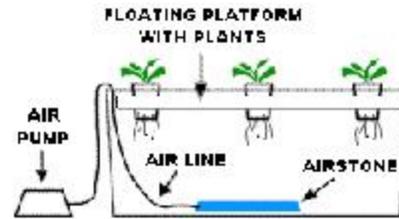


Water Culture System

Water Culture systems are about the simplest of all six types of hydroponic systems. While technically simple, they are still very effective for growing plants hydroponically. Not only do a lot of home hydroponic growers really like using water culture systems, but many commercial growers use this type of system on a large scale as well. Mainly because the water culture systems is a simple and easy concept. It's also a very inexpensive type of system to build, and another reason why it's popular with home growers as well. Even though the concept is simple, there are plenty of imaginative ways to use and build water culture systems out of different materials.



What you need to build a Water Culture system:

- Container to hold the nutrient solution (reservoir)
- Aquarium air pump
- Air line/hose
- Air stones (or soaker hose) to create the small bubbles
- Baskets, pots, or cups to hold the plants
- Some type of growing media

How a hydroponic Water Culture system operates is easy. The plant is actually suspended in baskets right above the nutrient solution in the reservoir. Usually by

styrofoam floating on top, or through holes cut in the lid covering the reservoir. The roots hang down from baskets the plants are in, and hang down directly into the nutrient solution where they are submerged. The roots remain submerged all the time 24/7. The roots don't suffocate because they get the air and oxygen they need from air bubbles rising through the nutrient solution, as well as from dissolved oxygen in the water itself.

The more air bubbles the better for water culture systems. The bubbles rising should make the water look like water boiling at a heavy rolling boil. The bubbles should be rising up through, and making direct contact with the roots as they rise to the top of the water to be most effective for the plants. There are actually two ways of providing aeration and dissolved oxygen to the nutrient solution.

Types of aeration

Air bubbles

An aquarium air pump and air stones are typically used to provide air bubbles to the nutrient solution for water culture systems, as well as other types of hydroponic systems. The air pump provides the air volume, and is connected to air stones with an air line/tubing. The air stones are made of a porous rock like material, the small pores create small individual air bubbles that rise to the top of the water (nutrient solution).

Soaker hose can be used in place of air stones to create the air bubbles as well. The soaker hose creates even smaller air bubbles. The smaller the air bubbles, the better for aerating the nutrient solutions. Smaller air bubbles provide more contact surface with the water. The contact between the air bubbles and water helps to replace the dissolved oxygen taken up by the plants roots.

Falling water

Though not typical in water culture systems for home growers, surface agitation from falling water splashing around is another very good way of aerating the nutrient solution. The higher the water is falling from, and/or the more volume of water falling, the more downward force it has when it hits the water's surface. The more downward force, the deeper the agitation and more aeration (dissolved oxygen) provided. This method of aeration is more common in commercial water culture systems because they use large volumes of water compared to home growers.

Recirculating Water Culture systems

Another variation of the typical water culture system is a recirculating water culture system. The recirculating system works like a flood and drain system but never drains. You can have as many growing containers (water culture reservoirs) as you want connected to one central reservoir. Each growing container has its own fill line, as well as a drain/overflow tube that drains back to the central reservoir.

Some growers will use buckets instead of wide shallow containers. Each bucket with their own plant in it, and of course filled with nutrient solution. They may have a row of these buckets. Using a fountain/pond pump to pump the nutrient solution up to each of the buckets. As the water fills the buckets, the excess water spills over into the overflow tube and flows back to the reservoir where it's recirculated back through the system again.

Most growers that recirculate the nutrient solution like this for their water culture systems only use an air pump in the central reservoir, rather than in each individual bucket (mainly to save money). They let the water pump run 24/7 all the time. However if you have air bubbles running in each bucket like a typical water culture system, you can vary the on time for the water pump. Also the plants would benefit from the direct contact with the rising air bubbles contacting the roots.

Recirculating the water allows you to be able to utilize falling water as a source of aeration in the system. Also you don't need to keep checking the water level in each container to replace the water the plants drank up (you just check and replace it in the central reservoir), a nice benefit when you are growing large, or many plants in the same system. Just about all the large commercially operated water culture systems recirculate water through the system.