

INTERACTION OF SULPHUR WITH PHOSPHORUS AND POTASSIUM IN GROUNDNUT NUTRITION IN CALCAREOUS SOIL

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SUMMARY

Pot experiments conducted in calcareous soil have shown that application of S, along with K and P in the soil, increased the nodulation, podding and pod and haulm yields of groundnut and also the concentration and uptake of these nutrients by groundnut. Sulphur had synergistic effect both with K and P on the yield and nutrients concentration and uptake. The P and K doses caused significant increase in all the parameters upto 150 kg/ha of P (as P_2O_5), and 100 kg/ha of K (as K_2O). However, S was beneficial to groundnut upto 50 kg/ha. The increase in the concentrations and uptake of K and P by groundnut due to the application of K and P, were more pronounced with S than without S. On the other hand the effect of S on the concentrations and uptakes of K, P and S was more pronounced at higher levels of K and P than at their lower levels.

INTRODUCTION

Groundnut being a major oilseed crop is cultivated world-wide on almost all soil types. But due to its underground pod bearing habit it is preferred on light textured soils generally deficient in S and P and to some extent K also (Bell, 1985; Kanwar *et al.*, 1983; Singh *et al.*, 1991; Tandon, 1991). The problem of nutrient deficiencies are more pronounced in calcareous soils of Saurashtra, a dominant groundnut belt (Dwivedi, 1988; Singh *et al.*, 1991). The Sulphur deficiency in groundnut occur in young upper leaves as chlorosis, causing yield reduction upto 40% (Supakamnerd *et al.*, 1990; Singh *et al.*, 1990). The P and K deficiencies, however, occur very late on the lower leaves causing poor pod bearing and kernel filling. These deficiencies are generally neglected for the want of clear-cut symptoms. More over by the time these deficiencies are diagnosed in the field, it is too late to rectify it, in the standing crop, to prevent the yield losses. The prevention of these deficiencies with soil application of the S, P and K containing fertilizers is the main remedy. Field experiments on the use of P and K has been conducted in many soils in India, but there is no information on the interaction of these macronutrients

with S when applied in combination. The present pot experiments, therefore, were conducted to study the effects of S, with and without P and K in calcareous soil, on the growth, yield and nutrient contents and uptake by groundnut.

MATERIALS AND METHODS

Pot experiments were conducted, during the dry and wet seasons at the National Research Centre for Groundnut, Junagadh. The soil was medium black calcareous (18.5% $CaCO_3$), clayey (58 % clay and 12 % sand) which contained 0.9 % organic carbon, 0.056% total N, 5.2 mg/kg available P (Olsen P), 10 mg/kg available S (heat soluble), 0.4 meq/100g soil exchangeable K and pH 7.7. Two separate experiments were conducted for two seasons. Ten kg of soil was filled in Polythene lined earthen pots. Two experiments were conducted with bunch ground nut cv. GG2

Experiment I

Experiment was conducted in factorial CRD to test the effectiveness of P with and without S. Phosphorus was applied at the rate of 0, 50, 100, 150, and 200 kg of P_2O_5 /ha by adding 0, 1.95, 3.9, 5.85 and 7.8 g $Na_2 HPO_4$