Aeroponics’ Effective Shortcuts

Introduction

The growing of plants without using soil is called aeroponics. It is widely used to grow lush, healthy indoor plants and good quality vegetables, fruits and herbs.

Plants absorb nutrients through mist. The nutrients in the soil dissolve in water and the plant roots absorb them. When the plants get adequate nutrients, the soil is no longer required for the plant to thrive. With the use of proper nutrients and the right artificial light source, you can achieve amazing results.

A complete controlled environmental agriculture system should have controlled light, temperature, water, CO2, oxygen, pH and nutrients.

Many gardeners are beginning to switch to aeroponics gardening for many different reasons. These types of gardens are small and can easily be grown inside. They are perfect for most vegetables. Also, the equipment required for aeroponics gardening is not expensive and is relatively easy to manage.

Aeroponics gardening is the growing of plants without soil, in other words, “dirt less gardening”. There are many methods of aeroponics gardening, most of which work better than regular soil gardening because it is easier to give the plant exactly what it needs when it needs it.

Plants will only receive what you give them; therefore you will be able to regulate the pH, nutrients, nutrient strength, amount of water, and light. This makes it imperative for you to research the kind of plants you will be growing so you know exactly what they need to thrive.
Aeroponics’ Effective Shortcuts

There are certain micro-nutrients that are necessary for healthy plant growth, including magnesium, sulfur, calcium, cobalt, boron, iron, copper, manganese, and zinc. These nutrients are absolutely essential to the plants' health. It is very important that you use good quality fertilizer.

Another important aspect of aeroponics gardening that must be taken care of is the pH balance. When the pH balance varies, the plants lose their ability to absorb the nutrients that they need.

The pH you should use is 5.2 or 5.4. The ease with which the pH in aeroponics gardening is tested and controlled gives it a huge advantage over regular dirt gardening.

Aeroponics is simple and efficient. You must change the pH level from time to time. You have to change the nutrient every 7 – 12 days. To turn the light and garden on and off automatically, you can often use a timer.

Aeroponics gardening is easy, affordable, and you can have fresh produce, flowers, herbs & spices all year long!
Aeroponics’ Effective Shortcuts

The Benefits of Aeroponics

Did you know that you can still grow your own beautiful flowers and vegetables, without having to spend many hours every week looking after your garden?

One of the biggest problems many gardeners face is never having enough time to maintain their garden. There are always weeds to remove, insects and other pests to take care of, and steps to take to prevent plants becoming diseased.

Even watering the garden each day can be very time consuming, unless there’s an automatic sprinkler system in place.
Aeroponics’ Effective Shortcuts

If you want a garden but only have limited time to look after it, aeroponics is a great option. Aeroponics gardening has many time-saving advantages over conventional gardening methods. Some of these advantages are:

1. **No weeding required.**

With aeroponics gardening, the plants are grown in a mist full of nutrients instead of soil. You don’t have to worry about weeds sprouting amongst your plants, because soil isn’t used, they don’t have where to grow.

2. **Fewer problems with pests and diseases.**

When growing aeroponically, you have less of the typical problems with pests such as slugs, snails and caterpillars attacking your plants.

The nutrient solution of your aeroponic garden will have to be changed regularly. This only takes a fraction of the time compared to conventional gardening maintenance. For example, greenhouse gardening, where soil has to be replaced between crops to prevent disease.

3. **You don’t need to spend time watering your plants.**

Plants grown in an aeroponic garden have an unlimited supply of water. You never need to be concerned that your plants are getting too much or too little water, because it comes in the form of mist. Your only concern should be the nutrient. If your nutrients lacks any important minerals, such as iron or magnesium, your plants will get sick and will not recover unless you add the necessary solution.
4. Say goodbye to digging your garden.

Preparation of a conventional garden involves preparing the soil to add oxygen extracted by the plant’s roots. Once again, as soil isn’t used with aeroponics, this means one less time consuming job for you to do.

Plants can be grown rapidly without all the concerns of regular gardening. Although an aeroponic system can take some time to set up, you’ll find it is worth the effort!

DIY Aeroponic System

You can make your own Aeroponic System! A 5 gallon bucket aeroponic system is very simple to make and operate. It is designed to provide a compact and inexpensive way to grow food; the unit is only filled with less than 2 gallons of water.

The roots are suspended and sprayed with water and nutrient solution. It is a worry-free way to clone most vegetables. You can also grow plants to harvest in the system, as well.
Aeroponics’ Effective Shortcuts

You will need:

- 5 Gallon Food-Grade Bucket with a Lid
- 1/2” X 12” cut-off threaded poly riser
- 360 degree 1/2” plastic head threaded sprinkler heads
- 317 gallon per hour (or equivalent) 1/2” threaded Hydroponics Pump
- Indoor/Outdoor Electrical Timer with 30 Minute Increments
- (7 or desired amount) Hydroponic Net Pots with Rubber Foam Lids
  *You can use any size and quantity you want depending on the plants you are growing. I used seven 3” net pots with lids.

Tools:

- Saw to cut poly riser
- Sharpie
- Hole Saw – Appropriate size for desired net pots. If you are using 3” net pots, use a 2 7/8” or 2 3/4” holes saw.
- Drill for hole saw
- Safety Glasses
Aeroponics’ Effective Shortcuts

Instructions

Step 1

Decide what size net pots you wish to use. The pots should be spaced equally apart, away from the edge, as shown in the image below. I used seven 3” pots.

Step 2

Carefully cut your holes for your net pots using a drill and a whole saw. The net pots should fit snugly in to the holes and not fall through.
Aeroponics’ Effective Shortcuts

Step 3

Screw the threaded poly cut-off riser to the hydroponic pump. Cut the threaded riser to the desired height and add the threaded 360 sprinkler head. Add the pump with riser and sprinkler head in to bottom of bucket. Hydro pumps with suction cups and pre-filters are best.

Step 4

Run the pump plug through a net pot hole and plug in to a timer. Set the timer for 30 minutes on and 30 minutes off. Fill the net with 2 gallons of water, add you plants and let the fun begin!
And there you have it! You own Aeroponic System! But this is not all, because we have another example of DIY Aeroponic System, made out of a 30 gallon tote.

**You will need:**

- 30 Gallon Tote with Lid
- (6) 3/4” slip to 1/2” threaded PVC connectors
- 3/4” slip “T” connector with 1/2” threaded top.
- 1/2” threaded bulkhead fitting with gasket.
- 1/2” barb to male threaded connector.
- (77”) 3/4” PVC
- 3/4” slip “T” PVC connector
- (6) 180 degree 1/2” plastic head threaded sprinkler heads
- 12” black flexi-tubing
- 1/2” hose clamp
- 1/2” flexi-tubing shut off valve
- 200 gallon per hour (or equivalent) Fountain Pump
- Tube of 100% Silicon Caulking
- 3/4” slip “cross” PVC connector
- (6) 3/4” slip “elbow” PVC connector
- Indoor/Outdoor Electrical Timer with 30 Minute Increments
- (6 or desired amount) Hydroponic Net Pots with Rubber Foam Lids

*You can use any size and quantity you want depending on the plants you are growing. I used six 3.75” net pots with lids.*
Aeroponics’ Effective Shortcuts

Tools

- Caulking Gun
- Saw to cut PVC
- PVC Primer & Glue
- Hole Saw – Appropriate size for desired net pots & bulkhead fitting
- Drill for hole saw
- Teflon Tape
- Tape Measure
- Safety Glasses
- Utility or hobby knife (if you do not wish to use the drill and hole saw)

Instructions

Step 1

Decide what size net pots you wish to use. The pots should be spaced a few inches apart. I used six 3.75" net pots as you will use primarily to clone tomatoes. Use many smaller pots for smaller crops.
Aeroponics’ Effective Shortcuts

Step 2

Carefully cut your holes for your net pots. You can carefully use a knife instead of the drill and hole saw. The net pots should fit snugly into the holes and not fall through.

Step 3

Cut the 3'4" PVC as follows: (6) 4.5", (6) 6", (1) 8", and (2) 3".
**Aeroponics’ Effective Shortcuts**

**Step 4**

Using the PVC glue and primer, connect the 4.5" PVC pieces to the PVC elbow connector and the 6" PVC pieces as shown below. The 6" piece will serve as the riser.

![Image of step 4](image1.png)

**Step 5**

Using the PVC primer and glue, attach the 3/4" slip to 1/2" threaded PVC connector. Screw in the sprinkler heads as shown below.

![Image of step 5](image2.png)
Step 6

Using the PVC Primer and glue, connect two 3/4" "T" PVC connectors and one 3/4" "cross" PVC connector as shown below:

Step 7

Connect the two 3" PVC pieces to the 3/4" "T" with the threaded 1/2" top. Also connect the 8" section to the risers. Screw in the 1/2" barb to 1/2" threaded connector.
**Aeroponics’ Effective Shortcuts**

**Step 8**

Place the PVC sprinkler unit inside the tote. Connect the fountain pump to the PVC unit with the 1/2" flexi-tubing. Make sure there are no kinks in the tubing.

**Step 9**

By using the entire tube of silicone caulking, seal the lid on top of the aeroponic system. Make sure that the seal is airtight with no gaps of coverage. Let completely cure and dry before using it. Install the bulkhead fitting at the desired location along the bottom of the unit. Attach the shut off valve with flexi-tubing as a drain valve.
**Aeroponics’ Effective Shortcuts**

**Step 10**

Insert the net pots with foam lids. We place our unit on a timed cycle of 30 minutes on and 30 minutes off, so that you let your roots air out. Fill with water to just below the sprinkler heads.
Aeroponics’ Effective Shortcuts

Aeroponics – The Veggies

Aeroponics gardening is a great idea for anyone who wants a garden but doesn’t have enough land or soil. With aeroponics gardening, it’s easy to grow succulent vegetables anywhere you want!

It’s true that aeroponics gardening takes less time to grow than an ordinary garden. In fact, you might spend only five minutes a day maintaining your aeroponics garden.
Aeroponics’ Effective Shortcuts

Things You Will Need

- Aeroponic system
- Carrot seeds
- Pruning shears

Step 1
Set up your aeroponic system in an area that receives full sunlight.

Step 2
Position the mesh holders over the growing chambers. Put the seeds in the growing chambers. Although the seed capacity of growing chambers varies, most aeroponic systems for domestic use require two to three seeds.

Step 3
Position the growing chambers in their slots in the system’s housing.

Step 4
Position the vapor cover over the growing kit.

Step 5
Acquire recommended nutrient supply solutions.

Step 6
Place the nutrient solution in the nutrient supply chamber.
Aeroponics’ Effective Shortcuts

Step 7

Remove the weak seedlings from the growing chambers after three days. Check the time it takes the carrot to reach maturity according to the information above. You must also know that different varieties of carrots mature at different rates.

Step 8

Lift the holder containing the growing chambers as the carrots approach maturity. The roots will be exposed through the growing tray.

Step 9

Trim the roots from the carrots when they mature with pruning shears. Remove the carrots from the growing chambers.

Necessary Nutrients

Aeroponics – A relatively new technology, which allows you not to rely on soil anymore when using plants that, saves space. How?

The system is designed to go up vertically as well as horizontally. Basically, the system suspends plants in the air and mists the roots regularly with water mixed with a nutritive solution.

Plants must remain healthy, they have to receive the right amount of minerals and have their roots protected from light. Yellow leaves indicate a lack of one or more necessary growing nutrient. The following substances are vital for you plants’ health:
1. Iron

If your plants suffer from an iron deficiency, their capacity for creating chlorophyll decreases. You need to add an iron supplement to your growing solution, if all of your plant’s leaves turn yellow, but the veins remain green. Take also into account that an untreated iron decrease can conclude to your plant’s death.

2. Manganese

If you are encountering a splotched pattern of yellow and green leaves, on the lower part of the plant, that could display a lack of manganese. Manganese is a mineral that activates many of the enzymes essential to healthy plant growth. If your plant begins lacking this mineral, its growth slows and remains stunted.
3. Magnesium

If your plant suffers from a magnesium shortage, you need to take care of it immediately! A lack of magnesium turns the very tips of the plant’s leaves yellow. The space between leaf veins also begins changing color to a pale yellow hue.

Also, the lower part of the plant begins wilting. If you do not restore the magnesium level as quickly as possible, the plant won’t be able to photosynthesize. In other words, it will starve to death!

4. Nitrogen

If nitrogen levels drop in your aeroponic system, the bottom of your plant produces yellowing leaves. In comparison to healthy foliage, this plant remains underdeveloped and grows slowly. In the end, the body of the plant’s leaves turn to a very pale green.
5. Phosphorus

If your aeroponic solution doesn’t contain enough phosphorus, the leaves toward the bottom turn yellow, and then end up being black. Phosphorus helps your plant with energy transfer. If the matter is not taken care of, the lower part of your plant remains barren, as the leaves fall off.

6. Zinc

Most aeroponic systems need only a trace of zinc. Zinc facilitates growth and keeps your plants healthy. When there isn’t enough zinc in your nutrient solution, the leaves of your plant change texturally. They become frail and thin and yellow.
Troubleshooting Your Aeroponic System

When an aeroponic system works well, its plants can be harvested on a regular basis. If anything goes wrong and the problem is not immediately taken care of, all of your plants could die. Some problems are related to the nutrient solution, lighting or the aeroponic system itself. Here are some tips and tricks to troubleshoot your aeroponic system:

You might need:

- Fresh nutrient solution
- Water-testing kit with corrective chemicals
- Toothbrush
- Cloth or sponge
- Spare nozzles

Inspect your plants for signs of nutrient deficiencies. As written in the previous chapter, look for discolored leaves, brown spots, odd colors, and curled or crinkled leaves. Each one of these symptoms indicates that the nutrient solution has to be changed.

Check for possible problems with the lighting. Not enough light can make a plant spindly, weak, with few and stunted leaves. Most plants need at least six hours of strong sunlight per day. Therefore, if your aeroponic system uses artificial light, then your plants should receive 12 to 16 hours of light per day.
Aeroponics’ Effective Shortcuts

Look at the amount of nutrient solution in the system’s reservoir. Add water or replace the solution altogether to fix the problem.

Test the pH and hardness levels of the nutrient solution with a water-testing kit. You can find one at a hydroponic and aeroponic supplier. They can also provide you with required chemicals to make adjustments. Your aeroponic system must be well balanced, so that the plants can grow healthy.
Aeroponics’ Effective Shortcuts

Run the system’s pump, and check whether or not it operates properly. The output and intake should be consistent. If the pump does not output enough water, check for clogs in the intake valve. Most aeroponic pumps have a screen to prevent solids from entering the system. Clean the screen with a tiny brush if it is clogged.

Check all pipe and joint connections. No leaks should be present, and the connections should be tight. Leaks decrease pressure throughout the system and may keep nozzles from spraying.

Inspect the system’s nozzles. While the system runs, look to ensure that each nozzle works properly. If you can’t get a nozzle clean, replace it.

Flushing your aeroponic system with plain water helps remove all impurities:

- Drain all the nutrient solution out.
- Wipe down everything you can reach and refill the reservoir with water.
- Run the system for several hours, and drain it again.
- If everything works properly, refill the system with nutrients and run it as normal.
Vertical Aeroponic System

Maybe you’re not much of a DIY enthusiast. So, I present to you the Vertical Aeroponic Garden! It produces fresh vegetables in half of the time required by the conventional growing. You save up to 90% water and 90% space!

These amazing gardens are designed for urban farms, rooftop gardens, and commercial growing operations. Also known by the name Tower Gardens, these vertical aeroponic gardens are a very exciting urban farming method. They produce larger quantities of food quicker; they take less space and water to function (about 90% less, according to researches).
Aeroponics’ Effective Shortcuts

These Tower Gardens were developed by a leading horticulture and aeroponics expert known as Tim Blank. His invention grows food efficiently and it is used at a number of big venues, such as Chicago’s O’Hare airport, Giant Stadium, Google cafeteria and other restaurants.

The basic Tower Garden unit has a 2.5' x 2.5' footprint, and uses modular stackable growing pots. With an 11-pot maximum configuration, you can grow up to 44 plants per tower.

The basic Tower Garden unit has a 2.5' x 2.5' footprint, and uses modular stackable growing pots. With an 11-pot maximum configuration, you can grow up to 44 plants per tower.

The basic Tower Garden unit has a 2.5' x 2.5' footprint, and uses modular stackable growing pots. With an 11-pot maximum configuration, you can grow up to 44 plants per tower.

The product is made out of a special plastic, that is FDA food grade compliant and free of harmful components commonly found in today’s agriculture-grade plastics.

This material is designed to last for ages, and is completely opaque, keeping all sunlight out. Therefore, it inhibits algae growth. You might want to find a system that is UV stabilized for outdoor protection.

Most white plastics are not opaque and degrade rapidly, because solar UV radiation breaks plastic down from the inside out.

When it comes to seeds for the tower garden, they are started in natural rock fiber seeding cubes. After germination, the cubes are placed in full light for a week or two. There, they can develop into hardy seedlings ready to be transplanted into the tower garden.
Aeroponics’ Effective Shortcuts

This amazing invention has a 25 gallon reservoir at its base, which stores ionic mineral nutrient solution. Inside the reservoir is a small, low wattage submersible pump.

The pump draws the nutrient solution up through the center of each pot all the way to the top of the tower garden.

From there, the nutrient solution drips through a special device that evenly cascades the nutrient solution over the plant roots. On the journey down, the nutrient solution feeds the plants’ roots, and becomes highly oxygenated as gravity tumbles it back down to the reservoir.

The process is continually repeated, providing fresh oxygen, water, and nutrients to the roots of the plants. The crops grow faster than they would in soil, and you can even harvest them on a regular basis, which is great.

You can start your own little vertical garden right now, and be prepared if the EMP disaster strikes. This is a very efficient way to improve your well-being and financial state. You can work on this Aeroponic System and grow fresh veggies for you and your family!