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# Commercial Floriculture Soilless Media Report

The UMass Soil Testing Lab tests commercial greenhouse soilless media using the Saturated Media Extraction (SME) method. The same basic method is used by most universities and commercial labs operated by major greenhouse fertilizer and soil mix manufacturers. Interpretation values differ according to various extraction methods.

***Use the nutrient values on this fact sheet to interpret the results of your SME test(s) analyzed by UMass.***

## Nutrient Levels

The normal range for each nutrient tested is shown in the accompanying table. These nutrient levels are for most growth media commonly used for containerized greenhouse crops in Massachusetts.

**The written comments on your SME test report form are based on these values.**

Values *below* normal indicate the potential for a nutrient deficiency. Values *above* normal may reflect too much fertilizer that could lead to reduced crop quality and postharvest longevity, injury from soluble salts, and pollution of water sources.

| SME Nutrient Levels (ppm) | | | |
|---|---|---|---|
| *Compare the results of your SME test(s) to these values.* | | | |
| **Macronutrient** | **Normal range** | **Micronutrient** | **Normal range** |
| Nitrate (NO3-N) | 60-175 | Iron (Fe) | 0.5-3.0 |
| Ammonium (NH4-N) | 0-10 | Manganese (Mn) | 0.5-3.0 |
| Phosphorus (P) | 5-15 | Copper (Cu) | 0.1-0.5 |
| Potassium (K) | 75-200 | Zinc (Zn) | 0.5-2.0 |
| Calcium (Ca) | 75-250 | Boron (B) | 0.1-0.5 |
| Magnesium (Mg) | 40-75 | | |

***Ammonium ($NH_4^+$)* -** Some ammonium in the fertilizer program is beneficial, but ammonium and urea should never exceed 50% of the total N supplied. Excess ammonium can cause injury to most greenhouse crops and the occurrence of injury is highest in soilless growth media.

***Calcium (Ca) and Magnesium (Mg)* -** In general the major source of Ca and Mg is limestone, therefore low pH is often accompanied by low Ca and Mg. Most commercial water-soluble fertilizers supply no Ca and very little Mg. If the test results indicate low Ca, levels can be increased by alternating applications of calcium nitrate and the usual N fertilizer. If Mg is low, apply a solution of Epsom salts every 2 to 3 weeks. This solution is prepared by dissolving 2 to 3 lbs. of Epsom salts in 100 gallons of water. Chronic Ca and Mg deficiencies can be corrected by using a fertilizer program that includes Ca and Mg.

| Soluble Salt Levels (mS/cm) | |
|---|---|
| *Compare results of your SME test(s)to these values.* | |
| **Optimum EC Values** | |
| **Seedlings and young transplants** | 0.7-1.0 |
| **Established Plants** | |
| Soilless growth media | 1.5-3.0 |
| Growth media containing 20% or more field soil | 0.8-1.5 |
| Interior landscapes[1] | 0.5-0.8 |

[1]The critical factors for indoor plants are light level and growth rate. For example, rapidly growing plants under high light can tolerate higher levels of soluble salts than slow-growing plants under low light.

### Soluble Salts

A common problem diagnosed by testing is excess soluble salts. Generally this is a result of too much fertilizer in relation to the plant's needs. Inadequate watering and leaching, or poor drainage are other causes. Sometimes high soluble salts levels occur when root function is impaired by disease or physical damage.

***Always check the condition of the root system when sampling soilless media for testing.***

The accompanying table shows the "normal range" of soluble salts levels for common greenhouse crops. Seedlings, young transplants, and plants growing in media containing 20% or more field soil are less tolerant of excess soluble salts. Soluble salts *above* the normal range for prolonged periods may cause root injury, leaf chlorosis, marginal burn, and sometimes, wilting. Soluble salts *below* the normal range may indicate the need for increased fertilization.

| Optimum pH Values | |
|---|---|
| *Compare your SME test(s) to these values.* | **pH** |
| Soilless media | 5.5-6.0 |
| Media with 20% or more field soil | 6.2-6.5 |

### pH and Acidity

Most greenhouse crops can grow satisfactorily over a fairly wide pH range. However, optimum pH values have been established for soilless media and media with 20% or more field soil. Optimum pH values are shown in the accompanying table.

The difference in optimum pH between the two types of growing media is related to pH effects on nutrient availability in each.

Low pH (values below the optimum range) is a common problem for some crops found in greenhouse growth media in Massachusetts. At low pH, Ca and Mg may be deficient. Molybdenum (Mo) deficiency in poinsettia can be partly attributed to low pH levels. Other trace elements such as iron (Fe) and manganese (Mn) may reach phytotoxic levels when pH is low (<5.8). Excess Fe and/or Mn can be toxic to geraniums, New Guinea impatiens, marigolds and other bedding plants.

Using a growing media that contains the proper amount of lime and choosing the correct fertilizers are the best way to avoid low pH problems. As a general recommendation, if a grower mixes their own growing medium, use no less than 5 lbs. of dolomitic limestone per $yd^3$ of growth medium. Greater amounts of limestone (8 to 10 lbs. per $yd^3$) may be needed depending on the materials used to make the medium, irrigation water pH and alkalinity, and the acid forming tendency of the fertilizer in use. ***Do not add limestone to commercial brands of growth medium.***

It is much more difficult to raise pH after planting. Using a basic fertilizer such as 15-0-15 or a suspension of hydrated lime (calcium hydroxide) will help to correct the situation. The suspension is made by adding 1lb. of limestone to 5 gallons of water. Irrigate with the clear solution. Commercial flowable limestone products can also be used following the label rates. Test again for pH after making one or two treatments.

As a general rule it is not advisable to compare test results from one lab to another due to different methods being used. However, UMass SME test results will be broadly similar to those from other labs using the saturated media extraction procedure. ***Ultimately, how the results are interpreted is the key to what action you should take based on the test.***

Questions regarding results and interpretation of commercial greenhouse floriculture soilless media tests should be directed to Douglas Cox, UMass Extension, dcox@umass.edu

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