During incubation moisture was maintained at field capacity and soil samples were analysed for available phosphorus at 21, 42, 63, 84 and 105 days of incubation period. The data were statistically analyzed as per procedure described by Panse and Sukhatme (1985).

RESULTS AND DISCUSSION

Effect of sources of phosphorus:

The data showed that periodical availability of phosphorus in soil decreased slightly from 21 to 105 days of incubation (Table 1).