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Hydroponics: An Advanced Technique for Vegetable Production

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SUMMARY

As of capable resources management and production of quality food, presently hydroponic cultivation is gaining popularity throughout the world. Soil-based agriculture is currently facing many defies like urbanization, natural disaster, global climate change, non-selective use of chemicals and pesticides which is diminishing the fertility of the land. In this article, various hydroponic structures like wick, ebb and flow, drip, deep water culture and, Nutrient Film Technique (NFT) system; their processes, benefits and drawbacks are discussed.

INTRODUCTION

Hydroponics by description, means 'water-working." It's a method of growing plants in nutrient solutions with or without the utilization of an inert medium like gravel, vermiculite, rockwool, peat moss, saw dust, coir dust, coconut fibre, etc. to supply mechanical support. It's also called as "cultivation of plants without using soil". The term Hydroponics was derived from the Greek words hydro' means "water" and ponos' means "labour" and literally means "water work". The science of hydroponics ascertains that soil isn't mandatory for plant growth. Within the current scenario, soil less cultivation might be initiated effectively and thought of as substitute option for growing healthy food plants, crops or vegetables (Butler and Oebker, 2006). Various commercial and specialty crops are often grown using hydroponics including leafy vegetables, tomatoes, cucumbers, peppers and strawberries, etc.

Types of Hydroponic System

1.Wick System

This hydroponic system is the simplest one, requiring no electricity, pump and aerators (Shrestha and Dunn, 2013) works well for small plants, herbs and spice and doesn't work effectively that desires lot of water. It works through capillary action. Plants are engaged in an absorbent medium like coco coir, vermiculite, perlite with a nylon wick running from plant roots into a reservoir of nutrient solution.

2.Ebb and Flow system

This system is the first commercial hydroponic system. It works on the principle of "flood and drain". Nutrient solution and water from reservoir flooded through a water pump to grow bed till it extents a certain level and stop there for a fixed period of time, then allowed to empty for a set period of time, in order that it provide nutrients and moisture to plants.

3.Drip system

This system is commonly used method among both home and commercial growers. With the help of pump, water or nutrient solution from the reservoir is delivered to specific plant roots in correct quantity. Plants are usually placed in moderately absorbent growing medium in order that the nutrient solution drips slowly. Various crops are often grown scientifically with more saving of water

4.**Deep water culture system**

In deep water culture, roots of plants are suspended in nutrient rich water and air is provided directly to the roots by an air stone. Plants are retained in net pots and roots are adjourned in nutrient solution where they grow quickly in a large mass. It is mandatory to display the oxygen and nutrient concentrations, salinity and pH (Domingues et al., 2012) as algae and moulds can grow rapidly in the reservoir. This system work well for especially cucumber and tomato.

5.**Nutrient Film Technique (NFT) system**

In this system, water or a nutrient solution circulates throughout the whole system; and enters the growth tray via a water pump without a time control (Domingues et al., 2012). This system is somewhat slanted so as

to nutrient solution runs through roots and down back into a reservoir. Plants are placed in channel or tube with roots dangling during a hydroponic solution.

Benefits of Hydroponics

- No soils needed
- Create better use of space and location
- Hydroponic growers can have total control above the climate - temperature, humidity, light intensification, the composition of the air.
- It is water-saving
- Actual use of nutrients
- pH control of the solution
- Better growth rate
- Elimination of weeding and soil preparation practices
- Fewer pests and diseases
- Fewer use of insecticide, and herbicides
- Labor and time savers
- Vegetable produced from hydroponically are of high quality and more nutritional value than field grown crops.

Drawback of Hydroponics

- Requires more time and commitment
- Experiences and technical knowledge
- Organic debates
- Water and electricity risks
- System failure threats
- Initial expenses
- Long return per investment

CONCLUSION

Nowadays, hydroponics is perceived as a promising approach for growing different crops. As it is probable to grow short period crop like vegetables round the year in very partial spaces by low labour, therefore hydroponics can play a great impact in areas with constraint of soil and water and for the poorer and landless people.

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