

FERTILIZER PROGRAMS

Plants require many nutrients for optimum growth. As most substrates have low nutrient holding capacity, micronutrients and macronutrients must be supplied in the form of fertilizer to provide plants with essential elements. There are three main times to fertilize, each of which is described below:

1. BEFORE PLANTING

- Consider each substrate component and additive for chemical properties such as pH and nutrients
 - Test for substrate pH, electrical conductivity (EC), and specific nutrient concentration
 - Substrate pH strongly influences nutrient availability
 - Nutritional deficiencies can occur even if the nutrients are present in the substrate if the pH range does not allow the nutrient to become soluble enough for absorption by the plant
 - If necessary, adjust pH to the optimum 5.6 - 6.2 for maximum nutrient availability
 - Add dolomitic limestone to increase pH and provide magnesium and calcium
 - Add sulfur to decrease pH
 - o Leaches moderately

- o May need to be reapplied since pre-planting application may leach out of substrate
- o Most common source is gypsum or calcium sulfate
- Phosphorus can be added as superphosphate
- Incorporate slow release fertilizer sources into substrate before planting
 - Helps establish a sufficient level of the nutrients for the plant's early growth
 - Simplifies future fertilization since most of the total quantity of micronutrients required can be supplied before planting (i.e., Micromax, Fritted Trace Element Mix)

2. CONTINUOUS FEED

- Fertilize at every irrigation with a soluble fertilizer (called fertigation) or apply liquid fertilizer
- For fertigation apply concentrations of at least 200 ppm N in each irrigation
- When applying liquid fertilizer at weekly intervals higher concentrations are required, up to 400 ppm N

3. END OF PRODUCTION SCHEDULE

- Reduce fertilization during the last two weeks of production schedule to

increase longevity of plants after they leave the growing area

- Test substrate pH:
 - If pH is higher than or equal to the high end of the optimum pH range (5.6-6.2) stop fertilizing for the last 2 weeks of the production schedule
 - If pH is in the middle of the optimum pH range cut fertilizer rate in half for the last two weeks
 - If pH is in the low end of the optimum pH range it should be corrected and fertilize regularly to last week and then stop
 - In the rare case that the pH is excessively low it should be corrected and plants should be fertilized to the end of the production schedule

FERTILIZER EFFECTS ON SUBSTRATE pH

- Over time fertilizers can change the pH of a media by leaving a residue that can be acidic or basic
- By alternating between acid forming fertilizers and basic forming fertilizers the pH can be maintained within a desired range
- Fertilizers with a high ammonium, ammonia, and urea content tend to acidify the soil, lower the pH
- Other nutrients that tend to lower the

pH are sulfur, chlorine, and phosphoric oxide

- Fertilizers that tend to raise the pH contain nitrate, calcium, magnesium, potassium oxide, or sodium
- Neutral fertilizers leave no residue in substrate, either acidic or basic
 - Example: potassium salts except for potassium nitrate
 - The acidic and basic elements in potassium salts neutralize each other
- Fertilizer labels indicate whether a particular fertilizer source tends to acidify the substrate or raise the pH in terms of calcium carbonate per ton of fertilizer

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, University of Maryland, College Park, and local governments. Cheng-i Wei, Director of Maryland Cooperative Extension, University of Maryland.

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