Effect of copper nutrition on uptake, yield and economics of chilli (*Capsicum annuum* L.) in a vertisol of zone-8, Karnataka

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ABSTRACT

A field experiment was carried out on a vertisol to evaluate the effect of copper nutrition on yield and uptake of major and micronutrients by chilli at Main Agricultural Research Station, UAS, Dharwad during *Kharif* 2008. Combined application of $CuCl_2$ at 2.5 kg ha^{-1} through soil and 0.25 per cent foliar spray registered significantly highest dry fruit yield (10.38 q ha^{-1}). The uptake of major nutrients (75.64, 14.14 and 119.12 kg ha^{-1} N, P and K, respectively) and micro nutrients (61.88, 113.24, 431.60 and 100.10 g ha^{-1} of Cu, Zn, Fe and Mn, respectively) were highest in the treatment T_8 followed by T_{10}. The treatment that received combined application of $CuCl_2$ at 2.5 kg ha^{-1} through soil and 0.25 per cent foliar spray recorded highest B:C ratio (3.34) along with highest yield and better quality chilli fruits. Treatment (T_{11}) receiving application of $CuCl_2$ at 5 kg ha^{-1} through soil + 0.50 per cent foliar spray recorded lowest B:C ratio of 2.30.

Key words : Vertisol, B:C ratio, Micronutrients, Byadgi dabbi

INTRODUCTION

Micronutrients play a vital role in influencing quality of crops in addition to regulating many of the metabolically important enzyme reactions in plants. In the post green revolution era there was a gradual decline in the yield of most crops after reaching a plateau particularly in irrigated areas. This was because of imbalanced application of fertilizers without emphasis on secondary and micronutrients. Indiscriminate use of high analysis fertilizers and apathy towards the use of organic manures along with increased cropping intensity and productivity resulted in country wide micronutrient deficiencies including copper. So in the present study, an attempt has been made to study the effect of copper nutrition on yield and uptake of nutrients besides working out the economics of different treatments.

MATERIALS AND METHODS

A field experiment was conducted at Main Agricultural Research Station UAS, Dharwad in Zone-8 of north Karnataka on a vertisol during *Kharif* 2008 to study the effect of copper nutrition on nutrient uptake, yield and economics of chilli (cv. BYADGI DABBI). A composite soil sample was collected from the experimental site (0-20cm) and was analysed for physico-chemical properties before the experiment. The soil had a pH of 7.44, EC- 0.38 dSm^{-1}, organic carbon-5.72 g

kg^{-1}. The available N, P and K were 299, 20 and 390 kg ha^{-1}, respectively. The available micronutrients were 3.00, 0.48, 0.64 and 9.30 mg kg^{-1} of Fe, Zn Cu and Mn, respectively. The experiment was laid out in Randomized Block Design with three replications and eleven treatments. All the treatments received farmyard manure @ 10 t ha^{-1} (spot application). Nitrogen was supplied partly through urea and partly through DAP while entire doses of phosphorus and potassium were supplied through DAP and muriate of potash, respectively. Copper was applied in the form of $CuCl_2$ through soil in two doses *viz.,* 2.5 and 5 kg ha^{-1} and in foliar spray at 0.25 and 0.50 per cent at 30 and 60 DAT. Based on the net plot yield, yield per hectare was calculated and expressed in quintals. Concentrations of N, P, K and micronutrients in plant samples were determined as per the standard procedures outlined by Tandon (1998).

The uptake of nutrients at 75 DAT and at 140 DAT (final picking of chilli) was worked out using the formulae.

$$\text{Biomass yield (kg ha}^{-1}) = \text{Dry matter yield plant}^{-1}\text{ (kg) } \times \text{ Plant population ha}^{-1}$$

$$\text{Nutrient uptake kg ha}^{-1}) = \frac{\text{Nutrient concentration (\%)}}{100} \times \text{Biomass yield (kg ha}^{-1})$$

Based on the prevailing price of inputs and produce obtained during the year (2008), the net profit per hectare and benefit cost ratio were worked out by using the following formulae.

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