Fads and Fallacies

By William Texier - GHE

Growing plants in a closet, under artificial light is a relatively recent activity. The utilisation of hydroponics technologies in those closets is even more recent. Also, this activity is often exercised by young people with no previous knowledge of plant growing and related fields. Certainly not your typical greenhouse grower profile!

As a result, there are numerous fades circulating in the home grower world that are deeply rooted in people's mind. They are often propagated on Internet forums. In fact, there is little access to good information. Technical books on hydroponics are hard to read for most people without a previous knowledge in chemistry and plant physiology. The many recent books on the subject of indoor growing cover all the fields from choice of a system, lighting, ventilation etc...Some of those books are well made and pretty thorough but proper hydroponics practises are only a short section of those books and they sure don't have the space to go into many details. You cannot trust Internet forums either since some manufacturers use them to promote their products by posing as simple users, ranting and raving on how this product is miraculous. Others are good faith users that can, by like of experience, draw the wrong conclusions and propagate them; or it could be something observed once and made as a rule without trying to have more repetitions of what was observed!

Often, as a result, products that are used badly can have damaging impact when they could be potentially useful. I will try below to review some of them.

HYDROGEN PEROXYDE (H_2O_2)

Many companies sell H_2O_2 with the claim of miraculous effects, from improving the oxygen level in the nutrient solution to killing all pathogens on site. They often use anthropomorphic images such as: "the oxygen ion search for the bad guy". Of course, there is some truth behind all that, but the presentation is rather misleading.

It is true that when H_2O_2 is dissolved in water, rapidely it looses an oxygen atom that becomes a free radical. As you probably know, free radicals are extremely reactive oxygen ions. They have an electric charge and they attach themselves very easily to any other particle with an opposite charge. "Attach" in that case means "oxidize", means "kill". It is this same process that transforms iron into rust.

All the micro-organisms, as well as every living cell, have an electrical activity, thus are susceptible to attract a free oxygen ion ... and dye! The free radical does not have a selection mechanism that makes it target the bad guys. It will oxidise indiscriminately spores and pathogens, but also root cells. So, at the same time that it is cleaning the nutrient solution, it is weakening the plant. In fact, the quantity that you can introduce in the nutrient solution without killing your plant is so small that it is not enough to free completely that solution from pathogens. It is true that their population will be reduced, but they will rapidly come back in even greater numbers to attack the weakened plants. As a general principle, doing something that weakens your plants when they are already attacked by pathogens does not strike me as the brightest of ideas.

The claim of extra oxygenation is also greatly exaggerated. It is important to realise that this ionic form of oxygen is not the one that the plant can use. Plants absorb O_2, the gaseous oxygen that is in the air, the reunion of 2 oxygen atoms.

What happens to that oxygen ion when it is released?

Since it is very reactive, it will not live long, or travel far. It will, most likely, encounter very soon something to attach to. It will then precipitate out of solution with that "something". Once again, that can be a cell, a spore, but also a metallic ion such as iron. If some of those ions, obviously a small portion, manage to turn into gaseous oxygen ... they will simply get out of solution, at least for the larger part. The reason is simple: there is a maximum of dissolved oxygen that you can have in the water. This maximum varies mostly in relation with the temperature. Once that saturation in oxygen is attained, any extra would simply "bubble through" and dissipate in the air. Granted, a minute fraction might be absorbed by the plant, but certainly not enough to make a difference.

Don't get me wrong, hydrogen peroxide is a very good product. There is nothing more efficient to rid a system from pathogens between 2 crops. I highly recommend the use of H_2O_2, especially if you experienced root problems in your previous crop. The use of a strongly acidic solution to dissolve the salts that might

accumulate in the line, as well as using a strong solution of H_2O_2 to get rid of pathogens should be your routine practice between crops. It is only the idea of using it with plants in the system, that makes the hair on my neck curl backward!

CO_2 TABS

There is no doubt that bringing extra CO_2 in the atmosphere surrounding your plants will improve their growth, their health, and the yield of your crop. It is not easy to do when growing in a small space: the heat from the light forces a quasi-constant renewal of the air, making it less practical to introduce CO_2.

CO_2 tabs serve a good purpose since they release in the growing space a large amount of CO_2 in a short time. Therefore, it is possible to shut the ventilation down for just a little while, but not long enough for the air to become too hot. And this can be repeated a few times for more effect. However, it is a bad mistake to put the tabs in your nutrient tank. They must be dissolved in a separate bucket with no connection what so ever with your system. You simply do not want CO_2 in your root zone! CO_2 is a by-product of plant metabolism that is released by the roots in the nutrient solution, as well as some other molecules exuded by the plants. They are "polluting" the nutrient solution. A well designed hydroponics system works well for 2 reasons: It oxygenates the nutrient solution, but also, it helps dissipate the gazes out of solution.

CO_2 tabs are absolutely counter productive in the root zone.

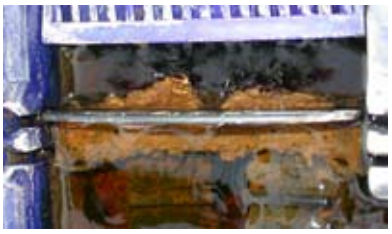
It is definitely a good idea to use them, but do take the extra pain of an extra container.

Another good way to bring CO_2 is the slow release system that will bring a slow increase of CO_2 at all times, by means of a basic chemical reaction. This is also a practical way, low-tech, efficient, and it will not pollute the nutrient solution.

Both those low-tech methods, if well used, can save you quite some money. The cost of a CO_2 generator system is not cheap.

ENZYMES

Most people are not familiar with the relationship between enzymes and bacteria. In fact the difference is pretty big: bacteria are alive, and enzymes are produced by bacteria, as part of their metabolism. They are the weapons of bacteria. Their role is to break down dead matter into single elements on which bacteria can feed. Enzymes are short lived but bacteria produce them all the time. Therefore, during a crop, if you introduce bacteria, it is like introducing millions of enzyme factories that are going to work for all the duration of the crop. If well managed, it is obviously more efficient than introducing enzymes during the crop; at best, a quick action that will not last very long.



Beneficial fungi growing in the BioFilter

Enzymes are very useful in fact, when used properly, and this is in between crops, when you need to clean a substrate from the residues of the previous crop and you want a quick, strong effect. In that case, nothing better than enzymes! For the rest of the time, use bacteria or fungi (they are also enzyme factories!). The typical bacteria to use in this case is Trichoderma harzianum, an especially efficient and economical product.

We have seen with those few examples how useful products can be detrimental when used improperly. Many beginners tend to buy all the products on the shelf and hope that this will help them succeed in their growing operation. In fact, it is often the contrary. As strange as it might sound, I have seen many beginners fail just by doing too much. It is better to start just with the basics: a hydroponics system, a plant, a nutrient, and a pH corrector. This is all you need really. From there, you can start experimenting with the many products on the market today... but not before learning how to use them efficiently!

For more information, don't hesitate to contact tech@eurohydro.com