

Effect of differential water soluble phosphorus in fertilizers with and without FYM and biofertilizers on soil fertility and uptake by wheat

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ABSTRACT

Field experiment was conducted to study the effect of different sources with varying solubility of phosphorus with and without FYM and biofertilizers on soil fertility and nutrient uptake by wheat. The highest uptake of N, P and K was observed with the treatment of SSP (0:16:0) having 100 per cent water soluble phosphorus with and without FYM and biofertilizers, pH and EC of soil after harvest of wheat was non significant however there was slight increase in EC with FYM and biofertilizers application. Highest available N (240.42 kg ha⁻¹) was observed with 30 per cent WSP source while highest available P (18.91 kg ha⁻¹) was observed with 100 per cent WSP source of phosphorus with FYM and biofertilisers.

Key words : Differential water soluble phosphorus, Soil fertility, Uptake and wheat.

INTRODUCTION

Wheat is one of the major cereal crops in Maharashtra grown over an area of 6.65 lakh ha. With production of 7.78 lakh tones. To meet out demands of over increasing population of our country, it is necessary to improve the production of food crops. For sustainable production of wheat, it is also important to improve and maintain soil facility and nutrient availability. Phosphorus availability is considered as a major constraint for crop production in calcareous black soil due to high precipitation and low availability. The availability of phosphorus is influenced by its solubility in water, soil properties, organic manures and biofertilizers. Therefore, it is required to compare different sources having differential water soluble phosphorus with and without FYM and biofertilizers. Present experiment was conducted to study the effect of sources of P with and without FYM and biofertilizers on nutrient uptake by wheat and soil fertility.

MATERIALS AND METHODS

The field experiment was conducted at Post Graduate Institution Farm, Mahatma Phule Krishi Vidyapeeth, Rahuri. The soil belonged to sawargaon soil series under inceptisol and was classified as clay having 55.09 per cent clay content, pH 8.15, CaCO₃ 8.7 per cent, organic carbon 0.58 per cent, available nitrogen, phosphorus and potassium 234, 7.9 and 380 kg ha⁻¹, respectively and phosphorus fixing capacity is 17 mg kg⁻¹. The experiment was designed as Randomized Block Design (RBD) with nine treatments. The experimental details were: T₁= control, T₂= (15:15:15)nitrophosphate – 30 per cent water soluble phosphorous, T₃= (15:15:15)

nitrophosphate – 50 per cent WSP, T₄= (20:20:20) nitrophosphate – 60 per cent WSP, T₅=SSP (0:16:0)-100 per cent WSP, T₆= (15:15:15) nitrophosphate -30 per cent WSP+FYM+ biofertilizers, T₇= (15:15:15)-50 per cent WSP+FYM+ biofertilizers, T₈= (20:20:20)-60 per cent WSP+FYM+ biofertilizers, and T₉= SSP (0:16:0) -100 per cent WSP+ FYM+biofertilizers. The fertilizers were applied as per RDF (120:60:40) through different sources of P, urea and muriate of potash. The FYM was applied at 10tha⁻¹ and biofertilizers like Azotobactor Azospirillum and PSB at 25 g kg⁻¹ each for seed treatment were used. The nutrient uptake and soil properities were determined by standard methods.

RESULTS AND DISCUSSION

Fertility status of soil:

The pH and EC of soil after harvest of wheat were found to be non significant among all the treatments, However, EC was slightly increased with suphala (20:20:20) 60 per cent WSP and SSP – 100 per cent WSP with and without FYM and biofertilizers (Table 1).

Among the different sources nitrophosphate having 30 per cent WSP was found better for available nitrogen content of soil and the availability was 240.42 and 246.74 kg ha⁻¹ without and with FYM and biofertilizers, respectively.

Available phosphorus in soil ranged form 6.66 to 18.91 kg ha⁻¹. Maximum available P content was observed due to application of SSP-100 per cent WSP without FYM and biofertilizer (14.40 kg ha⁻¹) and with FYM and biofertilizers 18.91 kg ha⁻¹. Available P content by 60 per cent WSP source with and without FYM and biofertilizers T₅ and T₈ were at par with each other (Table 1).Increase