

## A more active soil life on coco substrate

**An active soil life contributes to resilient plants that are more resistant to all manner of diseases and pests. Studies in our innovation centre 'de Kas' have shown that the type of substrate can play a significant role in this regard: coco lends itself perfectly to the development and maintenance of an active soil life. Nutrition also appears to have a significant effect.**

### Why is an active soil life important?

The soil life in substrate plays an increasingly important role. This has to do, among other things, with the elimination of plant protection products and increasingly stringent laws and regulations on emissions to surface water. Moreover, demand for emission-free products is on the rise. The main motivation, however, is that an active soil life contributes to resilient, stress-resistant plants with better resistance to all kinds of diseases and pests.

### Research in 'de Kas'

In 2020, a first tomato crop trial was set up in 'de Kas' on coco substrate and stone wool slabs. All plants were given the organic nutrient solution from the bioreactor (OWS). This bioreactor converts, among other things, protein and amino acids into absorbable nutrients. The result is a nutrient solution that is free of organic residues, fungi and bacteria. This nutrient solution contains a wide variety of

micronutrients and organic components that promote several processes in the crop that would be lacking in traditional cultivation. This extensive cultivation research has shown that products grown with organic nutrients contain higher substance concentrations. The overall recipe can be managed by changing the input into the bioreactor.

During the trial, monthly samples were taken to assess the soil life in the substrate. For reference, samples were regularly taken from a commercial grower that cultivates tomatoes (of the same variety and with the same sowing date) on stone wool with mineral nutrition, to ensure a proper comparison. During the trial, there were three treatments: coco with organic nutrition, stone wool with organic nutrition and stone wool with mineral nutrition.

### Results

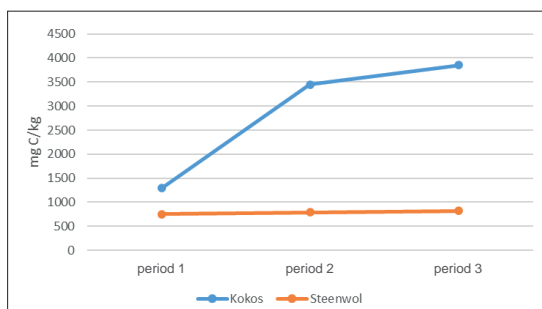
The trials carried out in 'de Kas' and the comparison we were able to

make with the practical situation show, among other things, that an active soil life is already present in coco, which continues to develop during cultivation. In contrast, stone wool lacks soil life in the initial phase and it develops less strongly during the cultivation season. The variety of fungi and bacteria was many times greater on coco than on stone wool, as was the content of actinomycetes. This outcome is important since actinomycetes can help ward off disease thanks to their ability to secrete antibiotics.

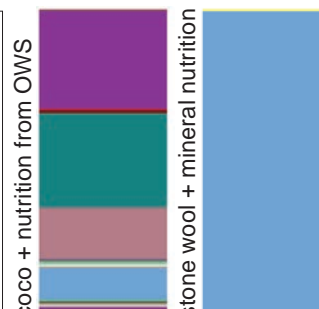
The research results showed not only that coco has better biodiversity than stone wool, but also that nutrition affects soil life. On coco, a much more diverse soil life can be achieved with both mineral and organic nutrition. However, with organic nutrition, things tend to move a little faster. Overall, it is safe to say that during the trials, organic nutrition produced more microbial mass than mineral nutrition.

### Conclusions

The trials clearly showed that coco is very suitable for achieving an active soil life and thus contributes to a resilient crop. In addition, soil life develops faster under the influence of the organic nutrients from the bioreactor. A follow-up trial is currently being carried out in 'de Kas'. Contact [rd@vanderknaap.info](mailto:rd@vanderknaap.info) for more information.



Total microbial biomass in coco and stone wool



Diversity in soil life

## 'Grown with WaterWick'

# Potted anthuriums in peat-reduced substrate

In recent years, the need for peat-reduced substrates and more sustainable cultivation methods has increased. This also applies to cultivation of potted anthuriums. In collaboration with Karma Plants and Visser Horti Systems, Van der Knaap Groep's R&D team did two consecutive trials in their innovation centre 'de Kas' to test a variety of peat-free and peat-reduced substrates in combination with the sustainable 'Grown with WaterWick' cultivation system.

### Peat-free and peat-reduced

Van der Knaap already regularly uses materials other than peat in potting soil mixtures. For these trials, mixtures of different degrees of coarseness, such as coir dust and coco fibre, were prepared in order to create a substrate skeleton in which the air-to-water ratio meets the optimum moisture conditions for the plant. In addition, other raw materials were used, such as Fibrecompost: a raw material made of compost and wood fibre. For both trials, some of the plants were also grown on Fibre-Neth® substrate, a 100% coco substrate with unique properties. A regularly used substrate containing 60% peat was used by way of reference.

It has been proven that excellent cultivation results can be achieved on coco substrates. This raw material is characterised by good air/water distribution; it has a naturally high air content and easily absorbs water. What's more, coco is very suitable for encouraging active soil life, which in turn leads to strong, resilient crops.

### 'Grown with WaterWick'

In addition to research into alternative substrates, the effects of the 'Grown with WaterWick'

cultivation system on drying of the substrate were also examined. This is a sustainable cultivation method whereby the wick absorbs water. The water can be absorbed from a water reservoir, supplying each plant with the right amount of water. It can also easily be used in existing cultivation systems, such as tables and floors with an ebb-and-flow irrigation system.

We tested several variations: with and without wick, with and without a pot and an ebb-and-flow table versus a mesh table. The variations with wick and pot have individual water reservoirs at their disposal, allowing the plant to absorb only the water it needs. The variations without pot showed that the wick accelerates drying of the substrate.

### Conclusions

All tested peat-free and peat-reduced substrates are suitable for growing potted anthuriums of equivalent quality. In practice, the plant quality obtained with the tested substrates was not inferior to the quality of the reference substrate. The Fibre-Neth® substrate yielded a lower saturated weight during cultivation and was therefore not as wet as the other substrates. This eventually resulted in better roots



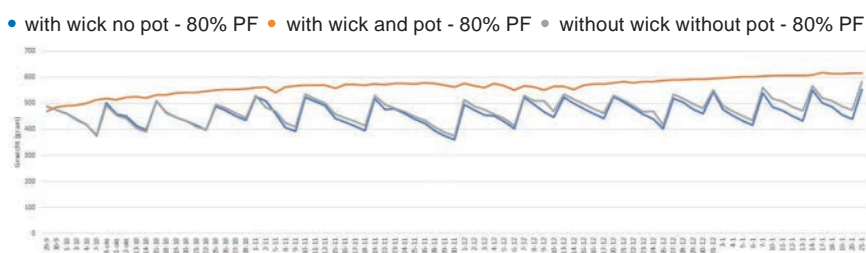
'Grown with WaterWick' teeltsysteem

(clear white) as a result of better oxygen exchange with the environment.

If the WaterWick is used and the reservoir of the pot is filled, a constant moistness can be achieved by capillary action with the right mix of substrates. This system can also be used to extend shelf-life at the retailer and consumer. The 80% peat-free mixture yields the best plant and root development in this situation.

### More information?

The 'Grown with WaterWick' system is also suitable for the cultivation of other houseplants and crops. For more information, please visit [www.waterwick.eu](http://www.waterwick.eu) For more information on peat-free or peat-reduced substrate trials, please contact the R&D department at: [rd@vanderknaap.info](mailto:rd@vanderknaap.info)



Drying of the pots in the 80% peat free mixture

# Research into circular raw materials

**“Substrates are an indispensable foundation for the production of food and plants that make our lives greener, healthier and more pleasant.” According to the policy agenda of the Association of Potting Soil and Substrate Manufacturers in the Netherlands (VPN), worldwide demand for raw materials for substrate production is set to increase significantly in the future. However, public debate is putting the availability of peat under pressure. As a result, research into new, safe, renewable and circular raw materials is crucial.**

### Peat in substrates

For years, peat has been the main raw material in organic substrates. Peat retains water well and buffers nutrients: two positive properties for cultivation. What's more, peat is clean from a phytosanitary point of view. In recent years, attention for the sustainability aspects of peat extraction has been on the rise, particularly when it comes to conservation of natural areas and the climate issue. Nevertheless, much less peat is extracted for substrates worldwide than is generally assumed: only 0.05% of the world's current peatlands. In substrates, peat is given a high-quality application since it contributes to food production and growing plants and trees. (source: VPN)

### Responsibly Produced Peat

In 2011, the substrate sector developed several requirements for responsible peat extraction. The ambition is for all peat extraction to eventually be done under the Responsibly Produced Peat certificate. This peat meets several guidelines. Peatlands that are entirely intact are not used for peat extraction. In addition, the production locations are chosen based on strict selection criteria, the locations are treated with care and there is always a recovery plan after use.

### Renewable raw materials

The VPN has defined several ambitions for the sector regarding the use of renewable raw materials in substrate. One of these objectives is that by 2025, 35% of the organic substrate for the professional market

should consist of renewable raw materials. At Van der Knaap, we strongly believe that the use of this type of raw materials in substrates is becoming increasingly important. The share of coco in our substrates has been growing steadily for years. This renewable raw material has several unique cultivation properties. At present, approximately 45% of our substrates are already made up of renewable raw materials. We expect this share to grow even more in the future.

### Trials with circular raw materials

In order to meet the increasing demand for substrates, we are regularly trialling circular raw materials in our innovation centre 'de Kas'. Circular raw materials consist of materials that are being reused. In order to assess whether a new raw material has potential, we conduct extensive research. We start by conducting several growth trials: standardised trials that the RHP also uses to test raw materials.

We use peat as a reference material in these trials. We mix varying percentages of the circular raw material and sow a crop on it that will clearly indicate whether the growing soil is satisfactory. In addition, the raw materials are subjected to physical and chemical analyses; for example, to check that they do not contain any harmful substances. Once a raw material has passed these trials and analyses, we set up a greenhouse test with a crop to observe how the substrate performs during cultivation. We have already reached this phase for several raw materials. These trials have been set up in 'de Kas' and the results for some raw materials certainly look promising!

### More information?

For more information about our research on circular raw materials, please don't hesitate to contact us via [rd@vanderknaap.info](mailto:rd@vanderknaap.info)



*Trials with different circular raw materials in 'de Kas'*



## Sodium remover

# Natrex®: the next step in emission-free cultivation

**After years of development, Van der Knaap Group is launching its sodium remover. 'Natrex®' selectively extracts the sodium that is present in the drain water, allowing for the drain water to continue to be recycled without losing the crop protection products and other useful nutritional elements. The first system has now been installed at a grower in Canada for an area of more than 12 hectares.**

### Residual water flows

Since 2018, purification of residual flows is mandatory in The Netherlands. At least 95% of the crop protective products must be removed from the discharge of wastewater. This was only one of the first steps towards emission-free cultivation. From 2027, the sector must comply with the 'zero discharge' goal. The rising sodium levels are the main reason for discharge.

### Reusing drain water

Drainage water can usually be reused as irrigation water. Reusing more drain water thus avoids the need to discharge. However, sodium accumulation in particular can be a reason why drain water can no longer be reused. In the coming years, drain water that can no longer be reused may be discharged to a lesser extent.

Sodium (Na) is an element that is absorbed to a limited extent by most crops. As a result, the sodium concentration in the substrate and the drain water will rise to the point where recirculation is no longer recommended. Van der Knaap's sodium remover 'Natrex®' selectively extracts the sodium that is present in the drain water, allowing for the drain water to continue to be recycled. The crop protection products and other useful nutritional elements do remain in the system.

### How it works

The system is based on the separation of sodium from the valuable nutrients. This is achieved through a succession of techniques where different elements can be filtered and separated from each other. An acidic solution of sodium

and chloride remains as waste stream. This is collected by Van der Knaap and then used in other industries to neutralise alkaline water flows. This process is completely circular; nothing goes to waste. The system is adapted to the situation of the grower, whereby the sodium peak remains below the damage threshold. This will differ per crop and can be determined in consultation with the grower.

### Effect of sodium on cultivation

Some crops are more sensitive to sodium than others. Van der Knaap has been researching the effects of sodium on various crops for several years now. In 2021, research was carried out in collaboration with Wageningen University & Research into the negative effects of sodium on the production and quality of a sweet pepper crop. Cultivation was monitored for a year, during which half of the plants in the trials were given a high sodium content. The other half of the plants did not receive sodium at all. This trial showed that it is beneficial to keep the sodium content low.



*Natrex®-system*

### Benefits of Natrex®

With Natrex® the grower can comply with regulations and also save on fertilisers, because other useful elements remain available in the system. In addition, research shows that the sodium content can also influence the growth and quality of the crop and the harvested product. Please contact Karel de Bruijn at [rd@vanderknaap.info](mailto:rd@vanderknaap.info) for more information.



*Trials in innovation centre 'de Kas'*