Making Isotonic Solutions For Draining : Preparing Your Own – and better – Clearex

When growing hydroponic products it is common in the industry to do a final treatment before picking up the crop in which nutrients are removed from the hydroponic solutions. While in most cases this is achieved by passing RO water through the system it is true that passing water with a very low osmotic pressure can make the plants absorb larger amounts of water than what we would ideally want, disturbing the osmotic equilibrium established by the roots with the nutrient solution. An approach that has been used to solve this problem is the use of isotonic cleaning solutions – such as Clearex – which drain the hydroponic media from nutrients without subjecting the roots to the stress of an hypo-tonic solution (such as RO or distilled water).

–

On today's article I will teach you what the Clearex solution is supposed to achieve and how you can make your own (or even a better) solution to solve this final draining problem. First of all, removing nutrient from a hydroponic solutions is not so hard. Simply by running RO water through your system after draining the original solution you will remove most nutrients since these salts – contrary to what some companies tell you – are readily soluble and easily leave the media and roots when washed with RO water. The small problem when using RO water is that it is hypo-tonic with the roots, meaning that water will go into the roots to attempt to "lower" the concentration of the solutes within the plant's cells.

–

_

Depending on what you want to achieve with this final draining solution you may have a problem when using such an hypo-tonic solution. In crops where there is fruit production, using such a solution can cause problems such as the rupture of fruits' skin due to the higher rate of water absorption that takes place when plants are placed in a hypo-tonic media. In order

to avoid these problems the best thing is to use an isotonic solution which has an osmotic pressure similar to the original nutrient solution.
Clearex achieves this simply by combining a few sugars to a concentration of about 4-6% in order to get to the point where the osmotic pressure of both solutions is similar. Getting regular table sugar an dissolving it in a ratio of 50g per liter of solution will achieve very similar results as those obtained with Clearex. However using sugars like this can have additional problems since sugars stimulate the development of fungi and bacteria within the root zones of the hydroponic plants.

In my opinion it would be possible to achieve better results by using an isotonic solution with a combination of salts and sugars in such a way that non-nutrient salts are used to provide an ionic content to the draining solution. Using a combination of NaCl, Sucrose and Sodium Hydrogen Carbonate to achieve a more balanced solution may provide better results when doing this type of draining procedures. Of course, this is based purely on my anecdotal evidence and an adequately controlled study would be needed to say anything conclusive for a particular plant specie.

In the end making these solutions is extremely simple and buying Clearex or such other solutions made for this purpose is an obvious waste of money. If you have obtained good results with solutions like these then you can simply make your own with simple sugars while it is possible that you could obtain results just as good as those by using RO water if your crop is not sensitive to hypo-tonic conditions. If you want to experiment a bit I would recommend using a solution with about 150 mg/L NaCl, 100 mg/L $NaHCO_3$ (sodium bicarbonate) and 10g/L of glucose. Let me know if you get better, worse or similar results :o) **(note that this is NOT a straight solution but a concentrated additive that should be used until the desired EC levels are reached)**