

MANAGING PH IN CONTAINER PRODUCTION

The long amount of time your production team spends growing out large patio pots for impulse purchases at retail means your crops could be prone to high-pH-induced iron (Fe) deficiency. Petunia and calibrachoa are the usual suspects for this disorder, but you also want to keep a close eye on New Guinea impatiens and geraniums.



The pH of growing media can increase over time for various reasons, so here are a few things to consider if your pH creeps up over time and cause issues in your crops.

What's Your Water Alkalinity?

If your soil pH increases persistently throughout production, your irrigation water's alkalinity likely has something to do with it. Not to be confused with pH, alkalinity is the buffering capacity of water, i.e. its ability to neutralize acids, which is often reported as meq/L or ppm of CaCO₃.

Midwestern growers often face the biggest challenges with high alkalinity (hooray for limestone aquifers), but other regions have high alkalinity, as well. Carbonates and bicarbonates that make up the alkalinity in your water accumulate in growing media and cause the pH to increase gradually as they react with different acids in the soil column. As such, you need to know your water's alkalinity and manage it appropriately to avoid high-pH-induced Fe deficiency.

- If you don't know what your water's alkalinity is, collect and submit a water sample to a commercial laboratory. Be sure that the analysis being performed includes alkalinity—not just hardness, as hardness does not provide actionable info for managing alkalinity.
- Drop-count titration kits offer relatively precise alkalinity readings (if used correctly). If the cost of having a lab analysis is too high, these kits can be purchased for about \$50 and shipped to you.
- Once you have an accurate water alkalinity reading, take proper management steps to reduce alkalinity to suitable levels for crop production. Alkalinity at or below 100 ppm CaCO₃ is a good target to shoot for in finished crop production.
- Check out [this info from Purdue University](#) for more details and specific strategies for managing on alkalinity.

How Much Lime is in Your Soil?

Dolomitic lime and other lime products are used by substrate manufacturers to stabilize soil pH and keep it within ranges suitable for growing plants over time. While reliable manufacturers have quality control measures to ensure the proper amount of liming agent is added, mistakes can happen. Whether an equipment failure occurred or a spot-check test wasn't done properly, too much lime in your mix can cause the pH to increase over time and cause high-pH-induced Fe deficiency in your crops. This is less common compared to high water alkalinity driving pH up, but if your water quality is good and/or being properly managed, look for the following indicators *and test your soil ASAP*.

- **Batch-wise patterns.** If all your crops are being treated the same and are growing in the same type of media but difference in crop health between one group of plants to the next is apparent, a mixing error may have occurred with the media in which more heavily symptomatic plants are growing. Be sure to save bag/bale/pallet labels with batch numbers on them in case you need to work with your supplier to back trace a batch-wise issue like this.
- **Severity of the issue.** If even your high-pH-loving crops like geraniums, marigolds and pentas are showing symptoms of Fe deficiency, your growing media may be over-limed. Be sure to eliminate possible high pH factors on your end (like water quality and other cultural factors) before reaching out to your supplier. This is another scenario where it pays to keep a record of substrate batch numbers to send to your supplier for testing.

In this type of situation, growing media pH might be within an appropriate range early in production. Regimented in-house soil pH tests can help catch issues associated with over-limed soils from sneaking up on you, so be sure to add periodical soil testing to your to-do list.

What's Your Feed?

If your water quality is decent and your growing media lime rate is appropriate, but Fe deficiency still occurs, you may need to adjust your fertilizer program. Use of fertilizers formulated with primarily nitrate-based nitrogen (ex. Cal-Mags [15-5-15 or 17-5-17], 15-0-15, 15-0-0) on a constant basis can drive the soil pH up over time and lead to high-pH-induced Fe deficiency. Be sure to rotate an acid-rendering fert formulation into your feed schedule to combat this.

- Fertilizers like 20-10-20 have a higher percentage of ammoniacal nitrogen than Cal-Mag feeds (for example), and drive soil pH down over time.
- In cases where pH needs to be decreased significantly, spot-feeding with a highly acidic fertilizer like 21-7-7 once or twice can be a short-term solution. However, do not apply fertilizers like this to crops that are sensitive to ammonia-form nitrogen (for example, coleus, salvia and zinnia).

Lastly, if you're using a new feed for any reason this spring, be sure to check the micronutrient levels on the label. If micro levels are lower than in your normal feed or micros are removed entirely, supplement with a micronutrient package at an appropriate rate to prevent Fe deficiency and save yourself from potentially going on a wild goose chase to find the cause.

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