

AQUAPONICS:

Aquaponics can simply be defined as the art of growing plants with the help of ammonia nutrient that comes from the waste left by fish.

AQUA



Aqua- Aquaculture, using a controlled environment in order to raise fish.

PONICS



Ponics- Plant growth in a soil-less media.

The basis of aquaponics is using aquaculture in order to use the waste left by the fish that you're farming and using it to make nutrients for the plants that you wish to grow. The plant later on absorb the nutrients and clean the water for the fish.

This symbiotic relationship between the plants and the fish is ideal for grow plants such as:

- lettuce
- kale
- spinach
- Swiss chard
- arugula
- mint
- chives
- basil
- watercress
- pak choi
- wheatgrass
- radish sprouts
- tomatoes
- pepper
- cucumbers
- beans
- squash
- peas

- broccoli
- cauliflower
- cabbage

Not to mention that the aquaponics system is also ideal for farming fishes such as:

- tilapia
- trout
- hybrid
- striped bass
- carp
- mosquito fish
- tetras
- guppies
- catfish
- cichlids
- crappie
- bluegill
- sunfish
- perch
- koi
- goldfish
- prawns

And many more...

Aquaponics systems are usually confused or compared with hydroponic systems, the reason being that but us the concept of growing plant in a soil-less based environment. The main difference between these systems is the fact that the aquaponic system gets their nutrients from the waste left from the fish, meanwhile the hydroponic system gets its nutrients from a liquid substance that the owner must provide.

Nevertheless, it's safe to say that aquaponic systems are better than hydroponic systems because:

1. You save a lot of money by getting your nutrients from less expensive fish.
2. Aquaponics gives your plants a more natural nutrients to grow better.
3. In aquaponics you can reuse all of the water just pour more water as it evaporates.
4. Aquaponics grow faster and produce bigger and better plants than hydroponics.

Hydroponics vs Aquaponics



Hydroponics is a method of growing plants in water rather than in soil.

Aquaponics is the marriage of aquaculture (raising fish) and hydroponics (the soil-less growing of plants) that grows fish and plants together in one integrated system.

In hydroponics you just add commercially formulated nutrients to your nutrient reservoir and you are off to the races.

With aquaponics it takes about a month to start your system by developing a colony of nitrifying bacteria through a process called 'cycling'. The ammonia from the fish waste will not be converted into the nitrates that the plants are seeking until this process is complete.



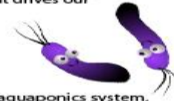
startup speed

Hydroponic systems tend to be fairly sterile.

Bacteria are revered by aquaponic gardeners because, as described above, they are the engine that drives our systems.



bacteria



Hydroponic growers using flood and drain techniques generally only fertigate their plants once every four to six hours. Academic studies and vast, collective experience have shown that this optimizes the water and fertilizer the plants need.

When you move to an aquaponics system, however, the ideal schedule changes to flooding for 15 minutes every 45 minutes. The reason is that the grow bed now has taken on the additional role of being the filter for the fish waste. If you only ran the fish water through the filter every four to six hours, fish waste would build to dangerous levels.

flood & drain

Hydroponic growers tend to use standard 6" deep flood tables and put pots or cubes with plants in them in the flood trays.

An aquaponics grow bed is serving a dual role of both home for the plants and bio-filter for the fish waste, both need to be considered and optimized. Most media based aquaponic gardeners use 12" deep grow beds filled with an inert media.

grow bed

Hydroponic gardeners live and die by their nutrients, and the supplements to those nutrients.

The goal of an aquaponic garden is to achieve a state of balance within it's eco-system. Everything that goes into the system must work towards this end goal, and not harm any other element of the system.

nutrient supplementation

Hydroponic nutrients must be dumped and replaced on a regular basis to address nutrient imbalances that arise over time.

In aquaponics you only top up the fish tank with water and never dump and replace it unless there is a severe, unexpected problem.

nutrient dumping



In hydroponics you sterilize anything that ever comes into contact with the plants, their roots or the nutrient solution. The most feared disease is a fungus called pythium, or 'root rot', which is widely considered the scourge of hydroponics.

Pythium is almost non-existent in aquaponics.

plant disease



An important part of an effective program to prevent pythium outbreaks in hydroponics is to make sure that the nutrient solution doesn't get above 70 degrees F. Warm water is a perfect breeding ground for fungus, so keeping the water temperature below optimal breeding conditions for pythium makes sense.

In aquaponics, however, the primary drivers of temperature are the requirements of the fish. The most widely used fish in North American aquaponics, after goldfish, are tilapia, and tilapia does best in water that is between 82 degrees and 86 degrees. The bacterium that drives the system is also happiest in that temperature range.

temperature



Optimal pH in a hydroponics system is 5.5 to 6.0

In aquaponics, pH is another factor that is compromised between the plants, fish and bacteria. Optimal pH is 6.8 - 7.0, which is again more closely related to what an organic soil gardener would target.

pH

Along with pH and water temperature, EC is the other measure that is closely tracked in hydroponics. EC, or Electrical Conductivity, is a measurement of the salts in the nutrient reservoir, which tells the hydroponic gardener how concentrated the nutrient solution is. This works because hydroponic nutrients are generally delivered in mineral salt form.

Aquaponic plants, are fed by the organic waste from the fish, which has very little salts. EC is therefore not a useful measurement for the concentration of nutrients in an aquaponics system. Aquaponics requires confidence in Mother Nature, rather than a managed system requiring intense control.

EC

Hydroponics is a system for growing plants under highly optimized conditions.

Aquaponics creates a complete eco-system in which various living creatures all interact to create a symbiotic whole. Aquaponics is, above all else, an ecosystem where plants, fish, bacteria, and worms all live together in a beautifully balanced symbiotic relationship.

eco system

The benefits of aquaponics:

- Aquaponic systems eliminates weeds, harsh gardening work, and the risk of small animals infecting your plants.
- Aquaponics constantly recycles all the water that it uses.
- Aquaponics uses less water than hydroponics, and even 1/10th of the water of soil-based gardening.
- Aquaponics has no need for pesticides or herbicides since it can be a controlled environment and ecosystem.
- Aquaponic systems can be small or big, meaning they can fit almost anywhere. This means that they can be put indoor or outdoor.
- Gardening chores are now obsolete because aquaponic systems are so easy to use.
- Aquaponic systems can change in size and capacity depending on your budget.
- With this system you can farm fish and grow plants, meaning that you can get all the nutrients you need from the food that you grow in your own backyard, or your own house.
- Instead of using dirt that can run out of nutrients and damage the plants, aquaponic systems uses that fishes highly nutritious waste in order to promote the maximum plant growth. It also recycles all of the water meaning that it uses a recurring bacterium to grow plants bigger and faster than in any of the other media. This means that you no longer need to waste water, because you just need to add water when it evaporates.