AEROPONICS: THE SOILLESS CULTURE

Ahamed Fayas.S[1] and B.Rakavi[2]

INTRODUCTION

Aeroponics is an alternative for people with limited spaces to grow plants. Aeroponics simply means, "growing in the air". In an aeroponic system, there is no medium since the plant's roots are suspended freely in an open root-zone environment. The growth chamber of an aeroponics system receives the ideal amounts of water, nutrients and air. The practice of growing plants in the absence of soil, in the presence of air or a mist, is known as aeroponics.

AEROPONICS FARMING METHOD

Roots are suspended in the air and irrigated with a nutrient-dense mist instead. This is in contrast to hydroponic systems, in which plant roots are submerged in a nutrient-rich solution on a regular basis(Fig.1). The plant you want to grow is suspended in an atmosphere that is typically fully or partially closed in an aeroponics system. In order to manage the amount of light, air and nutrient-rich water spray delivered to the plant, it is best to carry out this procedure in a closed, controlled environment.Since they receive more oxygen to carry out their food producing activity and are less vulnerable to pests and diseases, plants typically flourish in misty and airy environments. By spraying the plant's lower stem and dangling roots with a nutrient-rich water solution that helps them absorb the nutrients they need to generate nutrient-rich food to be consumed later, the necessary nutrients are delivered.

The plant's lower stem area is covered with biodegradable foams, which is then connected to or inserted into the aeroponics chamber apertures. The nutrient-rich liquid is dispersed in aeroponics chambers, where the time of the spraying is automated. For this system to work well, it is crucial to maintain a proper temperature and make sure that the necessary amount of nutrient-rich mist is available.

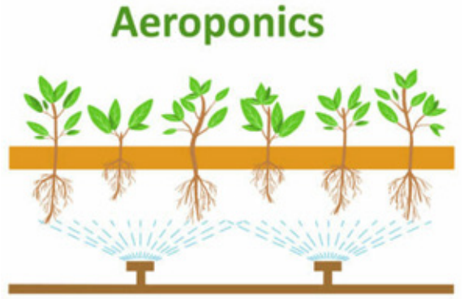

Fig.1 AEROPONICS SYSTM

COMPONENTS OF AEROPONICS

- ✓ A reservoir/container to hold the aeroponic nutrient solution
- ✓ Nutrient pump
- ✓ Mist nozzles
- ✓ Tubing to dispense water from the nutrient pump to the mister heads in the growing chamber
- ✓ Grow Baskets or pots to suspend plants
- ✓ Enclosed growing chamber for the root zone
- ✓ Watertight containers for the growing chamber where the plant's root systems will be hanged
- ✓ Timer (preferably a cycle timer) to turn on and off the nutrient pump

VITAL ROLE OF AEROPONICS

1. Round the year cultivation:
Since plants are grown in a controlled environment crops can be grown year-round without being dependent on the weather or atmosphere conditions outside.

2. Fast plant growth:
Plants grow fast because their roots have access to a lot of oxygen(Fig.2).

3. Easy system maintenance:
In aeroponics, all you need to maintain is the root chamber (the container housing the roots) which needs regular disinfecting, and periodically, the reservoir and irrigation channels.

4. Less need for nutrients and water:
Aeroponic plants need less nutrients and water on average, because the nutrient absorption rate is higher, and plants usually respond to aeroponic systems by growing even more roots.

5. Mobility:
Plants, even whole nurseries, can be moved around without too much effort, as all that is required is moving the plants from one collar to another.

6. Requires little space and high yield:
Aeroponic systems can be stacked up in layers to build vertical farms that take up much less space than traditional farming methods.

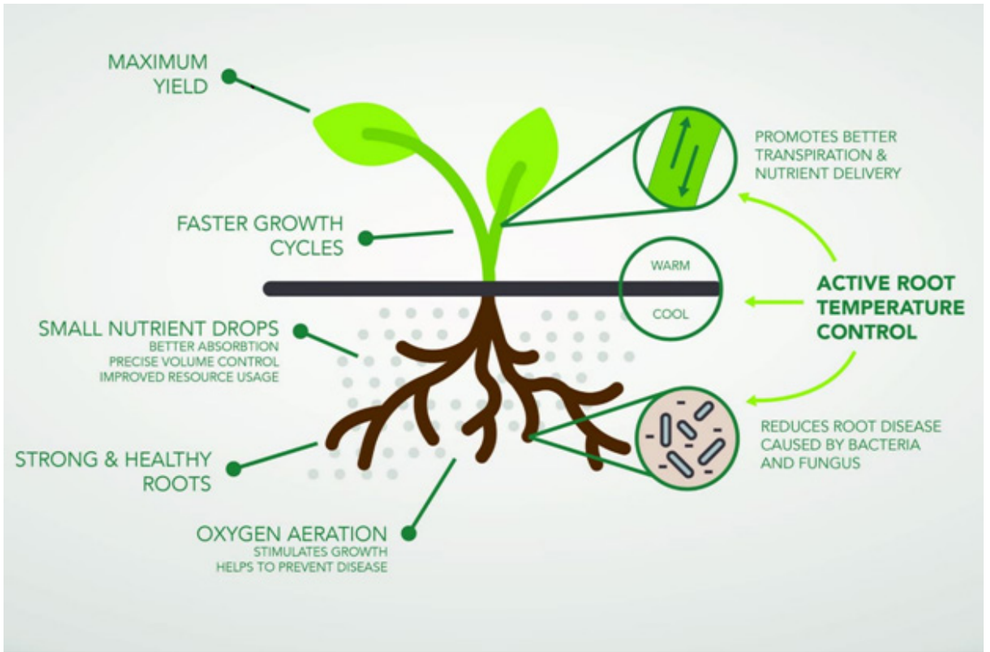

Fig.2 TEMPERATURE CONTROLLED AEROPONICS

7. Great educational value:
Plants and root growth study in laboratories is easier for students and researchers.

8. Proper root growth:
Plant roots have proper space to grow well. So they don't stretch or wilt.

9. No transplantation shock:
Plants can be shifted to any growing media system without any transplantation shock after root development.

10. Easier fruit harvest:
Fruits produced from the system are easier to harvest. Disease free produce: Due to clean and sterile growing conditions, plant diseases and infections reduce up to a great extent.

DISADVANTAGE OF AEROPONICS

- It is an expensive growing method to set up initially
- Aeroponics is highly susceptible to power outages
- You must have a certain level of technical knowledge
- Aeroponics require regular disinfection of the root chamber
- The equipment relies heavily on automatic systems
- Only high-pressure systems are suitable for long-term growth projects

CONCLUSION

Water plays an important role in the world economy. Fresh, clean, healthy, efficient and rapid food production can be obtained from aeroponic systems throughout the year. Soilless culture can overcome all the constraints that are present in soil culture production. Enhanced disease free yield leads India to be at top growers and exporters in near future. Aeroponic system has the potential to produce enhanced vegetative growth without use of any artificial hormones, pesticides or insecticide. For urban dwellers that live in apartments, sometimes aeroponics is the only practical way to garden. On arid lands, aeroponics circumvents all this problem, and provides the best means of growing plants effect.