

The Techniques of Hydroponic System

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Received: May 08, 2020

Published: June 22, 2020

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Abstract

Hydroponics is soilless cultures where plants are created using a mineral enhancement for without soil. It redesigns genuine root limits, deftly water, agreeable oxygen and enhancements to the plant while giving physical, substance and natural assistance to the plant. When orchestrating a hydroponic nursery or home nursery, ought to pick a suitable space and techniques. Hydroponics systems are requested as open and shut methods. A hydroponic system implies the procedure for applying supplement answer for the plant roots. The hydroponics ended up being logically notable in a short period of time and this strategy lead to begin indoor and outdoor hydroponic planting rapidly.

Keywords: Brain Metastases; Prostate Cancer; Radiation Treatment (RT)

Introduction

Hydroponics was drilled numerous hundreds of years back in Amazon, Babylon, Egypt, china and India where antiquated men utilized broke down compost to develop cucumber, watermelons and different vegetables in sandy riverbeds. The "hanging solidify of Babylon" and the Aztec's drifting homesteads were really models of hydroponic frameworks. Afterward, when plant physiologists began to develop plants with explicit supplements for exploratory purposes, they gave the name "nutriculture". It was created in 1925 when the green house soils must be supplanted much of the time to conquer issues of soil structure, fruitfulness and vermin.

The word hydroponics in fact implies working water, originating from the Latin words "hydro" which means water, and "ponos" which means work. A wide range of human advancements from the earliest starting point of time have depended on hydroponics for developing plants, for example, the early Mexican and Egyptian civic establishments. In any case, as of late developing hydroponically has expanded in prevalence and use across a wide range of business sectors. Hydroponics is a soilless culture where plants

are developed utilizing a mineral supplement arrangement Instead of soil [1]. Plants developed utilizing hydroponics have appeared to develop at a quicker rate, age prior and produce up to multiple times the yield than that of soil-developed plants just as giving a more noteworthy healthy benefit.

Basic requirements of hydroponics

- Buffer action of water or the inert medium used.
- The nutrient solution or the fertilizer mixture used must contain all micro and macro elements necessary for plant growth and development.
- Buffer action of the nutrient solution must be in the suitable range so that plant root system or the inert medium is not affected.
- The temperature and aeration of the inert medium or the nutrient solution is suitable for plant root system.

Classification of hydroponics/aeroponics

The term hydroponics initially implied supplement arrangement culture with no supporting medium. Be that as it may, plant

developing in strong media for safe haven utilizing supplement arrangement is likewise remembered for hydroponics. This strategy is called total framework. Hydroponics frameworks are additionally arranged as open (i.e. when the supplement arrangement is conveyed to the plant roots, it isn't reused) or shut (i.e. surplus arrangement is recouped, renewed and reused). A hydroponic system suggests the method for applying supplement answer for the plant roots.

Solution culture or liquid hydroponics

Circulating methods (closed system)

- Nutrient film technique (NFT)
- Deep flow technique (DFT).

Non-circulating method (open systems)

- Root dipping technique
- Floating technique
- Capillary action technique.

Solid media culture (Aggregate systems)

- Hanging bag technique
- Grow bag technique
- Trench or trough technique
- Pot technique.

Aeroponics

- Root mist technique
- Fog feed technique.

Solution culture or liquid hydroponics

Circulating methods (Closed System)

The supplement arrangement is siphoned through the plant root framework and overabundance arrangement is gathered, renewed and reused.

NFT (Nutrient film technique)

NFT is a genuine hydroponics framework where the plant attaches are straightforwardly presented to supplement arrangement. NFT frameworks have a consistent progression of supplement arrangement so no clock required for the sub siphon. The supplement arrangement is siphoned into the developing plate (generally a cylinder) and streams over the underlying foundations of the plants and afterward depletes once more into the repository. There is typically no developing medium utilized other than air,

which spares the cost of supplanting the developing medium after each yield. Regularly the plant is bolstered in a little plastic bushel with the roots dangling into the supplement arrangement. NFT frameworks are entirely helpless to control blackouts and siphon disappointments. The roots dry out quickly when the progression of supplement arrangement is interfered. The channel is made of adaptable sheet. The seedlings with small developing medium are set at the focal point of the sheet and the two edges are attracted to the base of the seedlings and cut together to forestall vanishing and to reject light. The developing medium ingests supplement answer for youthful plants and when the plants develop the roots structure a tangle in the channels [2].

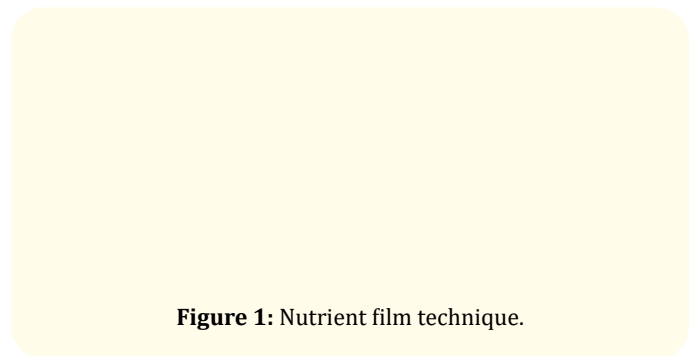


Figure 1: Nutrient film technique.

The greatest length of the channel is 5 - 10m and is set at a slant drop of 1 of every 50 to 1 out of 75. The supplement arrangement is siphoned to the higher finish of each channel and streams by gravity to the lower end wetting the root tangle. At lower end of the channels supplement arrangement gets gathered and streams to the supplement arrangement tank. The arrangement is observed for salt focus before reusing. A few cultivators supplant the supplement arrangement consistently with new arrangement. Alter the stream pace of the supplement answer for 2 - 3 liters for each moment relying upon the length of the channel. Offer enough help for tall developing plants in this method. By and by, it is exceptionally hard to keep up an extremely flimsy film of supplement arrangement and subsequently, this method has experienced a few alterations [3].

Deep flow technique (DFT)/pipe system

As the name infers, 2 - 3 cm profound supplement arrangement courses through 10 cm width PVC funnels to which plastic net pots with plants are fitted. The plastic pots contain planting materials and their bottoms contact the supplement arrangement that streams in the channels. The PVC channels might be organized

in one plane or fit as a fiddle contingent upon the sorts of yields developed.

The crisscross framework uses the space proficiently however appropriate for low developing harvests. The single plane framework is appropriate for both tall and short harvests. Plants are set up in plastic net pots and fixed to the openings made in the PVC pipes. Old coir dust or carbonized rice husk or blend of both might be utilized as planting material to fill the net pots. Spot little bit of net as a coating in the net pots to forestall the planting material falling into the supplement arrangement. Little plastic cups with openings on the sides and base might be utilized rather than net pots [4].

Figure 2: Deep flow technique.

At the point when the reused arrangement falls into the arrangement in the stock tank, the supplement arrangement gets circulated air through. The PVC pipes must have a slant of drop of 1 out of 30 - 40 to encourage the progression of supplement arrangement. Painting the PVC pipes white will help lessen the warming up of supplement arrangement. This framework can be set up in the open space or in ensured structures.

Non-circulating methods (Open system)

The supplement arrangement isn't circled yet utilized just a single time. At the point when its supplement fixation diminishes or pH or Ec transforms, it is supplanted. This framework is of following kinds.

Root dipping technique

Plants are developed in little pots loaded up with small developing medium. The pots are put so that lower 2 - 3 cm of the pots is lowered in the supplement arrangement. A few roots are plunged in the arrangement while others linger palpably over the answer for supplement and air assimilation, separately.

Figure 3: Root dipping technique.

This procedure is simple and can be created utilizing effectively accessible materials. This 'low tech' developing technique is cheap to build and needs little upkeep. Significantly, this procedure doesn't require costly things, for example, power, water siphon, channels, and so forth. For root crops (beet, raddish and so on) be that as it may, a dormant medium must be utilized.

Floating technique

This is like box technique yet shallow holders (10 cm profound) can be utilized. Plants built up in little pots are fixed to a Styro-foam sheet or some other light plate and permitted to skim on the supplement arrangement filled in the holder and arrangement is falsely circulated air through.

Capillary action technique

Planting pots of various sizes and shapes with gaps at the base are utilized. The pots are filled with a dormant medium and seedlings/seeds are planted in inactive medium. These pots are set in shallow compartments loaded up with the supplement arrangement. Supplement arrangement arrives at latent medium by fine

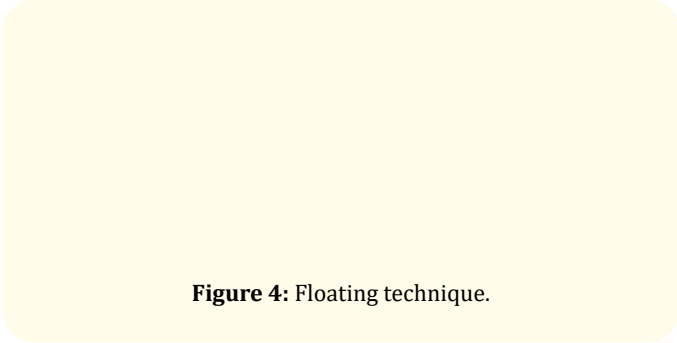


Figure 4: Floating technique.

activity. Air circulation is significant in this method. Hence, old coir dust blended in with sand or rock can be utilized. This strategy is appropriate for decorative, bloom and indoor plants [5].

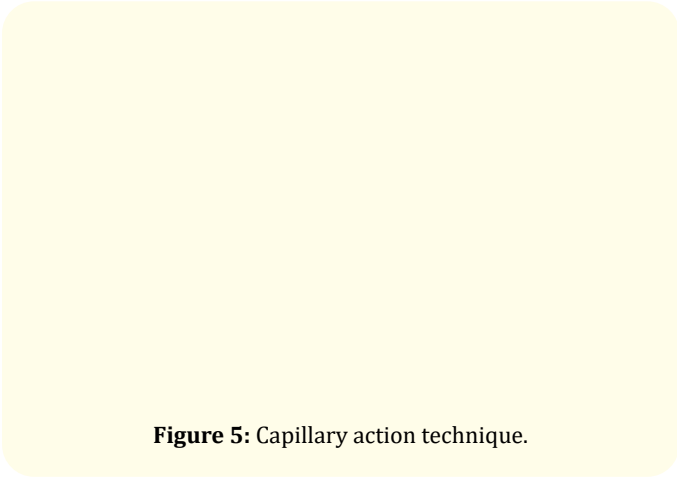


Figure 5: Capillary action technique.

Solid media culture or aggregate system

These strategies including idle strong media can be worked on utilizing locally accessible materials. The media material chose must be adaptable, friable, with water and air holding limit and can be depleted without any problem. What's more, it must be liberated from poisonous substances, bothers, malady causing microorganisms, nematodes, and so forth. The medium utilized must be completely cleaned before use:

- Inorganic normal media (Gravel culture)
- Organic normal media (Smoked rice husk, Saw dust, Coconut fiber, Coir dust peat greenery)
- Inorganic counterfeit media (Rockwool, Perlite, Vermiculite)
- Organic counterfeit media (Polyurethane, Polyphenol, Polyether, Polyvinyl).

Tannins and acids present in the recently separated coir-dust influence plants. Thusly, use at any rate a half year old coir-dust. Dry, clean compacted coir-dust squares are ready to move in the market [6].

Hanging bag technique (Open system)

Around 1m long chamber molded, white (inside dark) UV treated, thick polythene packs, loaded up with sanitized coconut fiber are utilized. These packs are fixed at the base end and attached to little PVC pipe at the top. These sacks are suspended vertically from an overhead help over a supplement arrangement gathering channel. Consequently, this strategy is otherwise called verti-develop' method [7].

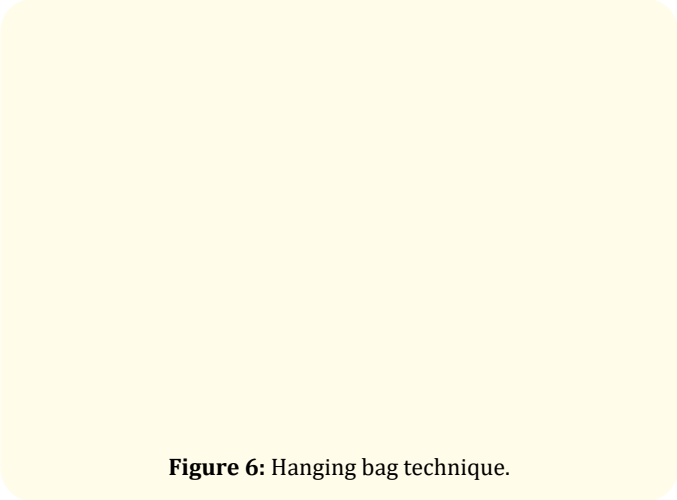


Figure 6: Hanging bag technique.

Seedlings or other planting materials built up in net pots are crushed into openings on the sides of the hanging packs. The supplement arrangement is siphoned to top of each balancing pack through a smaller scale sprinkler appended inside the draping sacks at the top. This miniaturized scale sprinkler equally disseminates the supplement arrangement inside the hanging pack. Supplement arrangement dribbles down wetting the coconut fiber and plant roots. Abundance arrangement gets gathered in the channel underneath through openings made at the base of the hanging sacks and streams back to the supplement arrangement stock tank. This framework can be built up in the open space or in secured structures. In secured structures, the balancing packs in the columns and among the lines must be separated so that satisfactory daylight falls on the sacks in the inward lines. This framework

is reasonable for verdant vegetables, strawberry, and little bloom plants. Dark shading cylinders should be utilized for supplement arrangement conveyance to forestall form development inside.

Grow bag technique

In this strategy 1 - 1.5m long white (inside dark), UV safe, polythene packs loaded up with old, disinfected coir-dust are utilized. These sacks are around 6 cm in tallness and 18 cm wide. These sacks are set start to finish evenly in columns on the floor with strolling space in the middle. The packs might be put in matched columns relying upon the harvest to develop. Little openings are made on the upper surface of the sacks and press seedlings or other planting materials set up in net pots into the coir-dust. 2 - 3 plants can be built up per pack. Two little cuts low on each side of the sacks are available for waste or draining. Fertigation with dark slender cylinder driving from primary flexibly line to each plant is polished. Whole floor is secured with white UV safe polythene before setting the sacks. This white polythene mirrors the daylight to the plants. It likewise decreases the relative stickiness in the middle of plants and occurrence of contagious sicknesses [8].

Figure 7: Grow bag technique.

Trench or trough technique

In this open framework, plants are developed in thin channels in the ground or over the ground troughs built with blocks or solid squares. The two channels and troughs are fixed with waterproof material (thick UV safe polythene sheets in two layers) to isolate the developing media from rest of the ground. The width of the channel or trough can be chosen relying upon the simplicity of activity. More extensive channels or troughs will allow two columns of plants. The profundity fluctuates relying upon the plants to develop and at least 30 cm might be essential. Old coir buildup, sand or rock, peat, vermiculite, perlite, old sawdust or mix of these materials can be used as the media for this culture. The supplement ar-

Figure 8: Trench or trough technique

angement and water are provided through a dribble water system framework or manual application is likewise conceivable liable to work accessibility. A very much punctured channel of 2.5 cm distance across might be set at the base of the trough or channel to deplete out overabundance supplement arrangement. Tall developing vine plants (cucumber, tomato, and so on.) need extra help to withstand the heaviness of the natural products.

Pot technique

Pot method is like channel or trough culture yet developing media is filled in mud or plastic pots. Volume of the holder and developing media rely upon the harvest development necessities. The volume goes for the most part from 01 to 10 liters. Developing media, supplement arrangement flexibly, offering help to plants, and so on is like that of trough or channel culture [9].

Aeroponic

Aeroponic is a strategy for developing plants where they are secured in gaps in Styrofoam boards and their underlying foundations are suspended in air underneath the board. The boards create a fixed box to forestall light infiltration to support root development and forestall green growth development. The supplement arrangement is splashed in fine fog structure to the roots. Moistening is accomplished for a couple of moments each 2 - 3 minutes. This is adequate to keep roots damp and supplement arrangement circulated air through. The plants get supplements and water from the arrangement film that clings to the roots. The aeroponic culture is normally drilled in secured structures and is reasonable for low verdant vegetables like lettuce, spinach, and so on. The chief bit of leeway of this procedure is the most extreme usage of room. In this procedure twice the same number of plants might be obliged per

unit floor region as in different frameworks. Another potential utilization of this procedure is in the creation of plants liberated from soil particles from cuttings for sends out [10].

Figure 9: Aeroponic system.

The aeroponic framework is likely the most cutting edge sort of hydroponic planting. Like the NFT framework over the developing medium is principally air. The roots linger palpably and are moistened with supplement arrangement. Since the roots are presented to the air like the NFT framework, the roots will dry out quickly if the clouding cycles are intruded.

Conclusion

Hydroponics culture is quickly picking up energy and fame and quickest developing area of farming and agriculture. Also, hydroponics is famous and acknowledged in certain nations, particularly in business creation of vegetables and is rapidly getting on in different pieces of the world. In creating nations, this procedure couldn't get prevalence among plant specialists till the date. The primary bottleneck behind this is absence of its standard information and poor dispersal of its accessible advances. In this audit article is increasingly helpful to give strategies for hydroponic methods to plant specialists and make mass mindfulness in potential zones at national level.

Acknowledgement

The authors thanks to Core Projects for research activities at College and Research stations of Tamil Nadu Agricultural University - Phase III (Post Doctoral Fellowships), funded by Agriculture Department, Govt. of Tamil Nadu, 2018-20.

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