

# Japan Aquaponics DIY Aquaponics Guides

## Fish Tank Choices



Aquaponics fish tanks will be one of the first components of aquaponics systems that you are likely to consider, and in many ways we will follow similar guidelines to the ones we follow for growbed considerations.

The fish tank (the aquaculture part of our system) holds the fish, a crucial part of your system and so you should choose one carefully and with an emphasis on safety, water quality, strength and long term usability. If outside it will be subject to environmental conditions and so it should be able to withstand direct sunlight and temperature variations without cracking, warping or leaching chemicals into the water. Your fish tank is likely to be one of the most expensive components of your system but it is worthwhile focusing on quality and safety and purchasing a fish tank that will provide a stable, safe environment for the fish.

### Fish Tank Shape

An Aquaponics fish tank can be of almost any shape but the most commonly used are circular. A round tank is structurally stronger than any other shape and so given that the tank may be holding upwards of 1000 liters, the round shape allows manufacturers to use less reinforcement on the tanks and therefore use less bulky materials. A rounded shape also allows for much easier water circulation and



flow in the fish tanks, and this has several distinct benefits for water quality and fish health:

Still water will naturally 'layer' or stratify into different temperature bands and so good water circulation prevents this type of thermal layering and thus helps to improve water quality.

A good flow of water provides the fish with a current to swim against, which increases their health and the quality of their flesh if the fish are for consumption.

The fish also seem to naturally enjoy playing in currents of water or in dropping water.

Good water movement also prevents a layer of protein forming on the surface of the water, which could inhibit the exchange of gases between the air and the water.

Good water movement increases the surface area of the tank. With the surface water constantly changing you dramatically increase the rate of oxygen exchange.

Increased oxygen benefits not only your fish, but also the denitrifying bacteria in your system, as well as inhibiting harmful bacteria that thrive in an anaerobic environment.

In a rounded tank, solid waste will often gravitate toward the bottom centre of the tank - strategic placement of your pump will pick up almost all of the solid waste quickly.

Square or rectangular fish tanks are also very common and can be useful if you are working in a confined space, be it indoors or outside. Square or rectangular fish tanks can be commonly found in aquarium outlets and can be hand-built if necessary. Care should be taken to ensure adequate water flow, and ideally if these tanks have rounded corners it will assist in the water movement.



IBC (International Bulk Carrier) totes, or high quality, food grade bulk shipping containers such as Macrobins are commonly used square aquaponics fish tanks.

### Fish Tank Materials

Fish tanks are most commonly made from a food-grade plastic material, regardless of their size and shape. Such tanks are generally the most cost effective and are readily available across the world, from a wide variety of sources like Homestores, DIY stores, Aquaculture outlets and so forth. If you are repurposing a tank that has an alternative main function, care should be taken to ensure that it is made from a material that will not compromise water quality and is safe to be used for fish, and in a system, which will provide food for human consumption.

In all cases the fish tank should be made of an opaque material that is UV resistant and which blocks sunlight as direct sunlight will encourage algae growth which is generally detrimental to your system (primarily because algae is a prolific grower that also need oxygen to multiply and so depletes your system of the available oxygen needed by your fish, bacteria, and plants) Smaller systems can use standard glass aquariums, but again, care should be taken not to keep the tank in direct sunlight.

Backyard aquaponics enthusiasts may choose to make a fish tank either from concrete, or out of a wooden structure then covered with a food-grade liner. Concrete needs to be handled carefully as it can seriously affect your water composition causing imbalances in your pH. If concrete is used it should be sealed with a food safe commercially available sealant. Wooden tanks (or any other type of material for that matter) can also be built and then lined with a commercially available liner to make it waterproof. With these fish tanks you need to be careful that the tank will be structurally strong enough to withstand the pressures and stresses of the water that they will be holding.

Ponds can also be used in an aquaponics setup, although care should be taken as an outside pond may contain and spread undesirable bacteria or insects through your system and again, compromise the water quality of your system. Some permaculture experts have also successfully converted swimming pools to self-sustaining aquaponics systems - the excellent work of Geoff Lawson is well worth looking at in this respect.

### Fish Tank Size

Aquaponics is an integrated symbiosis of fish, bacteria and plants, and so when considering fish tank size you have to

take into consideration the size of your entire system. Your growbed (or growbeds) need to be able to perform various levels of filtration on the water and waste coming from the fish tank, and so it would be no good having an enormous fish tank with lots of fish, if you are using a tiny growbed. As with most things in aquaponics we are striving to design and build a balanced system.

As a general rule of thumb your growbed volume (in a media based growbed system) and your fish tank volume should be at least equal, with preference being for a slightly larger growbed volume. This simple rule will usually ensure that you have sufficient biological filtration, mechanical filtration and mineralisation capacity for your fish tank.

In summary, your fish tank choice will be influenced by space, environmental and size considerations. There are a huge variety of choices and it can be bewildering at first, but if you focus on safety and water quality then you cannot go far wrong. Providing your fish with a tank that meets their needs will ensure healthy and happy fish who will power your aquaponics system for years to come. Ensure the size of the fish tank is suitable for the size of your growbed space and your fish, bacteria, plants... and you, will be able to live harmoniously together.

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