Hydroponic or organic?

The commercial cultivation of cannabis varies considerably depending on which medium is selected. The two predominant methodologies are hydroponic and organic. **Thomas Walker** explores the merits and disadvantages of each.

As most readers will know, hydroponic cultivation involves growing plants using an inert medium as a substrate. Nutrients are added to the irrigation water.

Many types of hydroponic systems are available. Some use a substrate, such as rock wool, coco, perlite, clay pebbles, or combinations thereof, to enable the roots to take hold. Others, such as deep-water culture and aeroponics, don't use substrates at all. In the former, the roots grow directly into a water-nutrient mixture; in the latter, the roots are left hanging and the plants are gently sprayed with a nutrient-rich mist.

With hydroponically grown cannabis, the nutrient regime can be fine-tuned to achieve a growth rate, yield and potency unattainable by soil-grown plants.

Electrical conductivity and pH value can also be precisely controlled to enable optimal nutrient uptake, contributing to vigorous growth.

Another advantage is that water usage drops drastically, as the plants are provided with only what they need. An efficient hydroponic fertigation system typically uses one-tenth as much water as does traditional open-field soil agriculture. Seepage is often a problem in a normal soil environment, and large volumes of water are not accessible to the plants' roots.

Hydroponic cannabis cultivation is by far the methodology most widely used for commercial operators, especially those growing the crop for the medicinal market, where traceability, compliance, yield, active pharmaceutical ingredients (APIs), and efficacy are of the utmost importance.

Other advantages of hydroponics are that the growth rate can be as much as twice that of organic cultivation, yield tends to be dramatically higher, APIs are increased, and the growth medium is inert, hence free of detrimental organisms, pests and weeds.

Inevitably, the system is not without its challenges. Capital expenditure is higher than with organic methods and there is a steep learning curve for those using the system for the first time.

ORGANIC CULTIVATION

While soil is readily available and usually has most of the required elements needed for growth, it is not necessarily the most efficient way to grow plants, and sustainability has been brought into question in recent years.

Soils, of course, can vary vastly, from inert desert sands, for example, to highly fertile, humus-rich soil. The first step, therefore, is to have a soil analysis carried out. Even though soil can be fertile, it might contain a balance of elements that can be detrimental to production.

Plants grown in soil rely on microscopic beneficial bacteria, fungi, nematodes, and protozoa for robust growth and health. Some micro-organisms break down organic matter, making minerals and other nutrients more easily available to the plant. Others provide protection from harmful bacteria and pathogens. It is therefore in the best interest of the organic grower to maximise the concentrations of beneficial organisms in the soil.

The organic make-up of soil is often insufficient, which is why many organic growers increase it through methods such as no-till farming. Unfortunately, the effects of this are noticeable only after three years or so, depending on initial soil quality.

On the positive side, cannabis grown in soil is reputed to have a superior taste (when smoked) and greater terpene expression.

Although terpene variance could possibly be proven in a laboratory, taste cannot, as it is a matter of opinion.

Hydroponically grown cannabis can achieve a higher growth rate, a better yield and greater potency

Other advantages of organic production are relatively low capital expenditure, moderate operational cost, and the consumer perception that organic goods are generally 'better'.

The disadvantages of this approach, in addition to slow implementation, are a significantly lower growth and yield than hydroponics, the difficulty of scaling up production, the need for more labour, the presence of pests, weeds and other unwanted organisms in the soil, and the fact that this production method is accepted only for the recreational market.

With its obvious advantages, the hydroponic cannabis production system is a clear winner.

Moreover, the higher upfront costs are balanced by consistency, increased yield, less labour and lower water usage over the longer term.

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