



## ROLE OF MICRONUTRIENTS IN VEGETABLE PRODUCTION

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**Abstract.** Proper plant nutrition is essential for successful production of vegetable crops. Integrated supply of micronutrients with macronutrients in adequate amount and suitable proportions is one of the most important factors that control the plant growth and development. Micronutrients are usually required in minute quantities, nevertheless, are vital to the growth of plant. Judicious use of micronutrients is essential for vegetable cultivation to get maximum yield of high quality produce. Plant metabolism, nutrient regulation, chlorophyll synthesis, reproductive growth, flower retention, fruit and seed development etc., are such effective functions performed by various micronutrients.

**Keywords:** Vegetable crops, micronutrients, functions, importance.

### INTRODUCTION

Vegetables are non woody herbaceous plant or part of the plant eaten as food by humans in whole or in part. It is the science of vegetable growing, dealing with the culture of non-woody (herbaceous) plants for food. It is the production of plants for use of their edible parts such as root, fruits, flower bud, bulbs, tubers etc. The importance of micronutrients in agriculture is truly well recognized and their uses have significantly contributed to the increased productivity of several crops (Tirpathi et al., 2015). The nutrient elements which are required comparatively in small quantities are called as micro or minor nutrients or trace elements. Micronutrients are essentially as important as macronutrients to have better growth, yield and quality in plants (Yadav et al., 2018). The requirement of micronutrients (boron, iron, copper, zinc, manganese, chloride and molybdenum) is only in traces, which is partly met from the soil through chemical fertilizer or through other sources.

### MATERIALS AND METHODS

Zinc is indispensable for normal growth and development of plants. It is effective for the synthesis of plant hormones like auxin and carbohydrate formation (Pankaj et al., 2018). It plays a fundamental role in several critical functions in the cell such as protein metabolism, gene expression, structural and functional integrity of bio-membranes and photosynthetic metabolism (Sanju et al., 2003). Zinc is also a constituent of ribosomes and is essential for their structural integrity (Trivedi et al., 2013). It promotes starch formation, seed maturation, production, enhances seed viability and seedling vigor.

### RESULTS AND DISCUSSION

#### Importance of Boron

Boron plays an essential role in the growth and development of new cells in the meristematic region of plants. Boron is necessary for cell wall formation, development of fruit and seed. It helps in pollen formation, pollination and flowering of plants (Malek and Rahim, 2011). The primary role of boron in plants is to improve solubility and metabolism of Ca and its mobility and also helps in the absorption of nitrogen (Pandav et al., 2016). It also involves in metabolism and transport of carbohydrates, nucleic acid synthesis, root elongation, photosynthetic activities and water absorption in plant parts (Islam et al., 2018). Boron increases the stability of plant cells and is involved in the reproductive phase of plants. Its inadequacy is

often associated with sterility and malformation of reproductive organs (Katyal and Randhawa, 1983).

### **Combine effect of Boron and Zinc**

The application of zinc and boron increases the number of mature fruits per plant in tomato (Yadav et al. 2001). Srivastava et al. (2005) recorded that the foliar application of ZnSO<sub>4</sub> and boric acid increases the TSS content in garlic. Salam et al. (2011) investigated that the combination of boron and zinc @ 2.5 kg B/ha + 6 kg Zn/ha, resulted the highest pulp weight, dry matter content, ascorbic acid, lycopene content, chlorophyll content in tomato. Kant et al. (2013) revealed that the plant height, number of leaves per plant, biological yield, curd weight and marketable yield were found highest with combined application of zinc and boron (20:10kg/ha) in cauliflower. Shil et al. (2013) evaluated the interaction effect between zinc and boron in the yield of dry chilli and weight of ripe chilli/plant.

### **Importance of Iron**

Iron is an essential micronutrient required for normal growth and plant function. Iron act as catalyst in synthesis of chlorophyll molecule and helps in the absorption of other elements (Pandey et al., 2016). It is a structural component of porphyrin molecules like cytochrome, hemes, hematin, ferrichrome and leg hemoglobin. These substances are involved in oxidation- reduction reactions in respiration and photosynthesis (Borlotti et al., 2012).

### **Importance of Copper**

Copper plays pivotal role in regulating multiple biochemical reactions in plants (Tripathi et al., 2015). Arnon and Stout (1939) earlier declared copper as an important nutrient for plants in their experiments with tomato. Being the stable cofactor of various enzymes and proteins, copper plays an indispensable role in regulating several metabolic and physiological processes of plants. It helps in the utilization of iron during chlorophyll synthesis (Harris, 2016). Copper has been also some indirect effect on nodule formation.

### **Importance of Manganese**

Manganese involve in the activation of many enzymes which helps in photosynthesis and respiration (Pankaj et al., 2018). It activates several important metabolic reactions, accelerates germination and maturity while increasing the availability of phosphorus (P) and calcium (Ca). It enhances root growth, development of fruit and develops disease resistance. It also helps in the movement of iron in plants. High concentration of Mn favors the breakdown of indole acetic acid (IAA). Its availability is reduced in high pH calcareous soils but is often very high in the acid soils (Jawad et al., 2016). Manganese deficiency causes a light green mottle between the main veins and interveinal chlorotic areas become pale green or dull yellowish colour (Mousavi et al., 2011). Dry edible beans, cucumbers, lettuce, onions, peas, potatoes, radishes are the most responsive crops.

### **Effect of Molybdenum**

Most of the vegetable crops are prone to molybdenum deficiency. Mohamed et al. (2011) showed that 30 and 45 µg/l molybdenum significantly improved vegetative growth parameters like curds yield and its components and chemical composition of leaves and curds in cauliflower. Adiloglu et al. (2013) studied the effects of increasing molybdenum application on some nutrient element contents of head lettuce plant. Results indicated that N, P and K contents of head lettuce increased with increasing of molybdenum applications. The level of Fe, Zn and Mn contents of plant decreased with increasing level of molybdenum applications, while Cu content of plant was not affected. Singh et al. (2017) revealed that the combined soil application of borax at 20 kg/ha and sodium molybdate 2 kg/ha gave the maximum height of the plant, length of leaf, width of leaf, total weight of plant, width of curd, average weight of curd and curd yield in cauliflower.

### **Importance of Chlorine**

Chlorine is most commonly used as sanitizer, due to its low cost for maintaining the fruit quality like appearance, soluble solids content, acidity, pH, texture and flavor, shelf life and also control microbial growth (Rahman et al., 2012). It is essential for photosynthesis (chlorotic tissues), helps in stomatal regulation and raises cell osmotic potential, necessary for shoot apex and root growth. Chlorosis of younger leaves and overall wilting of the plant is a common symptom. Deficiency seldom occurs because chlorine is found in the atmosphere and rainwater. Vegetable crops like potato and beans are more sensitive to chlorine deficiency (Singh, 2016).

## CONCLUSION

Micronutrients play an indispensable role in growth and development of vegetables crops. The nutritional value of crops is becoming a major issue, therefore, application of micronutrients to sustain soil health and crop productivity besides maintaining the quality of vegetables is of profound importance. Micronutrients are beneficial for improve yield, quality, earliness, fruit setting, increases post-harvest life, and develop resistance to biotic and a biotic stresses.

## REFERENCES:

1. Chaudhari VJ, Patel NK, Tandel BM, Chaudhari V. Effect of foliar spray of micronutrients on growth and yield of cauliflower (*Brassica oleracea* L. var. Botrytis). *International Journal of Chemical Studies*. 2017; 5(6):1133-1135.
2. Das DK. *Introductory to Soil Science*. Ed 4<sup>th</sup>, Kalyani Publishers, New Delhi, 2018, 468-479.
3. Dursun A, Turan M, Ekinici M, Gunes A, Ataoglu N, Esringu A, Yildirim E. Effects of Boron Fertilizer on Tomato, Pepper, and Cucumber Yields and Chemical Composition. *Communication in Soil Science and Plant Analysis*. 2010; 41(13):1576-1593.
4. Ejraei A. Determination optimum concentration of iron in hydroponic medium of Tomato (*Lycopersicon esculentum*). *Journal of Novel Applied Sciences*. 2013;2(3):856-860.