

Table 16. Solution used to spot treat for micronutrient deficiencies.

Deficient Micronutrient	Fertilizer Source	Rate	
		oz/gal	lb element/1,000 sq. ft.
Fe	iron sulfate	2/3	0.025
Mn	manganese sulfate	1/2	0.025
Zn	zinc sulfate	1/2	0.01
Cu	copper sulfate	1/2	0.003
B	borax	0.1	0.001
Mo	sodium molybdate	0.01	0.001

Chelates

Chelates, chelating agents, or sequestering agents are cyclic structures of a normally nonsoluble metal atom and an organic component that become soluble in water when held together. However, the activity of the metallic ion is decreased in the aqueous solution. Commercially available sequestered metallic ions are iron, copper, zinc, and manganese. Organic compounds that have the ability to chelate or sequester these metallic ions include ethylenediaminetetraacetic acid (EDTA); diethylenetriaminepentaacetic acid (DTPA); cyclohexanediaminetetraacetic acid (CDTA); and ethylenediaminedi (*o*-hydroxyphenylacetic acid) (EDDHA).

Nonessential Elements

Sodium, aluminum, arsenic, and silicon are nonessential for turfgrass growth and development. In general, these elements become toxic at excessive levels and should not be applied in supplemental fertilizers.

FOLIAR LIQUID FERTILIZATION

I. Introduction

Foliar liquid fertilization, commonly referred to as foliar feeding, involves the use of a soluble form of nutrients for plants. Used for more than 100 years, this practice results in more rapid nutrient utilization and deficiency remediation than soil treatments. However, the response is often temporary. Since plants require only small amounts of micronutrients, application of these nutrients has been the most prominent use of foliar sprays. Applying sufficient amounts of macronutrients such as nitrogen, phosphorus, and potassium without leaf burn also has been difficult. Other advantages and disadvantages of using foliar liquid fertilization are listed below:

Advantages:

- There is no particle segregation, as is common with granulars.
- Foliar feeding provides nutrients directly to plants and is not influenced by soil properties.
- Nutrients are water-soluble.
- Co-application with pesticides is possible.
- Fertilizer is generally easier to handle and more quickly applied.

Disadvantages:

- Since the number of bags cannot be counted, the operator and meter must be reliable.