

# Hydroponics: A Versatile system of plant growing

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Hydroponics is a subset of hydroculture, which is the growing of plants in a soil less medium, or an aquatic based environment. Hydroponic growing uses mineral nutrient solutions to feed the plants in water, without soil. This technique instead uses a mineral nutrient solution in a water solvent, allowing the nutrient uptake process to be more efficient than when using soil. Hydroponics is a viable method of producing vegetables, foliage plants and other crops. The demand for locally grown produce has risen dramatically. Growing these crops hydroponically is a very efficient means of meeting that demand.

## Materials used in hydroponics

**(1) Coco coir:** Has an excellent air to water ratio with great water retention.

**(2) Rockwool:** A fibrous material made from melted rock

- Not biodegradable
- Must be pH balanced
- Excellent water retention

**(3) Expanded clay Pellets:**

- Most popular media
- Drain quickly and pH neutral
- Reusable
- Used in ebb & flow water culture
- 50:50 mix of clay and coco creates a breathable medium

**(4) Potting soil (Perlite):**

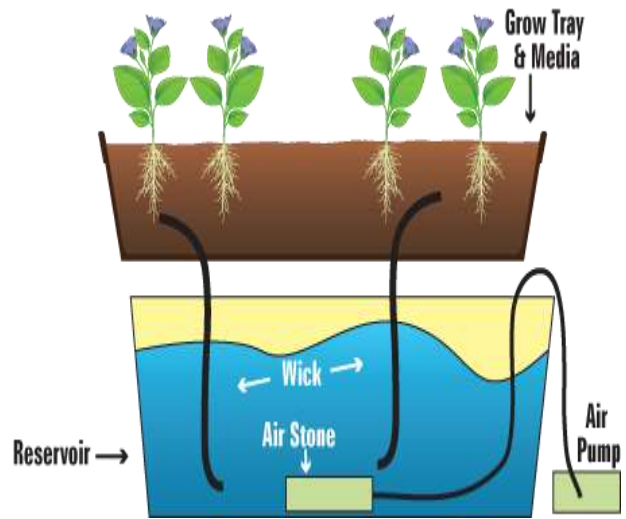
- Perlite + coco coir + vermiculite
- Synthetic materials
- Heated to produce light and porous material

## Types of Hydroponics

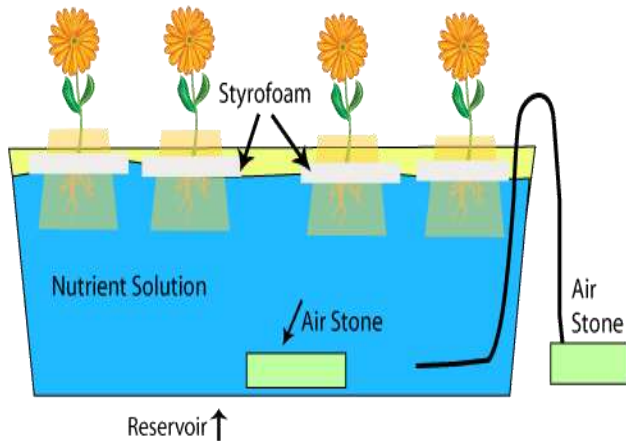
There are six basic types of hydroponics system. Wick, Water Culture, Ebb and Flow (Flood & Drain), Drip (recovery or non-recovery), N.F.T. (Nutrient Film Technique) and Aeroponic. There are hundreds of variations on these basic types of systems, but all hydroponic methods are a variation (or a combination) of these six.

### 1. Wick system:

- This is the simplest type of hydroponic system. This is a passive system, which means there are no moving parts. The nutrient solution is drawn into the growing medium from the reservoir with a wick.
- This system can use a variety of growing medium. Perlite, vermiculite, pro-mix and coconut fiber are among the most popular.
- The biggest draw back of this system is that plants that are large or use large amounts of water may use up the nutrient



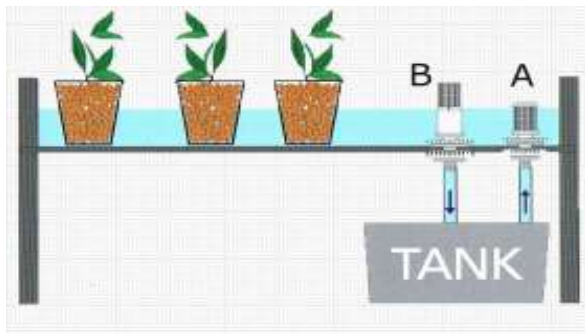
### 2. Water culture:



This system is an active system with moving parts. It is the simplest hydroculture technique. The roots of the plants are totally immersed in the water which contains the specific Growth technology nutrient solutions.

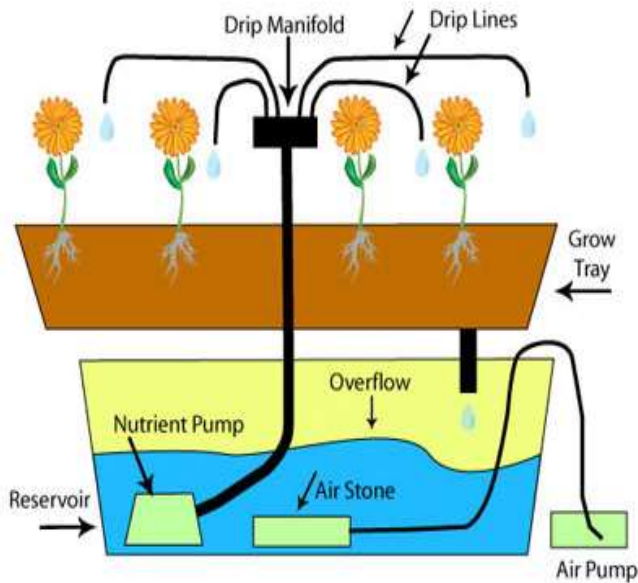
An air pump with help oxygenate the water and allow the roots to breath.

### 3. Ebb and flow system



- This system works by temporarily flooding the grow tray with nutrient solution and then draining the solution back into the reservoir. This action is normally done with a submerged pump that is connected to a timer.
- This system can be used with a variety of growing medium.

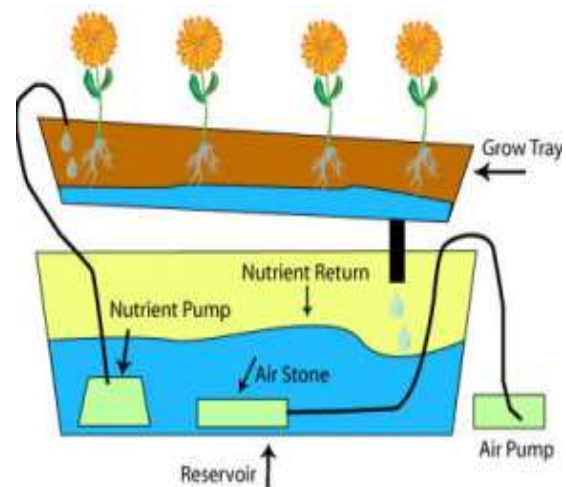
#### 4. Drip system (recovery or non-recovery)



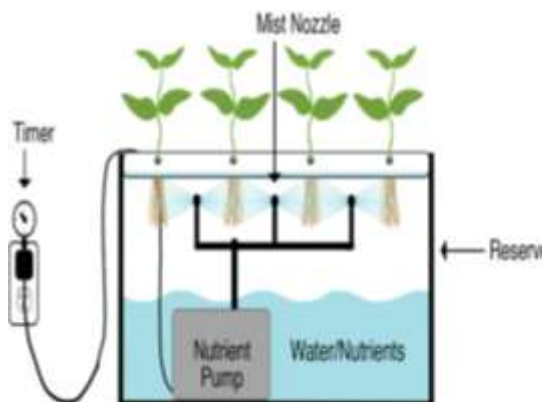
- Drip systems are a widely used hydroponic method. A timer will control a water pump, which pumps water and the Growth Technology nutrient solutions through a network of elevated water jets.
- A recovery system will collect excess nutrient solution back into the reservoir.
- A non-recovery drip system will avoid this allowing the pH of the reservoir not to vary. If using a recovery system, be sure to check the pH level of the reservoir regularly and adjust using either pH UP or pH Down solutions on a more frequent basis.

#### 5. Nutrient film technique (N. F. T.)

- Nutrient Film Technique uses a constant flow of your Growth Technology nutrient solution (therefore no timer is required).
- The solution is pumped from a reservoir into the growing tray. The growing tray requires no growing medium. The roots draw up the nutrients from the flowing solution.
- The downward flow pours back into the reservoir to be recycled again. Pump and electric maintenance is essential to avoid system failures, where roots can dry out rapidly when the flow stops.



#### 6. Aeroponics:



- Like the N.F.T. system above the growing medium is primarily air. The root hang in the air and are misted with nutrient solution. The misting are done usually done every few minutes. Because the roots are exposed to the air like the N.F.T. system, the roots will dry out rapidly if the missing cycles are interrupted.
- A timer controls the nutrient pump much like other types of hydroponics system, except the aeroponics system needs a short cycle timer that runs the pump for a few seconds every couple of minutes.

### **Advantages:**

- ✓ **Nutrients:** Complete control over nutrient balance.
- ✓ **No yard needed:** Create a hydroponic garden in any indoor space.
- ✓ **Labour saving:** No mulching, tilling, changing of soil and weeding.
- ✓ **Water-saving:** Hydroponic garden use up to 2/3 less water. The system water can be reused, allowing you to conserve water.
- ✓ **Affordable:** Get started on very low budget.
- ✓ **Higher yields:** More productive for their size.
- ✓ **Better results:** Hydroponics produces better tasting, more nutritional results.
- ✓ **Year round growing:** With hydroponics, you control the season.
- ✓ **Environment friendly:** Hydroponic gardening virtually eliminates the need for herbicides and pesticides, and need only use about 1/4 the fertilizer that traditional gardeners require.

### **Disadvantages:**

- ✓ Putting together a hydroponic system isn't cheap.
- ✓ Constant monitoring is required.
- ✓ Hydroponic systems are vulnerable to power outages. In the event of a power outage that outlasts your generators you will be manually watering your garden.
- ✓ Micro-organisms that are water-based can creep in rather easily.
- ✓ Growing a hydroponic garden demands technical expertise.
- ✓ Production is limited compared to field conditions
- ✓ If a disease appears, all plants in the system will be affected.
- ✓ Without soil to serve as a buffer if the system fails plant death will occur rapidly.