An Asian Journal of Soil Science, December 2007, Vol. 2 (2) : 134-137

THE EFFECTS OF LIGNITE HUMIC ACID AND INORGANIC FERTILIZER ADDITIONS ON THE PRODUCTIVITY OF TYPIC HAPLUSTALF IN T.N., INDIA

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Accepted : *December, 2007*

ABSTRACT

A field experiment was conducted during *kharif* 2003 in a sandy clay loam soil belonging to Somaiyanur series (Typic Haplustalf) to find out the efficacy of humic acid (HA) as potassium humate extracted from lignite, to improve the fertility status of the soil and to increase the yield of onion crop. The results showed that the onion bulb yields were significantly higher in the treatment that received 100 per cent recommended dose of NPK plus 20 kg HA ha^{-1} as soil application than in the treatment that received 100 per cent recommended dose of NPK alone. Organic carbon content (0.40 %), cation exchange capacity (18.5 cmol P^{+} kg^{-1}) and fertility status as reflected in the available status of N, P and K (237, 23.6 and 281 kg NPK ha^{-1} respectively) were significantly higher in the treatments that received 100 per cent recommended dose of NPK plus 20 kg HA ha^{-1} as soil application.

Key words : Bulb yield, Cation exchange capacity, Lignite humic acid, Onion.

Soil health is one of the key factors, which decides the yield target. Organic manures are indispensable factor in vegetable production and maintaining soil health (Singh and Kalloo, 2000). The importance of soil organic matter in the maintenance of soil fertility is well recognized. The humus substances in the soil have multiple effects, in which the influence of humic acid on plant growth can be grouped into indirect effect on physical, chemical and biological properties of the soil and direct effect on physiological and biochemical processes of plants (Schnitzer, 2000). The present study was undertaken to assess the effect of lignite humic acid and inorganic fertilizers on soil available nutrients and bulb yield of onion.

MATERIALS AND METHODS

A field experiment was conducted in Coimbatore during *kharif* 2003 with onion (CO 4). The soil of the experimental field was sandy clay loam with pH 8.1, low in available N (221 kg ha^{-1}), medium in available P (12.4 kg ha^{-1}) and medium in available K (253 kg ha^{-1}) (Table 1). Treatments consisted of control (T_1), 75% recommended dose of NPK (T_2), 100% recommended dose of NPK (T_3), 100% NPK + 10 kg humic acid ha^{-1}as soil application (T_4), T_5-100% NPK + 20 kg humic acid ha^{-1}as soil application (T_5), 100% NPK + 0.1 % humic acid as foliar spray (T_6), 100% NPK + 10 kg humic acid ha^{-1}as soil application + 0.1 % humic acid as foliar spray (T_7) and 75% NPK + 10 kg humic acid ha^{-1} as soil application + 0.1 % humic acid as foliar spray (T_8), were replicated thrice and laid out in randomized block design.

As per the treatments, recommended dose of NPK fertilizers 60:60:30 kg NPK ha^{-1} (100%) and 45:45:22.5 kg NPK ha^{-1} (75%) were applied along the ridges (N, P and K were applied as urea, single super phosphate and muriate of potash, respectively). Among these, half dose of N and full dose of P and K were applied basally; remaining half dose of N was applied at 30 days after sowing. The humic acid was applied basally in the treatments receiving soil application of humic acid by sand mix. The foliar application of 0.1% humic acid was done on 20^{th} and 40^{th} days after sowing (The humic acid content of potassium humate obtained from Neyveli Lignite Corporation was 65%). The recommended package of practices were followed and the crop was harvested at maturity and bulb yield of onion was recorded. The soil samples were collected at the time of harvest and analysed for available nutrients status using standard procedures.

RESULTS AND DISCUSSION

Bulb yield :

The treatments had significant effect on the yield of onion bulbs (Table 1). Amongst the different treatments tried application of 100 % NPK with 20 kg humic acid ha^{-1} recorded the highest yield (18.7 t ha^{-1}) of onion bulbs and the lowest (12.5 t ha^{-1}) was in control. This increase