

## Effect of differential water soluble phosphorus in fertilizers with and without FYM and biofertilizers on yield and nutrient uptake by wheat

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### ABSTRACT

The effect of 100 per cent water soluble phosphorus (WSP) application through single super phosphate along with FYM and biofertilizers resulted in highest grain (44.79 q ha<sup>-1</sup>) and straw yield (67.30 q ha<sup>-1</sup>) of wheat grown in calcareous black soil. Application of 100 per cent water soluble phosphorus fertilizer (SSP) was however, *at par* with 60 per cent WSP (nitro phosphate) for wheat and significantly better over 50 and 30 per cent WSP fertilizers (nitrophosphate). These treatments also resulted in maximum total uptake of NPK. The magnitude of N, P and K uptake by wheat crop was from 57.24 to 136.15, 12.01 to 29.67 and 58.71 to 152.90 kg ha<sup>-1</sup>, respectively.

**Key words :** Wheat, Nitrophosphate, Fertilizer, Yield, nutrient uptake.

Phosphorus availability from soil is considered as a major constraint for crop production particularly in calcareous black soils. These soils have extremely high capacity to precipitate phosphorus and thus its deficiency becomes wide spread. Phosphorus fixation tends to be more pronounced in clays if they are predominant with CaO and CaCO<sub>3</sub>. However, organic manures and biofertilizers play an important role in improving the productivity of soil.

The availability and uptake of phosphorus is greatly influenced by soil properties and degree of soluble forms of phosphorus in fertilizers. Nitro phosphate contains water and citrate soluble forms of phosphorus. The different grades of nitro phosphate (15:15:15, 20:20:0) popularly known as *suphala* containing differential water soluble phosphorus were used. The present investigation was therefore, undertaken to assess the relative influence of differential water soluble phosphorus in fertilizers (*suphala* VS SSP) with and without FYM and biofertilizers on nutrients uptake and yield of wheat.

### MATERIALS AND METHODS

The present investigation was carried out on calcareous black soil (Inceptisol) during *rabi* 2004-2005 at Post Graduate Institute Research Farm of MPKV, Rahuri. Trimbak variety of wheat was used for experiment. It was sown at 22.5cm between rows. The

plot size was 4.5 x 4.00 m. The fertilizers were used as per soil test @ 150:75:20 kg N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O per hectare based on recommended dose of fertilizers 120:60:40: kg ha<sup>-1</sup>. Fertilizers were applied as per treatments by band placement. Fifty per cent nitrogen dose was applied at sowing and remaining 50 per cent one month after sowing in the form of urea. Phosphorus through nitrophosphate 15:15:15 containing 30 and 50 per cent water soluble phosphorus and 20:20:00 (60% WSP) and single super phosphate (100% WSP) and potash through muriate of potash were applied as a basal dose. The FYM (Farm Yard Manure) was used @ 10t ha<sup>-1</sup> while biofertilizers like PSB, *Azotobater*, and *Azospirillum* were used @ 25g per kg each for seed treatment. The experiment was laid out in randomized block design. There were nine treatments and three replications. The treatment details followed are as per Table. The soil was clay with pH 8.15 and calcareous in nature (CaCO<sub>3</sub> 8.7%). The organic carbon content was 0.58 per cent. The available N, P, K content was 234, 7.9, 380 kg ha<sup>-1</sup>, respectively. The total phosphorus content (792 mg kg<sup>-1</sup>) and phosphorus fixing capacity (171mg kg<sup>-1</sup>) were high. At harvest, grain and straw yields were recorded treatment wise. The grain and straw samples were collected and analyzed for N, P and K content and uptake were estimated.

### RESULTS AND DISCUSSION

#### *Yield of wheat:*

The effect of variable WSP in nitro phosphate fertilizers with and without FYM and biofertilizers