Why Consider Reverse Osmosis?

Taken From Writings by Richard Gellert

Walk into any hydroponics shop and you will most likely see that they sell reverse osmosis water purification systems. You may ask yourself why someone would spend money on a water filter to grow plants. Most people give straight tap or hose water to their house and garden plants and they do just fine.

But what about more prized plants and fruits? What if you only want to give your plants the best ingredients? Most important, what if you were interested in pushing your plants to the max and achieving explosive growth? Serious gardeners have long realized how important pure water is to the success of their important crops. After all, water is the root of hydroponics and, therefore, the most important component to a healthy garden. Water acts like a carrier and bathes your root zone with nutrients, additives, and promoters.

If you look at the top nutrient manufacturer's feed charts, you will notice a common theme. They all require using 0 ppm (parts per million) water as a starting base for the nutrient solution. Without this ultra-pure base, it is much more difficult to dial in the ppms of your formula while making sure you have the proper amounts of each component vital to healthy growth. When the feed chart says bring the nutrient solution to 1200 ppm and you are starting with water that is at 500 ppm, what do you do? It is hard to even guess what that 500 ppm is composed of; nonetheless, try and adjust for it in the nutrient formula you are trying to perfect.

The first step is to determine how bad your water is and what type of system would be most beneficial to your garden. Free water reports are available from your municipality or water company, though water quality fluctuates greatly throughout an area and over

the seasons. Test kits can be ordered online and are quick and affordable. Some hydroponics shops do water testing and there are many labs that can do an analysis. A key indicator of water quality for plants is total hardness as expressed in ppm of calcium and magnesium or in grains per gallon (gpg). With too much hardness, the nutrient formula can be thrown out of balance and deficiencies and lockouts can quickly become a major problem. Any water source over 50 ppm of hardness should be purified. This translates to 3 gpg and is considered soft water, which few people have straight from the tap.

Organic gardeners using compost teas or bio-extraction solutions should use purified water. Anyone gardening with living micro-organisms such as beneficial bacteria, fungi, and nematodes, mycorrizae, and trichoderma, must have chlorine and contaminant-free water in order for those helpful microbes to survive and flourish. Unfortunately, it's rare someone's water source is perfect for his or her prized plants. Letting city water sit out overnight may get rid of some free chlorine, but it doesn't affect the chloramines or other contaminants. Water from well or spring sources is often too high in minerals such as calcium, magnesium, sulfur, and iron. This water may be fine to drink, but for hydroponics it may be too heavy with these minerals and may contribute to nutrient lockup.

Gardeners that start using pure water never go back to untreated water. There are still plenty of people that haul fivegallon jugs of water to their garden. They will go to these lengths to pamper their plants and make sure they only get the best. If you do the math, a water purification system from a hydroponics shop pays for itself quickly with the money and energy saved hauling water. There are several customized filtration systems on the market available for gardening and hydroponics.

The proper filter for your situation depends on the source water. A good place to start is having your water tested to determine several important values that affect water quality. The previous article mentioned several sources of obtaining your water's readings, and your local indoor gardening shop may be of great help. The ppm (parts per million) of

your TDS (total dissolved solids) is going to be very telling. Any values over 150 ppm and you are merely guessing at what hides in your water. But ppm is only part of the story. What this ppm is made up of is the other part.

There are a variety of contaminants that you can read on a ppm pen. Hardness is usually a large part of the total ppm you're reading. Hardness is the amount of dissolved calcium and magnesium in your water, and too much of these can create all sorts of problems, the main one being nutrient lockout. Usually measured in grains of hardness per gallon, GPG, each GPG equals 17.1 ppm of hardness. Starting with very low values of these minerals is the best way to ensure proper feeding and healthy plants.

The other part of the ppm reading is sediment, rust, chlorine, chloramines, iron, sulfur, volatile organic compounds, and, too a lesser degree, heavy metals and pesticides. These nasty pollutants should be kept far away from your prized plants and fruits. If you don't drink your tap water, then you probably shouldn't be giving it to your plants.

Reverse Osmosis Systems can remove all of the contaminants and seems like the best choice, though if you have extremely hard water (12+ grains per gallon (~4 L) or 200+ ppm calcium), then a softener is recommended to pre-treat the water before going into an RO filter. The softener does a great job at quickly and efficiently removing hardness, making it much easier for the RO machine to clean the rest of the pollutants.

Softeners exchange calcium and magnesium for sodium chloride (table salt), which is harmful to plants but easy to remove with reverse osmosis. Potassium chloride can be substituted for salt and is tolerated by plants, but it is twice the price of sodium chloride. The potassium levels end up being a bit high for delicate plants, so a reverse osmosis system is recommended afterwards for the ultimate in pure water.

Carbon and sediment filter systems are essentially instant dechlorinators and dirt removers. You will normally not see a huge drop in ppm like you will with a reverse osmosis filter. If the ppm is primarily sediment, chlorine, and organic compounds, then a reduction in ppm can be seen, but that is not the primary purpose of these machines.

Most dechlorinators have higher flow rates than typical RO filters and are priced more affordably. They remove 99 per cent of harmful chlorine and 85 per cent+ of chloramines to ensure that the living microbiology (beneficial bacteria, fungi, trichoderma, etc.) in your nutrient solution, and in the soil and root zone, remains healthy and thriving.

If you want to remove not only chlorine and sediment but also everything else, then a reverse osmosis filter is what you need. Reverse osmosis technology is the ultimate solution if lowering your ppm is the primary concern. A good RO machine is capable of removing 95 per cent of everything in your water, producing soft, pure H2O.

The heart of an RO machine is the membrane, which does the majority of the purifying. Most membranes are designed to last two to four years, depending on the quality of the source water and frequency of pre-filter changes. Most reverse osmosis machines can handle a maximum hardness of seven to 10 grains per gallon and a TDS of 1000 ppm. If your water is much harder than that, either invest in a softener or be prepared to change membranes more often.

There are several specialty filters available to deal with particularly nasty situations. Some people on well water experience high sulfur levels, indicated by a typical “rotten egg” smell and taste. High levels of iron can also require specific pretreatment. An overabundance of either of these can be harmful to plants and humans, and a water-conditioning expert in your area should be consulted.

So, don’t be afraid of the unknown pollutants hiding in your water. Find out what those contaminants are and use the above guide to help you find a solution. Many hydroponics shops carry a variety of water filters capable of helping with your water problems. Most of these shops can be very helpful in determining which is the correct filter for you and your plants.

Type	Observed Measurement
PPM of TDS (Parts Per Million of Total Dissolved Solids)	Test with shop PPM Pen
PH	Test with shop PPM Pen
Hardness (dissolved caldium & magnesium)	Test with hardness test kit to obtain Grains per Gallon
Chlorine (municipal water only)	Test with strip
Iron (well water only)	Test with strip

What Is In Your

Contaminant	Source	Effects on Plants
PPM of TDS	Well/Spring Municipal/City	Water with high PPM of dissolved solids) has ur contaminents that is th nutrient lockout and de plants.
Chlorine	Municipal/City	Biocide that kills benefici and micro-organisms. Ar bio-hydro garden is chlor using or brewing compo solutions, removing the c
Chloramines	Municipal/City	Biocide that's a combo of ammonia and is much m chlorine. It will not dissip even by boiling off. Can proper filtration. Toxic to fungi, micro-organisms, f
Hardness	Well/Spring Municipal/City	Dissolved calcium and m forms scale on equipme Too much of either of th and you are locking out your plants. Your plants feed properly and will ex Pipes and equipmnet ca clogged and fial. Minera key cuase of water probl and other gardening sys