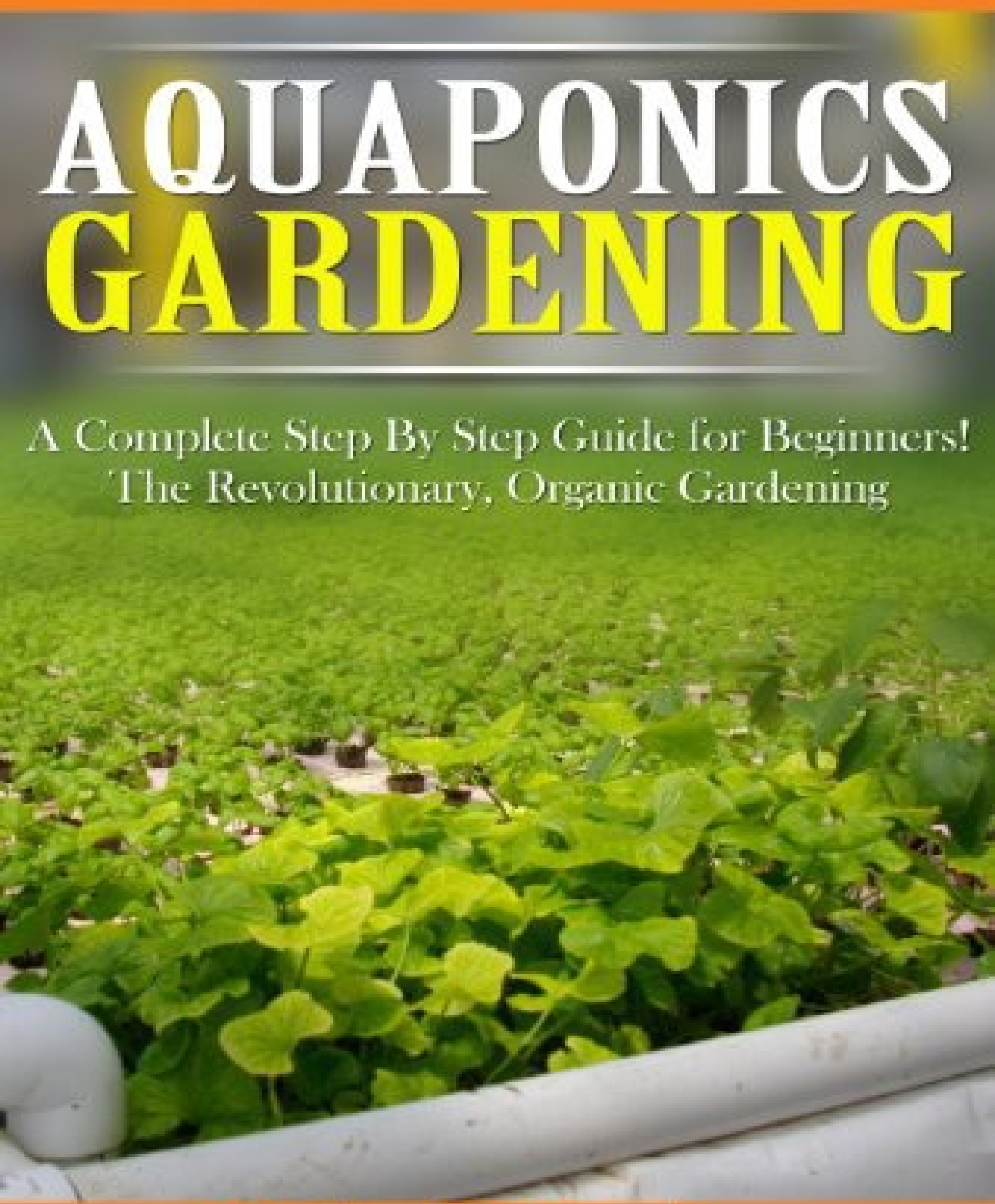
AQUAPONICS GARDENING

A Complete Step By Step Guide for Beginners!
The Revolutionary, Organic Gardening



Kelly T Hudson

Aquaponics Gardening:

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Summary

Are you fond of gardening but find it too much work? Do not worry! You can fulfill your hobby in a less time consuming, more efficient and productive form of gardening - Aquaponics gardening! With the help of this eBook, you can learn how to grow your own vegetables using this method. This revolutionary, organic system of growing vegetables will grant you a healthy, safe and toxic-free lifestyle.

This eBook will tell you what the requirements of this system are and how it will work. So, get ready to cultivate your own healthy plants and live a chemical-free life.

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What Is Aquaponic Gardening?

Aquaponic gardening requires building a system using aquaculture (aquatic animals snails, fishes and prawns etc.) and hydroponics (plants in water) to cultivate plants and fishes. The main concept behind creating this eco-system like environment is to develop a system in which the mutual benefits of both sources can be utilized. This will lead to the creation of a green, healthy environment. It is known as a symbiotic relationship. After the system has been set up, it is observed as a single unit; therefore, the elements of the system should be treated accordingly.

The best thing about this system is that it can work all round the year, despite any sort of weather conditions. Plus, you don't need to mow grass, clean weeds, till up the land or work in the heat for this type of gardening. You can make arrangements in your bedroom or backyard, whatever suits you, and revel in the taste of self-grown fresh tomatoes, green chilies or any other vegetable you want. Once you taste these vegetables, you will know what it is like to eat fresh, organic vegetables instead of the artificially prepared ones.

Why You Should Try Aquaponic Gardening?

Are you tired of the traditional gardening? You don't like to get your hands dirty with the soil but still unsure about whether or not you should opt for aquaponic gardening? Here are a few benefits that will make you want to try it.

1. You and your family can benefit greatly from healthy vegetables. Moreover, they taste amazing!
2. A cost effective activity that will reduce your overall food cost.
3. Aquaponic gardening consumes less time as compared to traditional gardening.

4. You will have a parasite- free house.
5. With this type of gardening, you do not need to worry about wild growing weeds.
6. The plants growing process is simple and requires less efforts.

7. You do not need to spend any money in artificially prepared chemicals.
8. An environmental friendly, plant growing technique.
9. Since the system is aquaponic, water recycles itself. You need to add extra just occasionally.

10. The rate of plant growth in aquaponic system is comparatively fast than that of soil growing plants.
11. The cost of gardening equipments like shovel, barrow, water hose etc. automatically reduced.
12. All living creatures can benefit from the toxic free lifestyle, especially plants.
13. Fertilization is an important aspect of this system. You need to choose quantity of fertilizer in moderation; you can neither over fertilize nor under fertilize it.

Definitely there are pros and cons of every system. But having an aquaponic garden in your own home has more pros than cons.

After going through all these advantages, how can you avoid not setting up this system?

Various Types of Aquaponic Gardens

Every type of system has its pros and cons. What is better for one location may not be suitable for the other one. Therefore, before you immerse your hands in the water, it is better to know which type of aquaponic garden can satisfy your needs. There are three basic types of aquaponic gardens.

Media Filled Bed

The growing medium in this type of aquaponic system is usually Lava rock. The presence of Lava rock can stimulate the growth of bacteria, which consequently will help in keeping the water clean. Therefore, fish tanks having plant beds laid with gravel and rocks are perfect for backyard aquaponic gardens. Moreover, they produce sufficient bacteria and do not need any artificial filters for the purification process. Due to this reason, these systems are easy to operate.

The fish tank is flooded with water, from time to time. When it is full, the fish tank drains back the water. The solid material present in the fish dump segregates within the plant bed with the help of beneficial microbes and bacteria. You can control the water flow in two ways: by the traditional flood and drain approach or ebb and flow cycle approach. Either way, this type of aquaponic system is easy to operate.

Raft a.k.a. Deep Water Culture (DWC)

If you want to grow floating plants in your house, then this is the type of gardening that you need. It allows the plants to flow on surface, where as only their roots are immersed deep in the water.

This type of system utilizes Styrofoam boards floating on the surface of the water. The water circulation takes place from the fish tank to the raft tank, where plants are bred, and then moves back to the fish tank. The raft tank is generally disconnected from the fish tank. The separation reduces the water

pressure and acts as a buffer for the aquatic animals. Moreover, it improves the quality of water.

The micro organisms and bacteria, that are responsible for the conversion of ammonia into nitrates, seek haven in the raft tank. This aquaponic system is beneficial for those houses that are eager to build a large aquaponic garden in green house and/or gardens built for commercial purposes.

NFT (Nutrient Film Technique)

This system is comparatively different from the above mentioned. It uses box channels and PVC pipes with open lids for the growth of plants. This piped cultivation method regulates constant supply of water, providing strength and oxygen to the plant's roots. For this type of systems, bio filters are an essential requirement. The reason is that the small surface area prevents the growth of bacteria. Therefore, the alternate method used for this purpose requires the installation of bio filters.

NFT system is quite popular in South America. The downside of using this system is that it cannot harbor plants having large roots, especially majority

of the green vegetables.

Components of an Aquaponic System

Aquaponic gardens are used in commercial sectors as well as residential. These systems are easy to built and simple to operate. Some aquaponic systems can be arranged indoors as well and are capable of surviving throughout the year. However, there are few essential components that every aquaponic system should possess in order to work efficiently.

A Fish Tank

Any large capacious box-shaped space would, as long as it is strong enough to support fishes. Make sure the size of the tank is in accordance to your requirements i.e. large enough to provide fishes comfortable living and small enough to be easily accommodated in the room or backyard.

Another factor that you need to consider before purchasing a fish tank is the location. For example, if you are going to construct an outdoor aquaponic garden, you need to select your fish tank such that it can withhold sunlight and extreme temperature conditions. Structurally speaking, round fish tanks are considered the best. Round structure can simplify the water circulation and flow, which in turn will increase the oxygen circulation and improve the water quality.

The tank material should be opaque and UV resistant so that it can block the sunlight. Exposure to sunlight promotes algae growth and algae can suck the oxygen that is essential for plants and marine life.

Aquaponic Grow Beds

If you want your aquaponic system to work on the flood and drain scheme, you will need to place grow media and grown beds in the fish tank. The grow bed should be capable of holding water as well as the roots of plants. Plus, it should be made of a material that can withhold sunlight to prevent fungi and algae growth. It will also regulate the water flow in tank so you do not have to constantly fret over the water levels in the tank.

Tubing

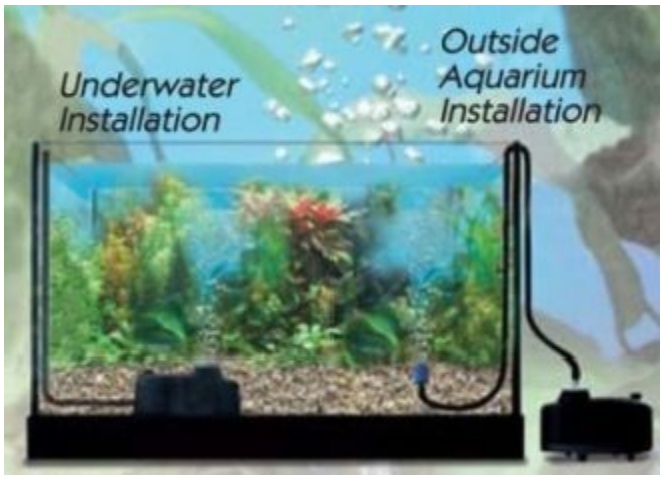
Tubing is a way of supplying water to the tank. General aquarium tubes can be used for this purpose. However, it is better if you select black colored tube, because black resists algae growth. You can also use drug irrigation tubes. They are durable and less expensive.

Plant Trays

The main purpose of plant trays is holding rocks, gravel or mud. So, whatever material you select for this purpose make sure that it is deep or hollow and sturdy enough to support this much weight. These trays can be plastic as well as metal. Available in different colors, patterns, volumes and styles, they can amplify aquarium's look and make it appear classy and stylish.

Water Pump

An aquaponic system uses recycled water. The recycling process starts when water is pumped from the fish tank to the plant trays. The water passes through the plant medium and drains back in the fish. This recycling process is repeated several times a day.



Employment of water pumps is a practical approach towards supplying water to the fish tank. After all, it is the main surviving tools for plants and aquatic animals. Large aquariums often use river or some other fresh water source as the man source of supply. However, when it comes down to small indoor aquariums, tap water can easily fulfill the purpose.

Basic Medium

In simple words, it is the soil of the aquaponic system. Plants grow in this medium. The main purpose of this medium is to provide support to the roots of the plants and hold water for them when it is not running through the tank. One of the most common and widely used medium is expanded clay pellets, also known by the name of Hydroton. This is man-made material, very light weighted and porous in structure. Due to this reason they are considered ideal for flood and drain aquaponic system. Their porous structure has the tendency to retain water, which is crucial for the drain part of this system.

A substitute for Hydroton can be pea gravel. The downside of gravels is that they are quite heavy, so you need to ensure that your grow bed is capable of supporting the gravel and water weight in the flooding part of the flood and drain process. Retaining water, however, will not be easy as it was with clay pellets.

Another alternative for this medium can be Lava Rock, commonly known as the Pumice Stone. This medium is also porous light weight, and less expensive than the clay pellets. It comes with a catch. It has irregular shape, which makes it difficult to handle and work with. In addition to that, Lava Rock carries several impurities and chemicals that can damage the plants as well as the aqua culture.

Timer

An automatic timer is used to turn the water supply on and off. You cannot leave it running all the time. If you do so, the plants will not get enough oxygen to survive. Therefore, setting the timer will turn off the tank when water is supplied in sufficient quantity. It may not seem like an important component, but t will save you a lot of time.

Air Stones

Air stones, also known as aquarium bubbler, are used to break the bubbles and aerate the water. They are placed near the tubes. They can eradicate large air bubbles produced by the traditional filtration system while at the same time erasing noise as well. Although it is basically considered aquarium furniture, it can diffuse air gradually in the tank, carry out protein skimming and provide several other benefits to the marine life.

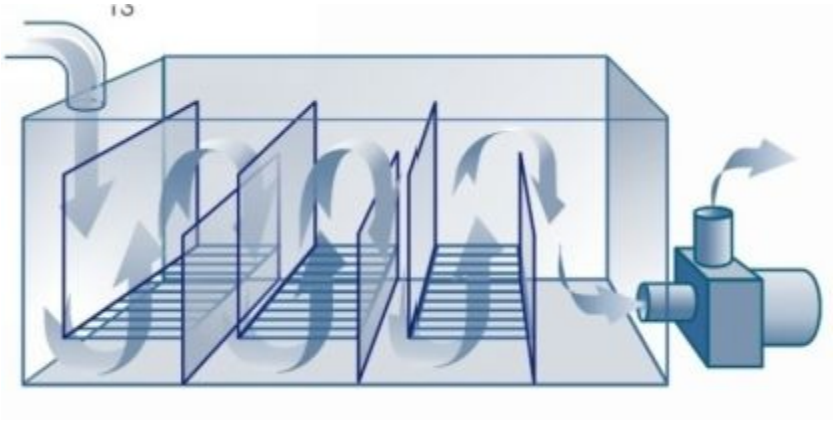
Air stones are available in various sizes, color, shapes, and coarseness levels. These days bonded glass and synthetic fiberglass air stones are also available in the market.

Settling Basin

A settling basin collects all the uneaten food, bio-films and unwanted dust particles. In simple words, it eliminates water pollution and treats turbidity. Turbidity is a property of water that is caused due to the scattering of light. Light scattering in water can create micro particles in water, spread all over the surface. This depends on the refractive index, specific gravity and light variations in the water. Settling basin absorbs all these dust particles and keeps the environment for plants and fishes clean.

Bio Filter

Your plant growing tank should be an ideal place for fishes and plants. Therefore, you need to make sure that no chemicals exist in the system; otherwise, it can be life threatening for the fishes as well as the plants. Bio filter help with the growth of nitrification, natural bacteria so that they can be used by plants.



Bio filter can be in the form of gravel or entire electrical system like filters that can convert ammonia into nitrates. Although an aquaponic system is very cost effective, but bio filter is an essential requirement of this system, so make sure you do not take it lightly. It produces beneficial microbes too so as to keep the aquaponic cycle going.

Sump Pumps

It is the bottom most part of the tank from where the water flows and is pumped back to the rearing tank. Sump tanks are beneficial when the growing bed volume exceeds the fish tank volume. This is because the grow bed has the tendency to replace large amount of water. Therefore, even if your grow beds are flooded with water, your fish tank will be only 40 percent empty at the most.

On the other hand, if the total water in your grow beds exceed the total water n the fish tank, you definitely need a sump pump. This sump pump will make sure that the water level of the fish tank remains constant despite the water level of grows beds. This will ensure that your fishes do not need to suffer because of the lack of water.

Hydroponics

One of the basic necessitates of the system is the hydroponic system. In this system, plants with their deep roots are immersed in the nutritious water and filter out all the ammonia that is toxic to the aquatic animals. When water passes through the tank, it is cleaned, oxygenated and filtered back to the tank. This cycle continues without interruption. However, make sure your hydroponic systems match the surrounding weather.

Below are some of the common aquaponic applications of a hydroponic system.

Reciprocating Aquaponics – This type of medium is in the solid form and utilizes siphon drains. It is constantly flooded and drained for the cleaning purposes. This is the reason why it is also called flood and drain aquaponics.

Re-circulating Aquaponics – It is also in the solid form, shaped like gravels and clay beads. They are placed in the container that is flooded with water filled with aquatic animals. It is also known as the closed – loop aquaponics.

Deep Water Raft Aquaponics – These are Styrofoam rafts that float in the basin of the tank.

Aqua Culture

In an aquaponic system, the two living creatures support each other's existence. One cannot survive without the other. The aqua culture should be cultivated with keeping the surrounding temperature in consideration. For example, catfish and bluegill are suitable for home aquaponic systems whereas, goldfish and Koi can be used where the system needs inedible fishes.

Fish Feed

You need to get the best food for your fish. You can use commercial as well as homemade fish feed.

When going for commercial fish feed, buy the kind that is free of GMOs, fish meals and soy. Remember that the quality of feed that you select for your fish will determine not only your fish's health but also the quality of the aquaponic plants your system is growing. Plus, if you are using it to grow edible vegetables, then the fish feed is indirectly affecting your digestion too. So, do not compromise the quality fro quantity.

There are two types of feeds commercially available; omnivores and carnivores fish feed. This feed is dependent on the protein constituency and age. Like human babies, fish fry should also be fed light food. Therefore, the protein constituency is kept different according to the age of fishes.

Home Grown Fish Feed

If you do not want to subject your fishes to commercially prepared food, you can try home grown fish feed too. It will not only help you save money but will also diminish the environmental footprint and further close the loop of the organic cycle. You can derive fish feed through various sources like worms, duckweed, Black Soldier Fly larvae, and even kitchen leftovers and garden scraps. It is all up to you!

Aquaponic Gardening Tips

Are you eager to make your surroundings green and nutritious, you can build an aquaponic garden in your own home. Space will not be a hindrance in the construction of an aquaponic garden. So, put on your gloves and get ready to make your own green, organic garden. The below mentioned tips will help you in that regard.

Location

Selecting the right location for your aquaponic garden is the key to building a green aquaponic garden. There are several factors that should be considered while selecting the location. Plus, indoor and outdoor plants have different requirements. If you want to set up an indoor garden, you need to arrange artificial sunlight supply. For outdoor garden, the location should be selected such that the system receives optimum sunlight, neither too low not too high. Most people use greenhouses for outdoor gardens. This helps in protecting the plants and aquatic animals against adverse weather conditions.

Oxygen Supply

Both, plants and animals need oxygen for their survival. Therefore, you need to make certain that the water is constantly supplied with oxygen. Air pumps and tubing fulfill this purpose. You need to check pumps and tubing regularly to be certain of the fact that oxygen supply reaches the system properly. Oxygen is something that should be available at all times. Unavailability of oxygen for the slightest time can suffocate the living creatures.

Type of Fishes

Your choice of fishes is completely dependent on your location. Some fishes are incapable of surviving in humid temperature while others find cold weather hard to resist. Moreover, you have to deal with government restrictions as well. Find out beforehand which fishes are categorized as legal by the government. In addition to that, you need to conduct a thorough research to find out what temperature conditions suit which types of fishes. If you have an indoor aquaponic system and you are artificially heating the water, then you can harbor various types of fishes.

Keep Exploring!

So, you have purchased all the necessary components and set up the system, now what? You need to take extensive care of your aquaponic garden so that your plants and animals can survive easily. Surf the web and purchase gardening books so that you can learn all about the plants and aquatic animals present in your home. It is essential to know what you will do if your fishes are dying or your plants and decaying.

There is no denying the fact that practice makes a man perfect, but exploring different learning options and choices is the one of the smartest way to breed living creatures. Just make sure that your exploration is not causing any considerable damage.

pH Level of Water

pH level is the measure of acidity or alkalinity of the water. Since it is the basic living medium of fishes, so you need to check the pH levels daily to confirm whether it is live-able for the fishes or not. For this purpose you will need especial tools and equipment. Fishes can survive within the pH level of 6.5 to 8.5; on the contrary plants require extremely low pH levels. So, create a balance between the plants and fishes' requirements so that they can continue to benefit each other.

Growth Medium

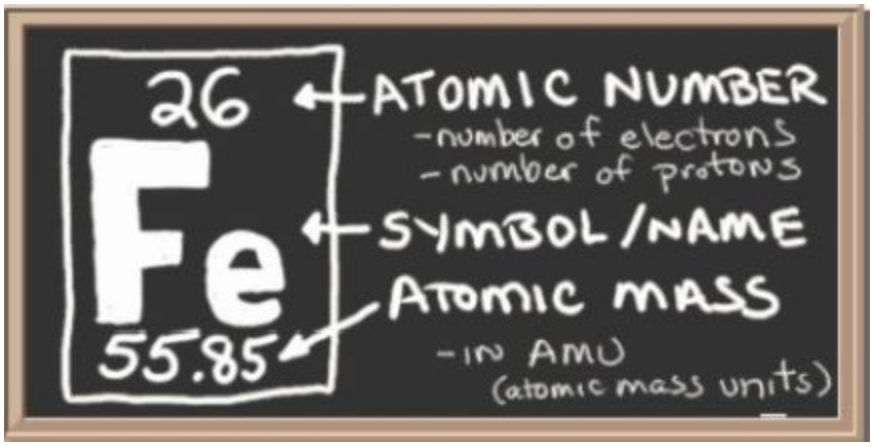
Most of the aquaponic systems use gravels and dusty, clay rocks as the growth medium instead of soil. Clean the rocks thoroughly before putting them in the tank. Dust particles attached to these rocks can cause the growth of ammonia and can be harmful for plants as well as the aquatic animals' health. In addition, the dust particles can clog the tubing system too.

Some street rocks carry harmful chemicals which can damage plants. Using a chemical induced growth medium will lead to the production of chemical induced vegetables, therefore, make your decision wisely! Rocks picked up from river and ponds serve as the best growth medium.

Research all these materials before you make the purchase, this will save you cost as well as time.

Supplemental Nutrient Needs of Aquaponic Plants

Aquaponic systems are generally considered self sufficient because the aquatic animals of the system provide necessary natural fertilizers and nutritional supplements. However, sometimes the fishes are incapable of producing the right amount of nutrients for plants. In such case you need to add extra nutritional supply.



In normal circumstances, plants gain nutrients through a process known as nitrification. In this process fish dump provides food to the plants. This contains ammonia. The right water temperature transforms ammonia into nitrate. Nitrates are very crucial for the plants. Therefore, the tank temperature should be maintained such that the bacteria responsible for the conversion of ammonia into nitrate can survive in it. Consequently, this leads to the conclusion that having right amount of bacteria in the water is essential too.

Extra supplemental nutrients can be added in the form of iron and potassium. Additional iron supply can be included in the form of Epsom salt, rusty nails or company manufactured powdered iron. Similarly, potassium sources include sea weed, wood ash, kelp meal, greensand etc.

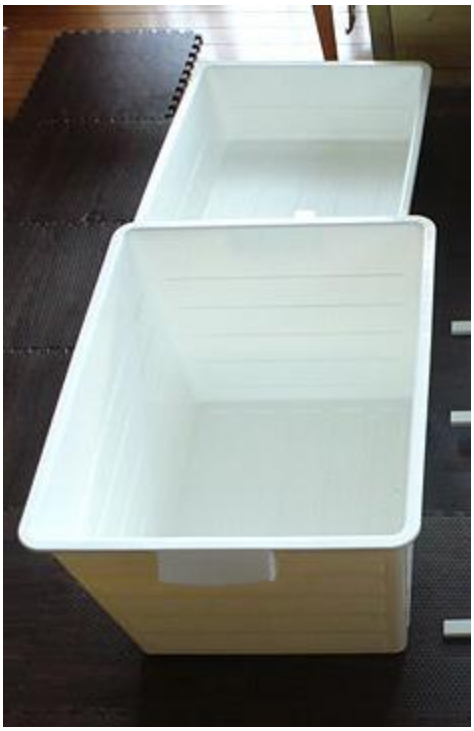
Creation of ideal surroundings for the aquaponic system is crucial, as it will decide the life span of your organic garden.

Make Your Own Indoor Aquaponic Garden

By following these simple steps, you will be able to create your own indoor garden. Eager to find out more? Read ahead!

Step # 1

First of all you need to find a base for your garden i.e. the frame. You can easily find sturdy plastic frames at IKEA or some other shop. The size of the frame is totally dependent on your requirements. You can combine it with wire baskets and plastic containers to make it large. Again, it is totally up to your requirements.



Step # 2

Find a support system for your fish tank base. You can use an iron stand or a plastic one, depending on the size and weight of your aquaponic tank frame. In addition to providing support, this will make you indoor garden + aquarium look aesthetically appealing and easy to manage.

Step # 3

Now, take care of the water system of the tank drill a hole in the right place and insert a standing pipe through it. You can adjust the size of the pipe by cutting it off. Just make sure that it covers the length of your fish tank. When you have made the adjustments, connect it to the main water source.

Step # 4

Purchase a bell siphon and media guard from the market and place it in the tank. Bell siphons are an efficient instrument for flooding and draining the grow bed. Operating bell siphon can be a bit tricky but once you learn to do so, your entire process will simplify.

Step # 5

Once, the aquarium is set and build, add the grow bed and fill water in the tank. Now you can introduce the aquatic life and plants into the water and your aquaponic system is ready.

This was the construction of a very basic aquaponic system, if you want to extend it you need to stay more involved with the system and consequently increase your research too.

The Revolutionary, Organic Gardening

As we are drifting towards technology, sustaining natural and organic creatures have become difficult. Aquaponic gardening is one of the most efficient way to make sure two categories of living creatures are saved through one system. In addition to that, this type of gardening is comparatively easier to the traditional gardening. The components of the system can be easily acquired and implemented. You will not even need professional help to get through with the system.

This interrelation of aquatic and hydroponic culture is a very sustainable approach towards creating home aquaponic gardens. Plus, it also facilitates fish lovers all over the country that want to benefit from the organic, green technology.