



HYDROPONICS SYSTEM AT GOVERNMENT DEGREE & PG COLLEGE (A) SIDDIPET DISTRICT OF TELANGANA STATE

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ABSTRACT

Hydroponics is a soilless method of growing plants, where nutrients are delivered to the plants' roots through a water-based solution. It's a controlled environment technique that can be used to grow a wide variety of crops, often with higher efficiency and faster growth compared to traditional soil-based farming. Hydroponic system it is a deep flow technique nutrient film technique it is tools in plant factories. For adequate management of water and nutrients in the hydroponic system, pH, dissolved oxygen, and temperature should be measured. Because ion concentrations in the nutrient solutions change with time, resulting in a nutrient imbalance in closed hydroponic systems, real-time measurements of all nutrients are required at all intervals of time.

Key words

Hydroponics, Soilless, environment, pH, Nutrient solution.

INTRODUCTION

Hydroponics is a plant production technology. Hydroponics is the practice of growing plants in a nutrient solution with or without a soilless substrate to provide physical support. The word hydroponics comes from the root words "hydro," meaning water, and "ponos," meaning labor, literally "working water." The concept of hydroponics existed thousands of years ago, with the earliest examples of Hanging Gardens of Babylon and the Floating Gardens of China. Many plants are suitable to cultivate with this system such as green leafy vegetables with low to medium nutrient requirements are well adopted to hydroponics system capsicum, tomatoes, lettuce, cabbage, spinach etc. However, modern hydroponic systems did not thrive until the advent of the greenhouse and plastics industries. Since then, scientists have developed many hydroponic systems for various crops based on locally available resources. Currently used commercial hydroponic systems are the improved versions of these early systems. The earliest published work on growing terrestrial plants without soil was the 1627 book *Sylva Sylvarum* or 'A Natural History' by Francis Bacon, printed a year after his death. As a result of his work, water culture became a popular research technique. In 1699, John Woodward published his water culture experiments with spearmint. He found that plants in less-pure water sources grew better than plants in distilled water. By 1842, a list of nine elements believed to be essential for plant growth had been compiled, and the discoveries of German botanists Julius von

Sachs and Wilhelm Knop, in the years 1859–1875, resulted in a development of the technique of soilless cultivation. To quote von Sachs directly: "In the year 1860, I published the results of experiments which demonstrated that land plants are capable of absorbing their nutritive matters out of watery solutions, without the aid of soil, and that it is possible in this way not only to maintain plants alive and growing for a long time, as had long been known, but also to bring about a vigorous increase of their organic substance, and even the production of seed capable of germination." Growth of terrestrial plants without soil in mineral nutrient solutions was later called "solution culture" in reference to "soil culture". It quickly became a standard research and teaching technique in the 19th and 20th centuries and is still widely used in plant nutrition science.

MATERIALS

PVC pipes, 1 inch CPVC Pipes, CPVC L-Bends, PVC Pipe cups, Glass, Pebbles, Plant saplings, cooler electric motor, electric wire, motor pipe, m-seal.

PROCEDURE

The present study started from March 2022 to June 3, 2022. we had prepared a skeleton with sticks to give a particular structure for pipes, We had taken measurement of about 1.5 meters 6 inch CPVC pipe, and closed with 6 inch caps and made a hole on various positions inlet is given on upward direction & outlet is given towards downward direction to maintain water flow level in pipes.to overcome from the leakage we have connected with 1 inch L-bends and coated the leakage area with M-Seal. All the pipes are arranged in the given manner *fig1.1* the plant saplings are placed as shown in the *fig1.2*

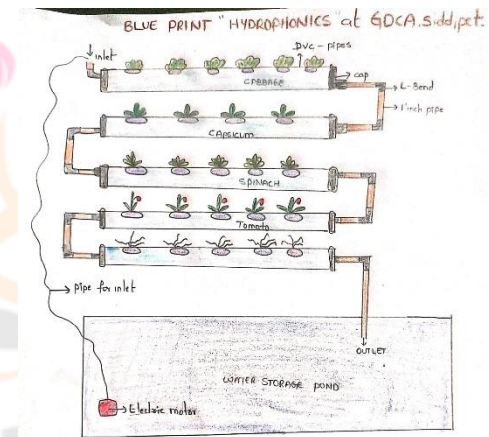


Fig 1.1

The system uses a pump to deliver nutrient rich solution to the plants

And recycle unused or excess water

solution back into the pond.

the nutrient rich solution reaches the CPVC pipes through the hole, when the pump is on . it meets net pots containing the sapling and growth medium, while the growth medium absorbs the nutrients it needs, the excess nutrient solution will

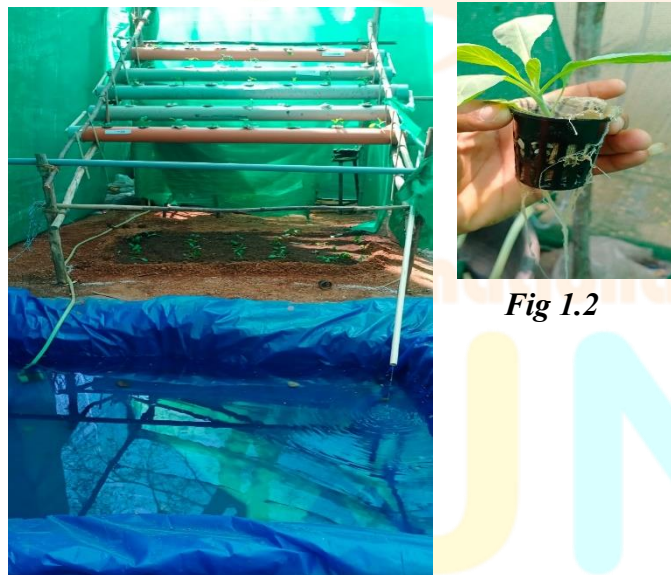


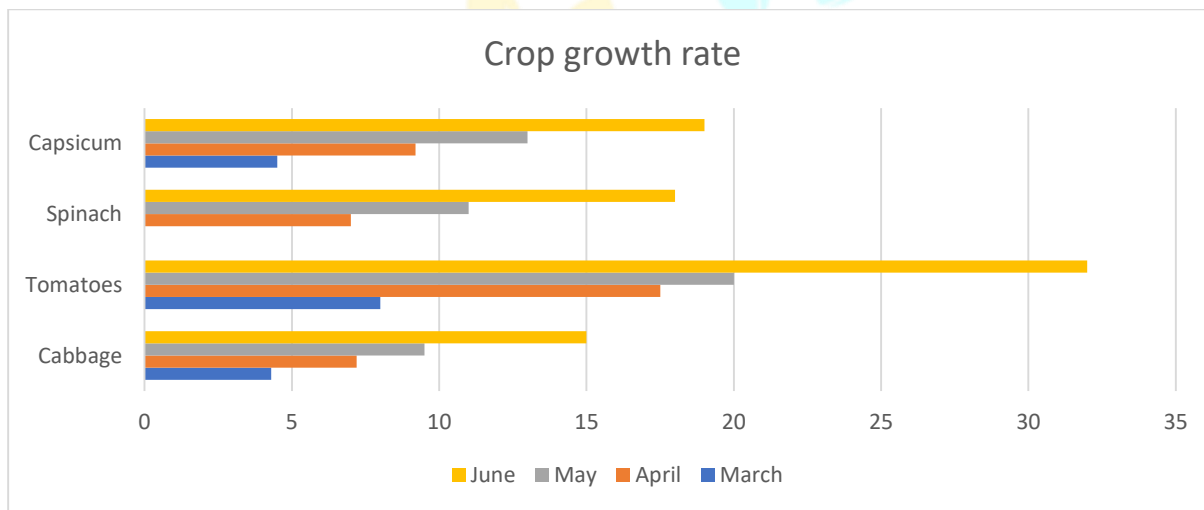
Fig 1.2

Fig 1.3 overall view of Hydroponics system flow the other CPVC system and go back into the pond therefore the plants are not entirely soaked. The upper section of the roots remains dry, so it has access to oxygen in the air this system doesn't use automatic timer so that water pumps runs constantly since the pump runs 24/7 it is advisable to connect your system to power backup.

Refill the pond when required, test the nutrient level and water level weekly.

RESULT AND DISCUSSION

- Hydroponics labelled an environmentally friendly food production system how ever, it is highly dependent on electricity and other non-renewable resources to support its need for constant oxygenation, water recirculation, filtration.
- Many hydroponics benefits make this an attractive farming method for the modern world. Such systems benefit the planet, offer ways to feed the growing population, and offer food supply protections against climate change. We'll describe ten of the most prominent benefits of hydroponics below.
- hydroponic growers report that their crops grow in half the time (or even less) of soil-grown versions of the same crops. This speed is most prominent in green leafy vegetables, but there are gains for nearly every variety of hydroponic plant.
- Space efficiency we can run the hydroponics unit in a limited space.
- Tomatoes shown high growth rate
- With this project we can grow crops organically with out chemicals.



During the observation tomatoes shown high growth rate than the other crops.

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