ENVIRONMENTAL STUDIES & LIFE SCIENCES

Dr. Sasmita Sabat
Department of Biotechnology
PES University, Bangalore - 560085

Bio-sustainability
Hydroponics

Dr. Sasmita Sabat
Department of Biotechnology

Hydroponics

- The word hydroponics comes from two Greek words, "hydro" meaning water and "ponos" meaning labour
- The concept of soil less gardening or hydroponics has been around for thousands of years
- The hanging Gardens of Babylon and The Floating Gardens of China are two of the earliest examples of hydroponics

Hydroponics

- Scientists started experimenting with soil less gardening around 1950
- Hydroponics is proved to have several advantages over soil gardening
- The growth rate on a hydroponic plant is 30-50 percent faster than a soil plant, grown under the same conditions
- The yield of the plant is also greater

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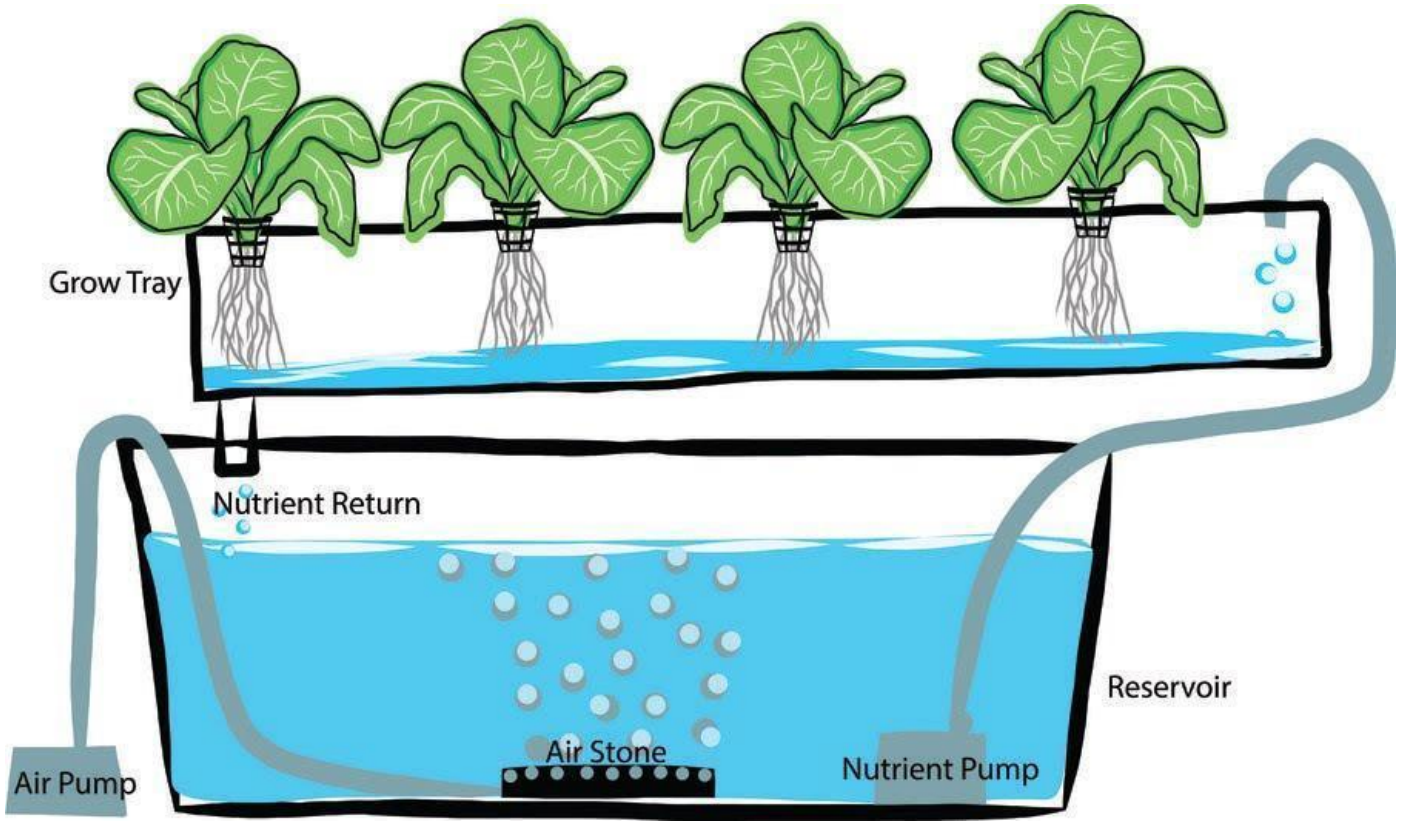

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Hydroponics

- **Benefits:**

1. The extra oxygen in hydroponic growing medium helps to stimulate root growth
2. The nutrients in a hydroponic system are mixed with the water and sent directly to the root system. The plant does not have to search in the soil for the nutrients that it requires.

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3. Those nutrients are being delivered to the plant several times per day

4. The hydroponic plant requires very little energy to find and break down food. The plant then uses this saved energy to grow faster and to produce more fruit.

5. Hydroponic plants also have fewer problems with bug infestations, funguses and disease

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- Hydroponic gardening also offers several benefits to our environment
- Hydroponic gardening uses considerably less water than soil gardening, because of the constant reuse the nutrient solutions
- Since hydroponic gardening systems use no topsoil, topsoil erosion isn't even an issue

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- **Growing mediums:**
- A fast draining medium, such as Hydrocorn
- Hydrocorn is a light expanded clay aggregate
- It is a light, airy type of growing medium that allows plenty of oxygen to penetrate the plant's root system

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- Rockwool has become an extremely popular growing medium
- Rockwool was originally used in construction as insulation. There is now a horticultural grade of Rockwool.
- Since Rockwool holds 10-14 times as much water as soil and retains 20 percent air it can be used in just about any hydroponic system

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- Other commonly used growing mediums are perlite, vermiculite and different grades of sand
- These three mediums are stable and rarely effect the pH of the nutrient solution
- Although, they tend to hold too much moisture and should be used with plants that are tolerant to these conditions

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- Like soil, hydroponic systems can be fertilized with organic or chemical nutrients
- A hydroponic nutrient solution contains all the elements that the plant normally would get from the soil
- Most plants can grow hydroponically within a pH range of 5.8 to 6.8, 6.3 is considered optimal. The pH in a hydroponic system is much easier to check than the pH of soil.

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- **Hydroponic systems:**
- Hydroponic systems are characterized as active or passive
- An active hydroponic system actively moves the nutrient solution, usually using a pump
- Passive hydroponic systems rely on the capillary action of the growing medium or a wick

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- The nutrient solution in passive system is absorbed by the medium or the wick and passed along to the roots
- Passive systems are usually too wet and do not supply enough oxygen to the root system for optimum growth rates

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- Hydroponic systems can also be characterized as recovery or non-recovery
- Recovery systems or recirculating systems reuse the nutrient solution
- In non-recovery system the nutrient solution is applied to the growing medium and not recovered

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- **Examples:**
- **The Wick System-** passive non-recovery type hydroponic system
- **The Ebb and Flow System-** active recovery type system
- **Nutrient Film Technique-** active recovery type hydroponic system
- **Continuous Drip-** active recovery or non-recovery type system

THANK YOU

Dr. Sasmita Sabat

Department of Biotechnology

sasmitasabat@pes.edu

+91 80 26721983 Extn 347