

Higher value is here

Trial demonstrates the potential of Grodan's stone wool for strawberry propagation and cultivation



Introduction

A recent trial by Grodan has demonstrated that strawberries can be propagated and cultivated on a stone wool substrate while maintaining high quality and attractive fruit size. Additionally, the yields and Brix values were higher than with traditional methods. "Our trial has shown that we have enough knowledge to grow good strawberry plants on stone wool. Everything is ready for upscaling," says Johanna Bac-Molenaar from WUR.

"Stone wool gives you optimum control over your crop. You can steer it precisely to achieve higher yields and better product quality"

Growers of many crops worldwide are under mounting pressure from several sides. Against the backdrop of rising consumer demand for fresh and healthy food, retailers expect a reliable year-round supply of consistently high-quality products. At the same time, there are tighter sustainability-related requirements, combined with sharp cost increases due to inflation. "Another factor affecting the strawberry industry in many regions is the restriction of the use of pesticides to avoid pollution of surface water. As a result, on a global level, we have seen a significant increase in the number of strawberry crops produced in greenhouses over the past decade. And this shift from outdoor to indoor growing is likely to accelerate in the coming years," says Thomas Peters, Business Development Manager New Crops at Grodan.

"Growers are constantly looking for ways to optimize their crop strategy, maximize their yields and minimize their costs, and our stone wool substrates support those goals in several ways," states his colleague Federico Puksic, Cultivation Specialist at Grodan. "Stone wool gives you optimum control over your crop. You can steer it precisely to achieve higher yields and better product quality,

including higher Brix levels and a longer shelf life. Our GroSens sensors support a targeted irrigation strategy, enabling growers to reduce their use of water, energy, fertilizers and pesticides. This is great news in view of ever-tighter environmental regulations, not to mention costs. Moreover, because stone wool is an inert substrate, you effectively start from zero inputs every time. This means that the same crop strategy always produces the same repeatable, uniform results."

The Grodan team realized that many strawberry professionals are not tapping into these benefits, largely because coco peat is currently seen as the standard substrate in soilless systems for strawberries. "There is actually very little information available about the propagation and cultivation of strawberry crops on stone wool," continues Puksic. "Needless to say, we're keen to fill that knowledge gap. We're working to develop guidelines for stone wool-based strawberry cultivation, just as we've done for other crops such as tomatoes and cucumbers. Therefore, we decided to conduct an R&D trial of our own in the summer of 2022 to gain some hands-on experience of how our products can be used for strawberry crops."



Thomas Peters
Business Development Manager
New Crops at Grodan



Federico Puksic
Cultivation Specialist at Grodan



Johanna Bac-Molenaar
Researcher at WUR



Strawberry propagation trial with WUR

“For us, the key aim of this trial was to push the boundaries and do things differently. In order to explore the possibilities in propagation, we decided to work with Wageningen University & Research (WUR). They have all the right facilities, equipment, people and expertise, both with strawberries and with stone wool,” states Peters, who also fulfilled the role of Project Lead for the strawberry trial.

The trial was divided into two parts. Firstly, cuttings of everbearer strawberry varieties – which are popular because they can be grown for many months of the year – were propagated in stone wool blocks at WUR’s expertise centre for horticulture in Bleiswijk, the Netherlands. The plants were then transferred to one of Grodan’s partners for outgrowing in the second part of the trial.



Six different treatments produced promising results

The trial revolved around two main research questions, according to Puksic: “It’s widely known that strawberries are sodium-sensitive crops, so they are traditionally cultivated with low levels of EC. But what happens if you increase the EC in the irrigation water when growing on stone wool? And secondly, is it possible to improve steering by changing the irrigation strategy?”

To find out, we set up a propagation experiment together with WUR in a compartment with 24 experimental tables. They were divided equally into six different treatments: three different concentrations of the same nutrient solution, each with two different irrigation strategies. “It’s difficult to test the effect of increasing the EC in traditional open-field systems because the run-off enters the soil and can’t be analysed. But because each of our tables had a closed-loop system, we could closely monitor the uptake of the nutrients given. To avoid waste, any unused nutrients were recaptured for reuse in the starting solution,” explains Johanna Bac-Molenaar, the researcher from WUR who led the trial. “With the two irrigation strategies, we investigated whether waiting longer between waterings and therefore reducing the water content in the block to allow more room for oxygen could be used as a way of actively steering plant growth.”

During the propagation trial, everything was closely monitored using Grodan’s GroSens system. “GroSens sensors constantly measured three parameters in the substrate – the water content, the EC level and temperature of the substrate – and we had two setpoints for irrigation,” says Puksic. He was responsible for the quality and execution of the trial, including the sensor set-up and data collection. “This enabled the researchers to objectively assess when the substrate had reached a certain water content level as the basis for deciding when it was the right moment to irrigate.”



Accurate sensor readings

“We double-checked the sensor readings by weighing the blocks to determine the water content, and our findings corresponded with what the sensors were telling us,” continues Bac-Molenaar. “This proves that GroSens is accurate and therefore offers a labour-saving alternative to weighing the blocks manually. Moreover, GroSens allows you to analyse the crop performance, learn what works and adapt your strategy accordingly.” Puksic agrees, adding: “Thanks to the sensor system and e-Gro platform, I could follow the irrigation and nutrient counts remotely in real time, so I could be involved in the research without needing to be at the trial location every day.”

The GroSens system enables 24/7 real-time insight into the WC, EC and temperature of the stone wool substrate. This provides valuable, timely information and guidance for optimising the irrigation strategy, allowing our customers and other growers to improve the yield and quality of their crops.



Benefits of integrated pest management

Another advantage of stone wool is that the blocks can be irrigated from the bottom via an ebb flood system rather than from the top. "This keeps the irrigation more uniform and avoids variation occurring between how much water each plant receives, including as run-off from the leaves of its neighbours if they are planted too close together. Plus the crown can become susceptible to fungus and disease if it stays wet," explains Bac-Molenaar. "Moreover, watering from the bottom helps to keep the top of the block dry, reducing the need for pesticides. Besides that, watering from the top causes around 30% of natural beneficial insects to die. Watering from the bottom means that you can introduce predators into the greenhouse sooner and maximize the effectiveness of your Integrated Pest Management (IPM)."

After six weeks of propagation, it was time to examine the initial results. "At that point, the trusses were already formed inside the plant but were not yet visible on the outside. Therefore, we cut the plants open to see how the different EC levels and irrigation strategies had affected the internal situation," recalls Bac-Molenaar. "We were actually a little surprised to see that there were hardly any differences between all the different batches of plants, apart from a slight variation in compactness. Overall, we can conclude that strawberries can cope with much higher EC levels than people realize."



Higher yield during outgrow trials

For the second stage of the trial, the plants were transferred from WUR to a commercial trial facility for ten weeks of outgrow trials. "By the end of the ten weeks, it was clear that the young plants which had received the highest EC at WUR produced a significantly higher yield of slightly bigger-sized fruits compared with those that received the lowest EC," says Peters. "Moreover, as expected from a higher EC, their Brix value was higher, which means that their shelf life is likely to be better too."

Commenting on these positive findings from the outgrow phase, Bac-Molenaar says: "These are remarkable results. It is very interesting to see that the young plants we produced at higher EC levels went on to perform well in production too. This underlines the importance of getting a young plant off to a strong, healthy start in order to have a resilient crop. Clearly, stone wool can play a key role in this."



New opportunities for propagators and growers

According to Peters, this opens up interesting opportunities for various types of propagators and growers.

“Particularly for those propagators who have switched from outdoor growing to indoor growing, this shows that stone wool offers an effective and actually more efficient alternative traditional tray-based techniques. For propagators who currently still have an outdoor operation but are thinking of investing in a greenhouse, it’s reassuring to know that the benefits of raising strawberries on stone wool can soon outweigh the costs. The market will continue to evolve and it’s inevitable that demand for indoor-propagated strawberries will rise.

Hopefully, they will consider the findings from our trial when thinking about future-proofing their company in preparation for this transition,” he says.

“As for growers, our trial results will hopefully encourage them to try stone wool instead of cocopeat. It could even inspire growers with an existing high-tech operation to think about diversifying into strawberries as part of a multi-crop approach. Stone wool is an easily scalable solution, and strawberries – as a popular and high-value fruit – are a great way of utilizing extra greenhouse capacity and spreading the workload more evenly throughout the year.”

Support from Grodan during the transformation

Bac-Molenaar puts the findings from the trial in a broader perspective: “Interestingly, we thought we were pushing the plants to extremes, but we obviously weren’t, because all the batches still looked good after the propagation phase, with nice leaves and good roots. Nothing we tried had a negative impact, and even the different irrigation strategies didn’t result in undernourished plants,” she observes. “Therefore, we can conclude that the boundaries of what is possible in strawberries have not yet been reached. What this trial has shown without a doubt is that stone wool can be used successfully to propagate strawberries, so there’s no need to wait for more research about that – it’s already a reality.”

This view is echoed by Peters. “Stone wool is actually already being used commercially for a number of strawberry crops around the world. Now, we know that

we can push the EC a little further without the risk of overstepping the boundaries. As an extra bonus, working with higher EC values offers greater opportunities for recycling the drain water. In fact, we’ve already implemented this knowledge in a commercial batch of 400,000 young plants, and they are looking really good,” he comments. “In terms of the next steps, we have some year-long commercial trials in the pipeline. Above all, we’re excited about building on these initial conclusions to further improve our knowledge and advice so that we can help customers get the very best out of our products for strawberry crops. In my view, there’s no doubt that global strawberry cultivation is at a turning point. At Grodan, we’re looking forward to supporting propagators and growers around the world during this transformation,” concludes Peters.

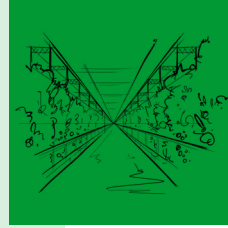
Growing a better future

Grodan is the global leader in supplying innovative, sustainable stone wool growing media solutions for the professional horticulture industry, based on Precision Growing principles. These solutions are applied to the cultivation of vegetables and flowers, such as tomatoes, cucumbers, sweet peppers, egg plants, roses and gerberas.

Research shows that high-tech greenhouses have the biggest positive impact on the UN Sustainable Development Goals compared to all other growing systems and score highest within water and nutrient efficiency. The use of stone wool Precision Growing media in a greenhouse can produce higher yields with significantly less resources than other cultivation methods. The key is precision. The essence of Precision Growing is use of less soil, less water, less fertiliser, lower CO₂ emissions, and gaining a higher yield. Combined with stone wool growing media, Grodan enables Precision Growing by offering a MultiSensor system, a software platform and personal advice to help maximise crop potential with data-driven cultivation.

Grodan's innovative growing media solutions facilitate the sustainable production of healthy, safe, and fresh food produce. Furthermore, it creates the possibility to use biocontrol and reduce, or even eliminate, the use and risk of chemical plant protection products.

Sustainability plays a prominent role within Grodan, from the manufacture of stone wool substrates to end-of-life solutions. Grodan was founded in 1969 and is active in more than seventy countries worldwide. The head office is located in Roermond, the Netherlands.



“Air is essential for good root growth and as there is sufficient air in the stone wool products the roots are encouraged to enter the water.”

Erkki Nylund, Viherkaste OY

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