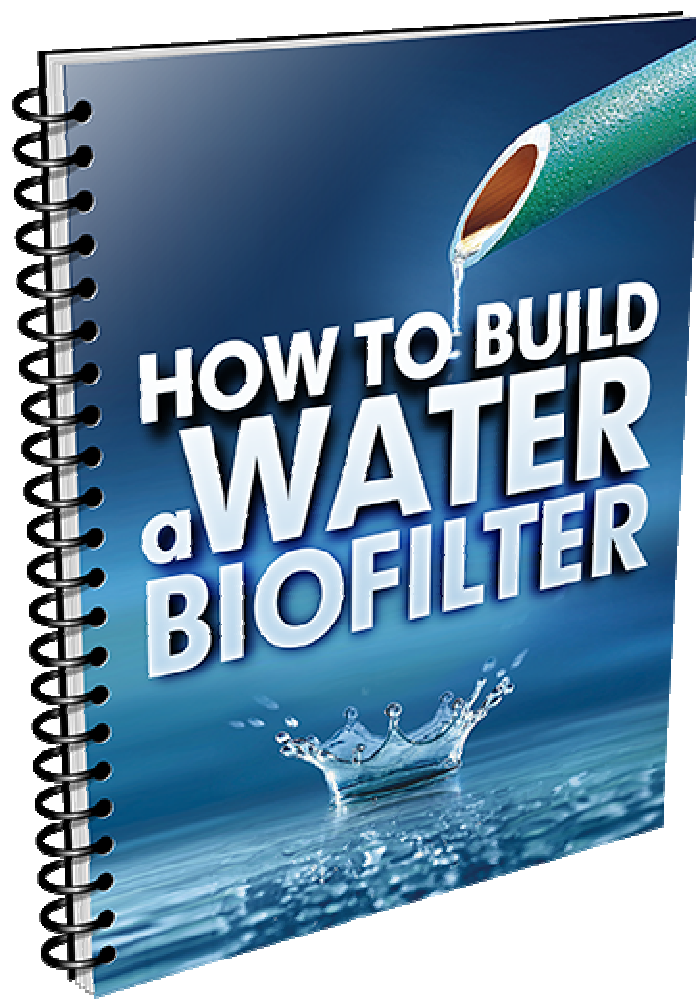


HOW TO BUILD YOUR OWN BIO-FILTER



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V2.0

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INTRODUCTION

Water availability is the most critical and under-acknowledged issue in time of crisis. What threaten our water supplies and have for a long time is: our current agricultural practices, population growth, and how we create electricity. The time when our water supplies are going to be put on hold is near, and we must understand that we must do something to survive.

Consider this:

- about 60% of your body weight is water, and about 75% of your muscles are water.
- more people are killed by the current water and sanitation crisis than wars kill through guns
- the lack of access to safe drinking water, inadequate sanitation and poor hygiene is going to occupy half of the world's hospital beds

Simply put – the lack of safe drinking water is the primary cause of disease in the world today. That's the reason why I wrote this, to give you a solution to our water situation.

We need to remain hydrated in order for biological processes to take place. Water is essential to life. The average person can survive for three days without water. Don't wait until you run out of water before you look for more.

Your body loses 1 gallon of water each day through sweating and urination, more if you are hot or exerting a lot of energy. This water must be replaced.

Finding fresh and clean water at a crisis time is critical, if not dehydration will inevitably occur. The first symptoms you will face are weakness and decreased mental capacity. Your health problem will become more serious until they result in death.

We must do all we can to conserve this precious resource. The best way is by making your own water supply.

This special report will show you how to...

- know how to have as much water as you need, without needing a lot of space;
- be independent when it comes to having enough water for your family;
- keep your family safe and hydrated, even in an extended water shortage;

I want to share this with you, because I'm concerned about my life, and my life is related to yours. We need each other and we need water to survive. After I read and saw so many stories about people being killed by diseases related to the lack of fresh water, I could not stay away and I did my research about how to make my own water supply.

The lack of a way to filter dirty water and make it safe to drink is the most common cause in the health hazards and socio-economic stagnation in the least developed countries, but not only. Those who do access clean water often pay the world's highest prices for it. Slum dwellers in many cities, living beyond the reach of distribution systems, must buy from private sources and often pay five to ten times more for their water than do their wealthier neighbors connected to municipal systems.

We certainly don't want to be like these people. We need our independence and we need our water – fresh and not expensive. How you can do that?

You've already taken the first step – and that is, to build your own aquaponics system.

Very few people know, but you can use it as a back-up source of water in a crisis.



Figure 1 Glass of clear water

SURVIVAL AQUAPONICS – YOUR OWN WATER SUPPLY

As I mentioned before, in the Backyard Liberty manual, water conservation and storage is an important part of most survival aquaponic systems. Essentially, aquaponics is a system that is productive and is producing crops but is still a water-storage system.

Aquaponic systems usually lose between 1% and 2% of your system volume daily. Compared to hydroponics and compared to aquaculture, this is a very small amount.

So for larger systems, you can grow crops and fish without losing too much water on a daily basis. This allows you to have an extra source of drinking water if you're ever in need.

If you really want to drink and feel safe drinking the water from your system, you have to figure out a way to protect it from birds, from mammals, from other things that can...especially poop in your water because that's going to be the primary way that your water can be fouled.

So in healthy systems, the solution can be potable. Essentially if the system is really healthy, if your fish are healthy, if nothing is too far off, you can drink the water directly out of your system, although of course, I recommend that water from the system should always be filtered. You just never know what's in it. The filters that I'm going to show you are bio-filters and are easy to be made.

STRAW BIO-FILTER

This is a small, portable, water bio-filter. You can use the water from the aquaponics system and filter it through this straw.

First of all you will need:

- 2 equal sections of 20 mm PVC pipe
- pipe joint
- 1 nozzle (a little piece of rubber)
- a small piece of synthetic fiber (not cotton)
- charcoal pellets
- a small plastic disc (to fit in the pipe joint)

This homemade life-straw is made from 2 main sections – the upper section (the first PVC pipe) and the lower section (the second PVC pipe).

The upper section of the PVC pipe will have a small piece of **synthetic fiber** inside it (like a little ball). This will be your pre-filter. When the water comes through this upper section it must come out without large organism and different impurities.

The lower section of the PVC pipe will be filled with **charcoal pellets** (these are actually used for repacking aquarium filters).

Between the upper and lower sections there will be a **pipe joint**. Inside this pipe joint, you must have a little plastic disc. This will keep the charcoal in one place. And the pipe joint itself keep the pipes evenly spaced. The top section must trap the piece of plastic.

At the end of the lower PVC pipe you must put **the nozzle (the little rubber tube)** At the end you must have a straw bio- filter.

The straw channels the water down in the small rubber inter-tube and your water from your aquaponics system is now more clear and clean. The synthetic fiber removes large organism, while the charcoal pellets blocks microorganism and other impurities.

BIO SAND FILTER

This water bio-filter, it's really simple and costs nothing. This was designed by V. Shastri, an engineering student.

What do you need:

- a bottle (half a gallon pet bottle)
- sand
- a straw pipe

First of all you need to take your bottle and cut the top off. Now you must drill some holes through the top that you cut and through the cap.



Figure 2 Top of the bottle - drilled

Before you put the sand in the bottle, you must wash it for 15-20 times, and make a hole at the bottom of the bottle to put the straw pipe in there.



Figure 3 The pipe straw

After that, you have to put the sand (2.5 inch of clean, washed sand) in the bottle. The straw pipe starts from the bottom of the bottle, after that is taken to the top of the sand and drawn at the sand level (just like in the image above).

A bio layer is formed at the top of the sand – this layer holds bacteria too. The sand should always be wet to allow the bacterial blanket to flourish. The bacteria in the filter fights the bacteria in the water you're filtering, but you're **not** supposed to have **bacteria in your aquaponics system.**

The water that comes is clean and 90% bacteria –free. Be careful when your pouring the water in the system, do It slowly, otherwise the whole system won't work properly.

5 GALLON BUCKET BIO-FILTER

This is a bio-filter for larger quantities, like 5 gallons of water. But it will take longer to filter the water from bucket nr.1 to bucket nr.2.

This is what you need

- 1 ceramic candle filter
- 2 x 5 gallons bucket
- 1 lid

Take **bucket nr.1** and drill a half-inch hole in the center of the bottom – you can also do it with the pocket knife. Put the **ceramic filter** inside the bucket nr.1. Take **the lid** from the bucket and drill a big hole (1 inch and a quarter). Put the lid under the first water.

Take the second bucket and put it under the first bucket. Put the water from your aquaponics system into the first bucket, let it filter in the second bucket.

Simple as that!



Figure 4 2x 5 gallons bucket

SAND AND GRAVEL BIO-FILTER

This is a bio-filter for even larger quantities, than the one before. You must have a big aquaponics system to use that amount of water.

What to use:

- 15 gallons bucket
- 1 PVC pipe
- some sand
- some gravel
- cheesecloth

Take your **15 gallons bucket** and cut a hole on one side of the bottom and add the **PVC pipe**. You can secure it with some **cheesecloth** at both ends. Be sure it's a nice, tight fit.

Put **the gravel** at the bottom of the bucket, approximately right pass were you connected the pipe. After that fill the bucket with **sand for $\frac{3}{4}$** .

You must be sure that the sand is secured in the upper part of the bucket, that is why you need gravel.

Now you can put water above the sand and you'll see how it makes a layer where all the bacteria and impurities are remaining. After that you'll have your own clean and fresh water poured at the end of the PVC pipe.

You can send the same water through to purify it more. Be sure to scrape up the top layer of the sand from time to time, and add a new one.

SIMPLE PORTABLE BIO-FILTER

This is a simple ultra-portable water bio-filter for you. This is very handy when you must go somewhere and you don't want to take lots of baggage after you. This is C. Cricket's idea.

You need:

- ceramic aquarium air stone
- some plastic tubing,
- a soda bottle
- the cap from the soda bottle

First of all you need to add the **ceramic aquarium air stone** to the **plastic/rubber tubing**. Be sure it is secure. Then you drill **the cap** from the **soda bottle** to enter on the plastic/rubber tubing. The cap must be near the end with the ceramic aquarium air stone.

After that, just cut the bottom of the bottle to have a place where the water is poured. You close the soda bottle with the cap; let the ceramic air stone inside the cut bottle. The plastic tubing must be outside the bottle so you can drip water in another bottle, or glass.



Figure 5 Plastic tubing with ceramic aquarium air stone

TO BUY BIO-FILTER

Reverse Osmosis

You can always buy a very effective **Reverse Osmosis filter**. Although Reverse Osmosis seems like a complex system it is really a simple and straightforward water filtration process. And it's not a new process. High-pressure (pump driven) reverse osmosis systems have been used for years to desalinate water – to convert brackish or seawater to drinking water.

You can buy this from Amazon.com or any other store that is specialized in this type of filters.

CONCLUSION

This is how you can do your own bio-filters. Now that you know these things, you should have peace of mind.

I told you why water is so important in a crisis, and what problems you encounter if you don't have the necessary amount of potable water. I think you gained knowledge that helps you to use your **aquaponic system** and make it in to your **water supply**.

After using any of the filtering systems mentioned above, your water should be safe enough to drink.

The only way to truly know the **quality of the water** is to **perform tests with a pH** testing kit or with a microscope because you won't be able to physically see these microscopic organisms just by looking at the water.

You're going to want to ensure that the water is at least clear. If the water is foggy and murky looking, it more than likely isn't safe to consume. Since in a crisis situation you probably won't have access to tools needed to test the water, you will probably have to rely on looking and smelling the water to determine if it's safe for drinking. However, as long as you used one of the methods above first, the water should be treated enough to drink, especially if from your aquaponics system.