

Hydroponic

Resources for the Educator

Hydroponic Basics

- *Hydroponics*, Oklahoma Cooperative Extension Service <https://extension.okstate.edu/fact-sheets/hydroponics.html>
- *Home Hydroponics*, Illinois Extension https://extension.illinois.edu/sites/default/files/illinois_extension_hydroponics_handouts.pdf

Nutrition, pH and EC

- *Electrical Conductivity and pH Guide for Hydroponics*, Oklahoma State University <https://extension.okstate.edu/fact-sheets/electrical-conductivity-and-ph-guide-for-hydroponics.html>

Checking the pH

- Inexpensive pH strips can determine pH but they are sometimes hard to read because the colors can look alike. Fertilizer dyes can also cause confusion on colors.
- Liquid pH test kits are a popular method to check pH for small hydroponic systems. They work by adding a few drops of a pH sensitive dye to a small amount of the nutrient solution. The color is compared with a color chart. They are easy to read and reliable.
- pH meters are very accurate for determining pH. Meters come in a many size and price points. They come from a variety of manufacturers and are easy to use.

pH Meters

- Hannah Instruments, Sample Combo pH/EC/TDS HI98130 Meter <https://www.hannainst.com/combo-ph-conductivity-tds-tester-high-range/>
- *Learn How to Set Up and Calibrate the Hannah combo tester HI98130* <https://www.youtube.com/watch?v=O5TQ4-T-gsk>
- *What is Electrical Conductivity (EC/TDS)?* By Hannah Instruments <https://www.youtube.com/watch?v=pxqdN0dI38k>
- Using a pH meter, Hannah Instruments <https://www.youtube.com/watch?v=dn9rDIJTHh8>
- Bluelab pH Pen <https://bluelab.com/usa/bluelab-ph-pen>

Hydroponic - Adjusting pH

A Frequently Asked Question

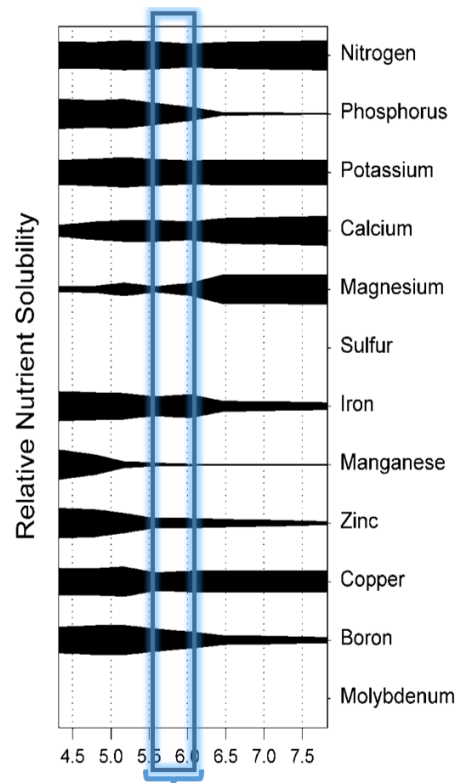
What causes the pH of my nutrient solution to keep rising?

Missouri water sources can have high concentrations of alkaline minerals and can cause the pH of your hydroponic system to rise and hard to regulate. Other factors causing pH to increase can include nutrients being consumed, nutrient availability, water temperature and nutrient solution strength.

To lower pH, there are several options:

- **PH-DOWN** is a General Hydroponics liquid phosphoric acid solution. Once added to your hydroponic nutrient solution, it will lower the pH. PH-DOWN should be added once the pH gets higher than 6.5. Add little of PH-DOWN at a time. Wait a couple of minutes before checking pH. Add more PH-DOWN if needed.
- **Citric Acid** occurs naturally in citrus fruits. Citric acid will bring down the pH but the effect is short-lived and once it wears off, the pH will rise again. Add Citric acid in small amount and test pH between applications. Record how much it takes to reach the pH desired. This will be how much you will have to add each time.
- **Food Grade Sulfuric Acid** is the strongest acid that can be used to lower pH. It causes the fastest drop in pH. Add in very small quantities (1.42 fluid ounces per 100 gallons of water to neutralize 50 ppm alkalinity).
- **White Distilled Vinegar** can be used to bring down pH. Add a capful of vinegar per gallon of water. Wait a couple of minutes and then test the pH. If more vinegar is needed, add only little bits at a time. It can cause leaf spotting and yellowing in some crops.

Other options include nitric acid, acetic acid, and monopotassium phosphate.



For plants to effectively absorb nutrients from the water, the pH of the water must be balance to the pH the crop requires. The is typically anywhere between 5.5 to 6.0 (typically where the most nutrients are most available.)

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