



CLIMATE-SMART URBAN  
AGRICULTURE  
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UNDERSERVED PRODUCERS**

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# INTRODUCTION



## MICRONUTRIENT ROLES

There is a plethora of micronutrients necessary for healthy plant development. Each responsible for fulfilling certain functions. Iron, Manganese, Copper, Zinc, Boron, Chloride, Nickel & Molybdenum are micronutrients. Fe, Mn, Zn, Cu, & Ni are metal components of enzymes and serve in the electron transfer reactions. They are considered immobile nutrients. Nickel is often forgotten but helps convert urea nitrogen into usable ammonia. Manganese is an enzyme activator,

including metabolism, energy transport and fatty acid synthesis. Zinc also activates enzymes and is necessary to create the growth hormone auxin. Iron plays a large function in photosynthesis. B and Cl are non-metal nutrients.

Cl plays a role in osmotic regulation and is mobile, B is important for cell division and is immobile in most plants. Boron's function is still being researched but it is thought to be involved in carbohydrate transport and cell wall development

## DEFICIENCY VISUAL IDENTIFICATION

- Iron deficiency can be identified by yellowing in the veins of leaves as iron helps manufacture chlorophyll. This is especially common to see in new growth.
- Manganese deficiency will cause the space in between the vein of a plant to yellow, this is more common to see in the older leaves.
- Molybdenum deficiency will cause leaves to be yellow and small.
- Zinc deficiency causes small leaves and crunkling on the leaf edges.
- Copper deficiency will cause yellow spots on leaves.
- Boron strengthens the cell wall; a lack of boron will cause brittle stems.
- Chloride deficiency may cause tiny white spots, although difficult to identify.
- Nickle may not display visual symptoms

## pH MANAGEMENT

Similarly, to macro nutrients, keeping pH in range is vital to ensure micronutrient uptake. Highly alkaline conditions cause iron, zinc, boron, copper, and manganese to not be available for uptake. At acidic

ranges other important nutrients will see a reduction of uptake such as, magnesium, phosphorus, calcium, potassium, and sulfur. Maintaining a pH between 5.5 – 6.5 is ideal.

## SUPPLEMENTATION

Non-organic compounds can provide optimal micronutrients for hydroponic and soil production. These can be purchased and mixed to appropriate ratios. Some micronutrient compounds are approved for organic use, make sure to check the OMRI list to confirm.

Other natural sources of micronutrients can be found in fish sludge, according to a study in 2017, Fe, Mn, Zn, & Cu have been measured (Delaide et al., 2017). Using compost is another great way to add micronutrients. Almost all micronutrients can be found in properly decomposed compost

## REFERENCES

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