Five tips to succeed when doing Kratky hydroponics

Passive hydroponic growing has become very popular during the past 10 years as it has a very low starting cost and uses no electricity. However, growing without active nutrient circulation, aeration and solution monitoring can cause significant problems, many of which can lead to crop failure. In this post I want to give you five tips that should help you with your passive growing experience and should allow you to go through your first Kratky crop with hopefully less problems.

1. It's all about height and volume per plant. In a Kratky system, successfully growing plants requires the level of the solution to go down with time to allow the roots to develop structures to obtain oxygen from the air as the solution level drops. Have too much volume per plant and this does not happen quickly enough and the plant dies from water logging, have too little volume and the solution goes down too fast and the plant dies. The exact volume per plant and container dimensions depend on the environmental conditions – which determine the plant's demand for water – but some rules of thumb have been established. *For your first experience, a 4 liter bottle can be used to successfully grow a head of lettuce through its entire lifetime*. You can check this and more suggestions for more complex setups in Kratky's 2008 paper.

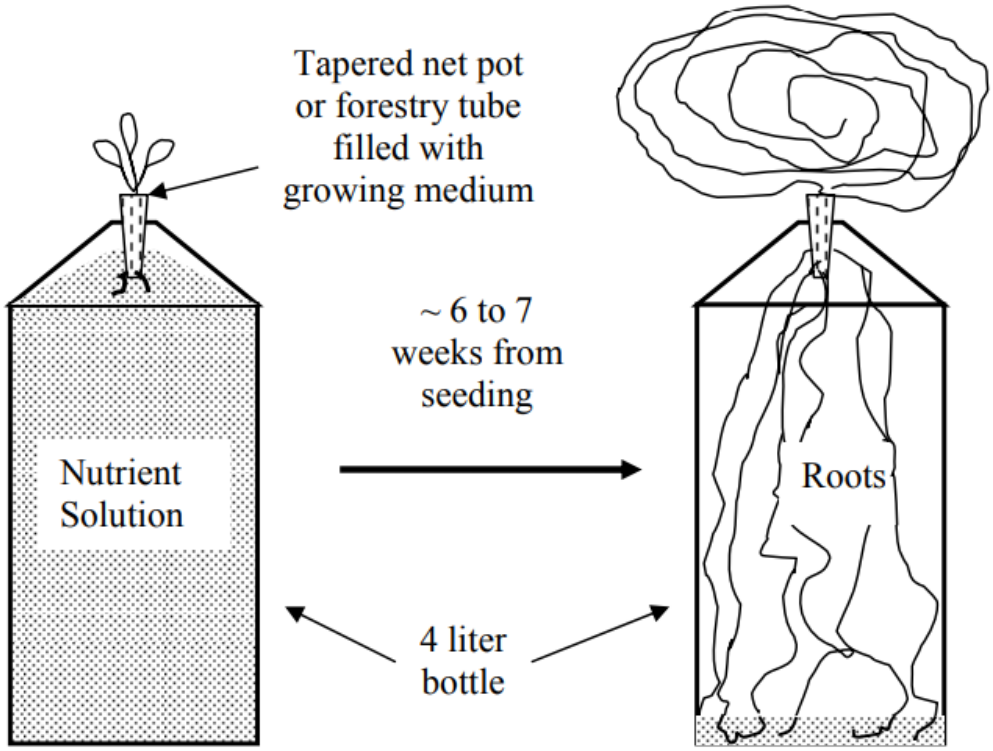

Fig. 2. Lettuce growing in a 4-liter plastic bottle.

Figure taken from Kratky's 2008 paper, cited above.

2. Be careful about the starting level. Another critical issue for a Kratky system is to make sure that the water level just barely touches the bottom of the receptacle where the seedling is placed or germinated. If the pot where the seedling resides is soaked with nutrient solution then the roots will never have access to enough oxygen and the seedlings will die. It is fundamental to allow the media where the plant is placed to wick water but to allow enough air space for the seedling at this stage.

3. Start with a lower nutrient dosage. Since the passive system will concentrate the nutrient solution as a function of time, the strength of the nutrients will go up a lot which will fit nicely with the ability of the plant to deal with more concentrated solutions. Starting with a nutrient solution that is too strong can cause the solution to become unbearable for the plant as the solution becomes more and more concentrated. This is why it is necessary to start at a lower

strength. In general, starting with a solution with an EC of around 0.6-0.8mS/cm is good since the solution will become around 4-5 times more concentrated by the end of the growth cycle.

4. Starting at a lower pH can be better. Plants like lettuce will generally want to try to increase the pH of a solution as a function of time, as they will absorb nitrates more aggressively, causing the nutrient solution to become more and more basic. Lettuce can be grown at lower pH levels with fewer problems than at higher pH levels, reason why it can be beneficial to start the solution at a pH of 4.5-5.0 so that it can increase gradually and reach 7-7.5 by the end of the growing cycle.

Example of Kratky lettuce, taken from this blog.

5. Disinfect the water before preparing nutrients. The Kratky method is very vulnerable to plant pathogens due to the fact that the solution remains unchanged through the entire growing period. If the solution contains any bacteria or fungal spores, these can prosper aggressively within the growing cycle. If you're aiming for a purely hydroponic experience with no bacteria or fungal content, you can alleviate this problem by disinfecting the solution before preparing your nutrients. *This can be done by adding a couple of drops of household bleach per liter* – allowing the solution to rest for a day after that before preparing nutrients – or by running the water through a UV treatment. Inline UV treatment filters for aquariums are cheaply available online, you only need to pass the solution through them once. Boiling the water is not something I would recommend, as this also removes all the dissolved oxygen from it, which can be hard to recover without a lot of aeration, which can reintroduce pathogens into the water.

There are many more things to consider to run a successful

Kratky setup but I hope the above tips do help you avoid some common pitfalls and establish your first completely passive, hydroponic growing method. All the above mentioned issues can get substantially harder when growing larger plants, so starting with smaller plants that are easier to handle – such as lettuce – is always a sure way to increase your chances of success.