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Meter Matters: *Selecting a pH and EC Meter*

Setting up an in-house nutrient monitoring program requires a reliable and easy-to-use pH and EC meter. Here are a few options that meet the needs of growers.



Figure 1. A pH and EC combination meter is utilized by greenhouse growers to monitor root zone conditions. (© Patrick Veazie)


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There is a wide variety of meters available on the market that can serve different functions and may work better in various settings. The most common styles of meters are either benchtop or portable. A benchtop unit is ideal for a lab setting and usually has a higher degree of accuracy. For in-house greenhouse monitoring, that degree of sensitivity is generally not needed. A benchtop meter may be more suitable if you are analyzing samples at a central lab location.

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Portable meters work well for spot-checking crops and reducing the time required to collect and analyze samples. There are two primary types of portable meters, small pen types and slightly larger hand-held types (Fig. 1). The lower-end pen-type pH and EC meters are more cumbersome to calibrate, and most growers quickly upgrade to the larger hand-held type of meters. The combination pH/EC hand-held meters are the ideal choice for a greenhouse situation.

Growers have expressed interest in obtaining a low-cost model with easy-to-use calibration knobs (instead of auto-calibrating units). A few meters are available for purchase to fit your needs. Growers have expressed ideal attributes of a meter: (1) it is a combination pH and EC meter with a single combined electrode for easy use, (2) easy to calibrate with calibration knobs, (3) EC is expressed in mS/cm (not mmhos/cm or ppm (*see Note 1*) - thus avoiding having to convert numbers into the reported industry mS/cm standard), (4) portable and rugged for greenhouse use, and (5) a suitable price point.

A key consideration when selecting a meter is what value ranges are measured. Some meters may only read up to an EC value of 4.00 mS/cm, which is insufficient for PourThru analysis used in greenhouse settings. The Hanna HI9813-61 only reads up to 4.00 mS/cm, so if interested in purchasing a Hanna model, the HI9811-51 is a better option because it reads up to 6.00 mS/cm [but expresses EC in mmhos/cm (ie: 6,000 mmhos/cm instead of 6.00 mS/cm, so value conversion must be done)]. The Milwaukee Instruments MW802 Pro 3-in-1 pH and EC meter also reads up to 6.00 mS/cm. All three of these models are available for under \$300 (*see*

Note 2 for Disclosure). Calibration solutions, electrode cleaning solution, and storage solutions are extra.

These models are suitable for most greenhouse settings, except when there is a significant nutrient accumulation issue. It would be preferable to have a meter that reads up to 8.0 mS/cm, but there seems to be a lack of economy meters on the market that fit that requirement. If your meter does not read a high enough EC value, then dilute your sample by 50% (v:v) with distilled water and reread. The resulting EC reading can be doubled to obtain your sample value.

Conclusion

In-house nutrient monitoring is important to help prevent pH and EC problems before they occur. There are a few low-cost, easy-to-use meters that are suitable for greenhouse use that will aid you in setting up a monitoring kit.

Note 1: Meters Expressing PPM Values

Total dissolved solids are expressed as parts per million (ppm) and can be converted to mS/cm by dividing by 640 to compare with most published recommendations. (Check with the reference guide that comes with your meter because the conversion factor can range between 640 to 700, depending on the model.) In floriculture production, most published EC recommendations are expressed as mS/cm.

Note 2: Disclosure

We generally try to avoid recommending specific products. The meters are listed in this article because they meet the criteria set by growers as being cost-effective and easy to use. While our research program has received funding in the past from one of the companies listed, we have no financial interest or gain from recommending any of these meters.

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