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Influence of potassium and sulphur levels on uptake of nutrients in onion (*Allium cepa* L.) and residual fertility of the soil

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SUMMARY

A field experiment was conducted in black soil at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during *Kharif* 2009 to study the effect of potassium and sulphur on growth, yield and quality parameters of onion. The experimental design was split plot with 12 treatments [(Main plots K_0 - Control (No potassium), K_1 - K_2O @ 100 kg ha⁻¹, K_2 - K_2O @ 125 kg ha⁻¹, K_3 - K_2O @ 150 kg ha⁻¹, Sub plots - S_0 - Control (No sulphur), S_1 - S @ 15 kg ha⁻¹, S_2 - S @ 30 kg ha⁻¹) (Nitrogen and phosphorus levels were kept constant for all the treatments] and three replications. Higher contents of potassium and sulphur in leaf as well as bulb were observed with the higher levels of potassium and sulphur. The higher uptake of N (202.47 kg/ha), P (25.00 kg/ha), K (111.13 kg/ha) and S (43.24 kg/ha) were observed with 125 kg K₂O + 30 kg S per ha. In post harvest soil maximum available potassium (498.00 kg/ha) and sulphur (25.16 kg/ha) content was obtained in the treatment 150 kg K₂O plus 30 kg S per ha. Among all treatment combinations, fertilizer dose of 125 kg potassium and 30 kg sulphur per ha was found more remunerative in respect of net returns.

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KEY WORDS : Onion, Potassium, Sulphur, Nutrient uptake, Residual fertility

Onion (*Allium cepa* L.) is one of the major bulb crops of the world and one of the most important commercial vegetable crops grown in India. The genus *Allium* belongs to family Alliaceae. Onion is used for its flavour and pungency. The pungency of onion is due to allyl=propyl-disulphide alkaloid. India is the second largest producer of onion in the world, next to China, accounting for 16 per cent of the world area and 10 per cent of the world production. India ranks first in total area under onion cultivation, second in total production and third after Netherlands and Spain in export.

Potassium (K) is an indispensable element in plant nutrition as it plays vital roles in plant metabolism such as photosynthesis, translocation of photosynthates, regulation of plant pores (stomata), activation of plant catalysts (enzymes) and resistance in plants against pests and diseases. On an average 92 per cent of the total K is present as reserve mineral K, 6.3 per cent as nonexchangeable K, 1.6 per cent as exchangeable K and only 0.2 per cent as water soluble K. The K content of Indian soils varies from less than 0.5 per cent (0.6% K₂O) to 3 per cent (3.6% K_2O). The average total potassium content of these soils is 1.52 per cent (1.82% K₂O). All these four forms of potassium are in dynamic equilibrium, as a result the available potassium will be replenished during crop growth. Besides potassium, sulphur is also considered as one of the essential plant nutrients in increasing the yield and quality parameters of important vegetable crops. Sulphur requirement of a crop is of the same order as that of phosphorus and is in the range of 10-80 kg S per hectare. Sulphur plays an important role in synthesis of three essential aminoacids such as cystine, cysteine and methionine, which are the building blocks of plant protein. It also helps in the formation of glycolipids in onion and garlic which besides giving pungency to the bulbs and also important in inducing resistance to drought and cold.

EXPERIMENTAL METHODS

A field experiment was conducted under rainfed condition during *Kharif* of 2009-2010. The experiment was laid out on a vertisol in plot No. 125 of block E, Main

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