

Hydroponics is not a Technology of the Future anymore



Often when discussing hydroponics we are greeted, not only by a lack of knowledge but, also, with incredulity, scepticism and occasionally downright disapproval, especially when we explain that this method of cultivation consists of growing plants directly in water and plastic, rather than in soil.

And yet our technology represents one of the most sensational developments in recent years. It is increasing rapidly in Australia, in Canada, in the US and in Holland, to mention the most important countries.

What is hydroponics?

Hydroponics is the art of growing plants in water. The word comes from the Greek "hydro = water" and "ponos = work". The concept was re-discovered in 1930, at the University of Berkeley in California by Dr. Gericke but in reality this growing method has existed since the earliest of times.

We all heard of the hanging gardens of Babylon, and of those people living at altitudes around mountain lakes like Titcaca in Peru and Inle in Myanmar, who cultivate their gardens on the water surface, over straw mats, water hyacinth beds or any other local substrata.

In hydroponics, as in these mountain lakes, plants live over water with their roots hanging in the dynamic flow of a nutrient solution.

Although plants such as rice, water lilies or carnivorous plants can adapt well in scarcely oxygenated, or even stagnant environments, most have difficulty in adapting to oxygen deficiencies.

Indeed, if a plant lacks oxygen in its root zone, it asphyxiates even though it is adequately watered: actually a recurrent cause of death for houseplants is due to over watering. This is often what happens in "hydroculture" (not to be confused with "hydroponics"), a growing method with wicker buckets standing in a "dormant" nutritive solution.

Thus, plants can grow in water, but not under all conditions. Water has to be "alive". One must be aware that, whatever the environment they are growing in, be it soil, air or water, plants absorb their food in the form of ions dissolved in oxygen. In water, when food and oxygen are absorbed, they must be replaced. This is the function of hydroponics: a soil-less cultivating method which stimulates plant growth while controlling the quantities of water, mineral salts and most important, dissolved oxygen.

The basic concept is quite simple. When roots are suspended in moving water, they absorb food and oxygen rapidly. If the oxygen content is insufficient, plant growth will be slow. But if the solution is saturated with oxygen, plant growth will accelerate. The grower's task is to balance the combination of water, nutrients, and oxygen, with the plant's needs, in order to maximise yield and quality.

For the best results, a few important parameters need to be taken into account; temperature, humidity and CO2 levels, light intensity, ventilation and the plant's genetic make-up. Essentially this is what any conscientious gardener would do.

What would we say are the advantages of this methodology?

Hydroponics can be used by a wide range of people; plant lovers in general, private or professional plant collectors, small and large greenhouse growers, horticultural societies, research centres, schools and many more.



Comparison of growth within a hydroponic system versus soil.
(These 2 plants were started from the same nursery stock and grown together)

The following list is a summary of its applications and advantages

- Optimal utilisation of the plant's genetic potential.
- Better control of the plant's nutrition
- A visible improvement in quantity and yields
- A significant shortening of the growth / production interval for a large variety of species.
- A more efficient use of space
- An excellent propagation success rate.
- Huge savings on fertilisers, and most important, of water, in a situation of ever increasing global scarcity.
- A total absence of herbicides. To replace pesticides and fungicides, hydroponic growers will often use IPM (Integrated Pest Management).
- The strength and vigour of plants started in hydroponics then transplanted in soil is such that it opens up enormous commercial perspectives, especially for potted plants.
- In the field of education, at all stages, hydroponics fills children and adults with wonder. Several countries already introduced it in their school or university programs.
- Last but not least, hydroponics was, and still is, used for research purposes. For the last 50 years this method has been applied in most important research centres because of its reliability, its precision and the broad spectrum of its applications. Thanks to hydroponics enormous leaps forward were made possible in the understanding of plants and especially their nutrition.

Like all things, hydroponics can have good or bad results depending on the people who apply it and their objectives.

- It can be used for mass production and to produce tomatoes with little taste or roses with no perfume. But it can grow products with the best nutritive qualities, bursting with flavour and aroma.
- It can be a pollutant when used with rockwool or in run-to-waste

conditions. But, it can be applied ecologically in respect to the environment, sustain a large portion of the planet's population with quality food, and allow third world countries to feed their own, even when the soil is poor and water scarce.

Another recurring question is, are hydroponic crops organic? The answer is no, they are not. The mere fact that this is a soil-less operation already prohibits an "organic" designation. As for the fertilisers, there is no complete organic fertiliser for hydroponics, to the best of my knowledge. But what is sure, is that there are fertilisers on the market with such a precisely crafted formulation, that they deposit no toxicity or heavy metals whatsoever in plants, when used according to instructions.

Today several variations of our technology are on the market: NFT, Drip Systems, Ebb & Flow, Aero-hydroponics. They are applied in industrialised countries like Australia and Canada, and are spreading to many south east-Asian countries, where an increasing acreage of hydroponic greenhouses are used to grow vegetables, fruits, potted plants, cut flowers, etc...

In some third world countries too, teams of volunteers are teaching people to build their own hydroponic systems from industrial scrap, and to produce fertilisers with domestic wastes.

Hydroponics has other applications, particularly in the field of outdoors and indoor gardening. In the US, for more than 25 years, manufacturers have developed small sized units for hobby gardeners, using the same technology as the greenhouse industry. Those systems are designed for a wide public and can be installed on a balcony or a patio, a sitting room or a kitchen. They vary from one-plant mini-modules, to real small kitchen gardens.



A "space station" based on the NASA model launches students into the world of hydroponics at Peterson Middle School in Sunnyvale (California) - Photo by Lawrence Brooke

It is true that these techniques are not relevant for everyone. A common error is to think that, if plants have sufficient water supplies, they can be left unattended longer. In fact, their accelerated metabolism requires greater attention. This methodology is not to save time on maintenance, rather it is conceived to maximise results. In this sense hydroponics is intended for plant lovers and collectors, beginners or professionals, rather than for the occasional gardener.

Of course the concept of hydroponics may appear inconceivable to some. Others will see it as another fad... Others will be curious, amused or interested... To you all, whatever your reaction, don't hesitate to [contact us](#) to give us your opinion or to request more information.