

The perfectpH Bible



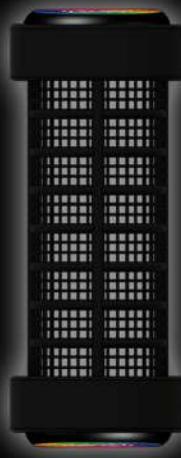
TORUS HYDRO

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GENERAL INFO

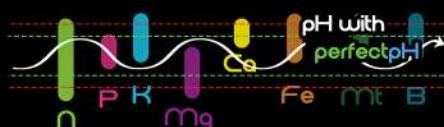
The **perfectpH** is a revolutionary pH stabilizer that automatically balances the pH of your hydroponics system, keeping it in the ideal range for optimal nutrient absorption.



Using advanced ion technology, the **perfectpH** eliminates excess pH swing that inhibits plant growth and weakens the plants' immune system.

Using the **perfectpH** can eliminate the need for chemical buffers, frequent reservoir changes, wasted water and nutrients, and will increase yields.

The **perfectpH** will generally maintain pH in the range of ~5.5 - 6.5, though most systems will be balanced within the range of ~5.7 - 6.2



It is important to keep in mind that having slight fluctuation within these target ranges will allow for optimal nutrient absorption, as different nutrients are taken up by the plant at varying pH levels, which can fluctuate with different growth stages and type of plant.

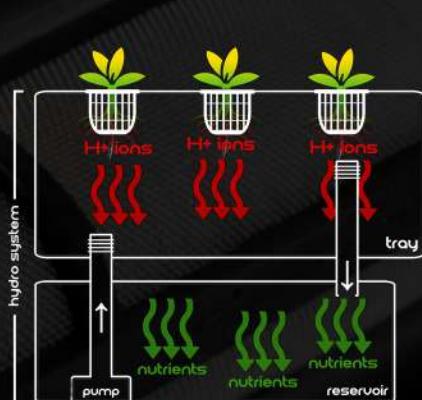
As seen in the chart above, the **perfectpH** allows for variance in the maintained pH, to access the different key values for uptake of different nutrients.

GENERAL INFO

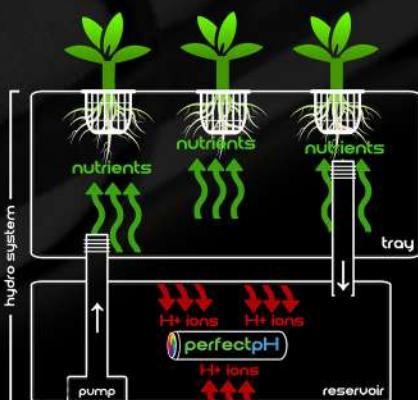
pH maintenance is an essential factor in any hydroponics setup. Without the plants being naturally rooted in the ground, excess ions build up in the system, creating a toxic environment for the plants. The perfectpH solves this by removing this charged ion build up, creating the perfect pH environment for your plants.

impact of excess H⁺ ions on nutrient absorption

without perfectpH



with perfectpH



excess H⁺/OH⁻ ions build up in the system during photosynthesis, blocking nutrients from proper absorption, causing pH fluctuation, weakened immune systems and diminished yields.

with the perfectpH natural ion pH balancer, excess H⁺/OH⁻ ions & other toxicities are captured & removed from the hydro system, resulting in balanced pH, healthy plants, & larger yields.



Welcome to the perfectpH



It is important to understand that as a user stops using pH Uppers and Downers, there may have been underlying issues present within their hydroponics system that only become obvious once they stop using chemical buffers to control pH.

Before using your perfectpH, it is advised to review the following key points for optimal results:

COMPATIBLE SYSTEMS

DWC (Deep Water Culture)

Flood-and-Drain (Ebb & Flow) - Note for Flood-and-Drain systems that flood scheduling can affect optimal results. See "Circulation" section for recommended usage info.

NFT (Nutrient Film Technique) - Note for NFT systems, if the depth of the nutrient film is very thin, circulation may be less than sufficient for optimal results. Increasing pump size to create a thicker nutrient film can remedy this, if encountered.

Aeroponics*

Hybrid Systems (systems that are a combination of these techniques)

SEMICOMPATIBLE

Drip Systems - Due to the low circulation of these systems, drip systems (such as Autopot) require use of the perfectpH Inline model for effective results. Drip systems can be effective with the standard model perfectpH if the system makes use of other techniques as well, such as Deep Water Culture or Flood & Drain.

INCOMPATIBLE

Aquaponics - Aquaponic systems are currently incompatible due to their organic nature.

IN DEVELOPMENT

DTW (Drain-To-Waste) - compatibility is currently in research & development.

Pre-Treatment Tanks - compatibility is currently in research & development.

*Some aeroponic systems may require the use of the perfectpH inline model.



CIRCULATION

The perfectpH works best in systems that have a very adequate recirculation of water & nutrients.

For example, DWC systems that are constantly flooded, with established roots submerged in the water containing the perfectpH, will provide very good results.

A flood & drain system, that may only flood for a 15 minute duration very infrequently, will minimize the ability of the perfectpH to create an ionic relationship with the plants' roots (to remedy this, it is usually recommended to increase pump flood frequency or duration, or using a higher flow pump).



SOURCE WATER

Extremely hard water (above ~150ppm [$\sim 0.3 \text{ mS/cm}^2$]) may force pH upward, due to its high concentration of carbonates that build up in the system over time.

If source water is extremely hard it is recommended to use an RO (Reverse Osmosis) filter and run your system using this RO water.



PLANT TYPE

The perfectpH is recommended for all fruiting plants (fruits, vegetables, medical plants, etc.) and is not recommended for ornamental plants.



ESTABLISHED ROOTS

In order for the ionic relationship to be created between the plants and the perfectpH, there needs to be established roots present in the system. As an example, we do not currently recommend using the perfectpH with a small amount of clones, as they have not created adequate root volume.

The larger the roots, the more ions will be discharged from them as the plants photosynthesize, and this will create a better relationship with the device. We usually recommend letting clones develop 1-2 weeks into their vegetative growth before adding the perfectpH, as the device may be less effective during this time.

Further compatibility for use with cloner systems is currently in research & development.



MEDIA

Inert media is recommended when using the perfectpH. Non-inert, or media that tends to pull pH into a more basic or more acidic range, can be usable with the device but may require some additional set up or system requirements. Predominantly inert media, requiring no additional set up, are listed below:

COMPATIBLE MEDIA

Perlite

Vermiculite

Coco Coir

Pumice

Hydroton/Clay**

Oasis Cubes

SEMICOMPATIBLE MEDIA

Non-inert media (that has additional requirements for usage)

Rockwool - Rockwool has a tendency to leech lime dust which will constantly force pH upward. To remedy this, it is recommended that users treat media as described on page 8 in section "Treating Your Media".

Growstones - When using Growstones, it is recommended that users treat the media as described on page 8 in section "Treating Your Media"

Peat Moss - Peat Moss, particularly when amended with lime-stone/dolomite, will force the pH of a system upwards initially, then forcing the pH downwards further into the harvest. In order to remedy this, it is recommended to use a larger sized perfectpH or recharge your perfectpH more frequently.***

Cotton - Cotton can force the pH downwards in time due to recommended to use a larger sized perfectpH, or recharge your perfectpH more frequently.***

INCOMPATIBLE MEDIA

Soil - Soil is not compatible with the perfectpH.

**Though hydroton/clay media is considered to be relatively inert, there is potential for pH rise, which may be magnified if the media has been sitting for long periods of time. If experiencing pH rise when using hydroton/clay, it is recommended that users treat the media as described in the "Treating Your Media" section below.

***Media treatment can help stabilize these media as well, but these stabilization effects may be temporary.

TREATING YOUR MEDIA

Leave your media in a solution of 1 part vinegar, 2 parts water, for over 48 hours. Rinse with water thoroughly to remove any remaining vinegar and return the media to the system.

For larger systems where removing the media may be less feasible, we recommend to run a pH 3-4.5 buffer (or as recommended by manufacturer) over the media within the system for several days, adding additional buffers if the pH drifts.

When the pH becomes stable the solution is ready, and the media should no longer interfere with the perfectpH's ability to most effectively regulate the system's pH.

Common buffers that could be used include the following: phosphoric acid /hydrogen, phosphate and acetate/acetic acid.



NUTRIENTS/ADDITIVES

Best results will be obtained using the perfectpH in a system with nutrients, as the ionic relationship created is supported by the plants releasing ions as they feed off of the nutrients available. If the nutrient mixture concentration is allowed to get very low, this can cause a slight increase in pH, but the system will correct itself once nutrients are added. Usually a minimum of ~350ppm (~0.7 mS/cm²) is sufficient.

Mineral nutrients are typically recommended.

Some organic fertilizer nutrient mixes may be less effective with the perfectpH, dependent on the specifics and environment of each system.

Use of un-stabilized silica with the perfectpH can cause the pH to rise. When using silica with the perfectpH it is recommended to use a brand that is pre-stabilized such as OSA 28, and dose in small amounts or as recommended by manufacturer. As well, a bit of pH down can be used to offset this effect.



TEMPERATURE

Significantly high reservoir temperatures can increase the pH in some situations. If the temperature of the reservoir is too high this could interfere with the device working to its full capacity, and could potentially result in a pH reading up to a full pH point higher than the ideal range. Lowering the temperature of the reservoir can resolve this issue.

An initial makeshift test can be done by freezing a couple of water bottles into ice and dropping them into the system to see if it has any effect. If using a chiller, a user can turn the setting to a cooler temperature to remedy any temperature issues. We recommend the reservoir temperature typically be in the range of 65-75 F (18-24 C), though some systems may continue to function properly within a wider temperature range.



FIRST USE

Upon the first few days of using a new perfectpH, some users may experience a temporary drop in pH. This is caused by a release of acidity from the composite within the perfectpH, upon the first initial use. To remedy this, a small amount of pH up can be added to counteract this drop, after which the pH will stay stabilized within the ideal range.



MAINTENANCE & STORAGE

In order to keep your perfectpH working optimally, it is recommended to remove the perfectpH from the reservoir and submerge in the Torus Hydro perfectpH Recharge Solution every 8-12 weeks of use, or as pH begins to drift outside of the recommended range.

The perfectpH can be thought of as a rechargeable battery. Bigger plants, with larger root mass will 'deplete the charge' more quickly than smaller plants with less root mass. Thus, the recharge recommendations are general guidelines, and user experience may vary. To recharge, the perfectpH should be submerged in the Recharge Solution for 2 hours, then rinsed with water, and returned to the reservoir.

When using the perfectpH keep your system free of algae, as algae can cause pH swing.

To keep the composite within the perfectpH from drying out, it is recommended to keep your perfectpH sealed in its original container or in a sealed, moist environment when storing the device.

Check out www.torushydro.com for more info about our products.

Thanks and happy growing!





TORUS HYDRO

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