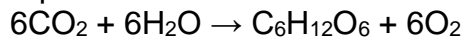


What is hydroponics?



Plants grow through a process called **photosynthesis**, in which they use sunlight and a chemical inside their leaves called chlorophyll to convert carbon dioxide (a gas in the air) and water into glucose (a type of sugar) and oxygen. Write that out chemically and you get this equation:



There's no mention of "soil" anywhere in there—and that's all the proof you need that plants can grow without it. What they *do* need is water and nutrients, both easily obtained from soil. But if they can get these things somewhere else—say, by standing with their roots in a nutrient-rich solution—they can do without soil altogether. That's the basic principle behind hydroponics. In theory, the word "hydroponics" means growing plants in water (from two Greek words meaning "water" and "toil"), but because you can grow plants without actually standing them in water, most people define the word to mean growing plants without using soil.

Why grow things hydroponically?



Although the benefits of hydroponics have sometimes been questioned, there seem to be many advantages in growing without soil. Some hydroponic growers have found they get yields many times greater when they switch from conventional methods. Because hydroponically grown plants dip their roots directly into nutrient-rich solutions, they get what they need much more easily than plants growing in soil, so they need much smaller root systems and can divert more energy into leaf and stem growth. With smaller roots, you can grow more plants in the same area and get more yield from the same amount of ground (which is particularly good news if you're growing in a limited area like a greenhouse or on a balcony or window-ledge inside). Hydroponic plants also grow faster. Many pests are carried in soil, so doing without it generally gives you a more hygienic growing system with fewer problems of disease. Since hydroponics is ideal for indoor growing, you can use it to grow plants all year round. Automated systems controlled by timers and computers make the whole thing a breeze.

It's not all good news; inevitably there are a few drawbacks. One is the cost of all the equipment you need—containers, pumps, lights, nutrients, and so on. Another drawback is the *ponic* part of hydroponics: there's a certain amount of toil involved. With conventional growing, you can sometimes be quite cavalier about how you treat plants and, if weather and other conditions are on your side, your plants will still thrive. But hydroponics is more scientific and the plants are much more under your control. You need to check them constantly to make sure they're growing in exactly the conditions they need (though automated systems, such as lighting timers, make things quite a bit easier). Another difference (arguably less of a drawback) is that, because hydroponic plants have much smaller root systems, they can't always support themselves very well. Heavy fruiting plants may need quite elaborate forms of support.

How does hydroponics work?



There are various different ways of growing things hydroponically. In one popular method, you stand your plants in a plastic trough and let a nutrient solution trickle past their roots (with the help of gravity and a pump). That's called the **nutrient-film technique**: the nutrient is like a kind of liquid conveyor belt—it's constantly sliding past the roots delivering to them the goodness they need. Alternatively, you can grow plants with their roots supported by a nutrient-enriched medium such as rockwool, sand, or vermiculite, which acts as a sterile substitute for soil. Another method is called **aeroponics** and it's typified by a popular product called the AeroGarden (see box below). Although the name suggests you're growing plants in air, the roots are actually suspended inside a container full of extremely humid air. Effectively, the roots grow in a nutrient-rich aerosol a bit like a cloud packed full of minerals.

In theory, you can grow any plant hydroponically but—as is always the case with gardening—some things inevitably do better than others. Fruit crops such as tomatoes and strawberries, and lettuces and herbs, are among plants that do particularly well.

Hydroponic Farming Dos

Make sure that your plants have the optimum amount of light during the day. And that shouldn't be 24x7! At the most, you can supply artificial light for up to 16 hours. For the remaining 8 hours, keep your plants in dark so that they can get over the exhaustion of continuous photosynthesis for 16 hours.

Use filters in the container so that the excessive oxygen is expelled out of the room and fresh carbon dioxide is pumped back in. Proper air circulation will let your plant become healthy. As the plants will be in the water throughout their lifetime, make sure that you regularly check the pH level. If you come across that the pH is more or less than the recommended value, add the chemicals accordingly to balance it out. Frequently inspect your Hydroponic Farming to check for the signs of bacterial invasions, nutrient burns or other threats. As soon as you come across one, take the preventative measures.

Hydroponic Farming Don'ts

Pests are a nightmare for plants. So, make sure that there is no pest infestation in the room where you have planted your greens.

Don't fully rely on the sun to provide the needed light and energy because if you have a denser garden, sunlight will not be able to reach deep into every leaf, flower and stem. Hence, instead of saving money by putting your hydroponics garden in the sunlight during the day time, use artificial lighting because that is purposed to reach every corner of your garden.

Don't let your house thermostat regulate the temperature in your grow room as well. In fact, bear in mind that the plants need a comparatively cooler temperature to flourish and grow well. If you will keep the grow room temperature same as the other parts of your house, you will be doing more harm than good to your plants.

Also, don't let your Hydroponic Farming garden grow wildly. Trim and prune it up regularly like you would do to an outside garden.

Don't wait for any issue to get worst before you take any action. In fact, as soon as you come across initial signs of some disease or problem, take the necessary measures to stop it there itself and prevent it from happening again.

Hydroponic Farming is a miracle for everyone. But make sure that you keep in mind the above dos and don'ts to get the maximum benefit of this type of gardening.