The future of medicinal crop cultivation

F1 hybrid seeds in combination with stone wool growing media are set to transform the medicinal crop industry

Grodan®

Part of the ROCKWOOL Group

Introduction

In a recent joint trial, Grodan and F1 SeedTech have demonstrated that it is possible to increase the gross margin in medicinal crop cultivation by at least 15%. This will come as welcome news to growers, who are urgently looking for ways to improve their efficiency, whether because of price pressure caused by an increasingly saturated market or due to the rising costs of energy and other inputs.

It is no secret that growers of medicinal crops are under increasing pressure to boost their efficiency and reduce their costs. Producers in many regions are affected by the rising price of energy and other inputs. On top of that, the recent flood of new entrants into the North American market is making it difficult for growers there to remain profitable. To help producers find new ways of saving costs, stone wool substrate supplier Grodan and seed breeder F1 SeedTech recently conducted a trial in conjunction with Wageningen University and Research (WUR) in the Netherlands.

"The large majority of our potential customers are already using Grodan products, so we were very keen to test our products in combination with Grodan's growing media to prove the viability of F1 hybrid seeds," says Maikel de Bresser, Operational Manager at F1 SeedTech. "Moreover, Grodan has an excellent reputation in the medicinal crops industry, so this was a great opportunity for us to leverage the company's position as a thought leader." F1 SeedTech was founded in the Netherlands in 2019 but can actually draw on more than five years of breeding work thanks to acquiring an Oregon-based company that has been active since 2016.

De Bresser himself has a background in the vegetable breeding industry, in particular for tomatoes. "Due to the legislative situation in many countries, there has been little research conducted into the breeding of medicinal crops. We are keen to help this industry catch up by applying the same kinds of skills and technologies that are already widely used in the high-tech greenhouse sector for other crops. For example, over the past several decades, average tomato yields have increased from around 20 kg/m^2 to up to 70 kg/m^2 today. By pooling our knowledge and resources with partners like Grodan, we hope to help the medicinal crop industry to transform globally in a similar way," he explains.

Frank Janssen
R&D Project Management in Grodan's Applications & Development

Maikel de Bresser
Operational Manager at F1 SeedTech

Moving the industry forwards

"We get quite a lot of requests to work on joint projects but we only agree to projects that we believe will really help to shake up the industry, and we felt that F1 SeedTech has the potential to do that," comments Frank Janssen, R&D Project Management in Grodan's Applications & Development department. "We soon realised that our products have several things in common – such as uniformity, reliability and predictability – and that both our companies share a similar vision of moving the industry forwards towards enhanced quality, higher yields and further professionalisation."

"We regularly conduct confidential research for Grodan purposes at WUR. It has a high-tech indoor facility equipped with all the necessary technology including climate control and LED lighting so that we can steer the plants very precisely. WUR is also licensed to cultivate medicinal crops and has the right skills and experience to run trials like these," he continues.
F1 SeedTech provided the seeds for the trial, and Grodan provided the growing media, the sensors and the e-Gro software to constantly monitor and analyse the performance from seeding to harvest. "The trial ran for a total of 11 weeks," adds Janssen. "For the first two weeks the seeds were propagated in a Grodan plug, and they were subsequently transferred to a larger substrate for the cultivation trial, which lasted for nine weeks. Extrapolated to 5.5 crop cycles per year, our calculations showed that the total production achieved with F1 hybrid seeds can add up to 6 kg/m^2 (1.23 lbs per sq ft) of dried flowers annually. Besides that, the flowers grown from F1 hybrid seeds had higher THC levels of 29% and showed more consistency between production batches."

15% more profitable

Further analysis of the trial results revealed that F1 hybrid seeds are not only more effective than standard seed varieties for medicinal crops, but are also 15% more profitable than the industry's traditional approach of producing flowers from cuttings from mother plants.
"There are several reasons for this," explains De Bresser. "Firstly, growing medicinal crops from seeds means you can create more growing space since you no longer need a room for mother plants. You can use that extra space for cultivation too and therefore boost your productivity without expanding your facility.

This also has an impact from a labour-saving perspective, because you don't need to manage the mother plants and select cuttings, plus you reduce the risk of human errors in the selection process."

1. Stronger rooting and uniform results

Secondly, F1 hybrid seeds take root more easily and dependably than cuttings, he continues: "This stronger rooting process provides a better foundation for healthy plants, resulting in fewer losses for growers. Still on the topic of losses, cuttings become increasingly susceptible to pests and diseases as the mother plants become weaker over time, which can expose whole cultivation rooms to a higher risk of infection.

Our seeds, on the other hand, are guaranteed to be disease-free and in some cases they are bred to include resistances or tolerances, especially to powdery mildew and botrytis."

Last but not least, as long as growers always stick to the same cultivation strategy, seeds will always deliver identical, uniform results. "Our F1 hybrid seed varieties are bred from selected parental lines to enhance the output traits. This means that they will always germinate in the same way and produce the same yield and other outputs such as percentage of active compounds, month after month and year after year. In contrast, cuttings gradually produce lower yields and lower levels of active ingredients as the mother plant ages," states De Bresser.

2. Repeatable quality and yield

Needless to say, it is only possible to achieve maximum results in terms of yield and active compounds based on optimal crop steering, and this is where Grodan's growing media come in. "All of our stone wool plugs and blocks are manufactured at elevated temperatures to precise specifications. This results in a clean and inert substrate which provides the optimal basis for stable and repeatable results, because you know that all the plants will react in the same way to any change you make to the growing conditions – whether climate, irrigation or EC.

You don't have to compensate for unequalness," says Janssen. "That's why stone wool is already widely used in high-tech growing, including for medicinal crops. Now that it's possible for growers and propagators to combine our stone wool growing media with equally dependable starting materials – F1 hybrid seeds – they can gain optimal control over their crop and take their production performance to the next level. There's no longer any need to compromise on quality."

3. Planning and logistics

Repeatable quality and yield will become even more important as growers scale up to serve the highly demanding pharmaceutical market, where customers require consistent results time after time. Another important factor in this professionalization process will be a sustainable and reliable supply chain. "Cuttings from mother plants are not always ready when you need them. This can delay your planting dates and cause havoc with your planning and subsequent delivery agreements. In contrast, under the right conditions, seeds can be stored on site for long periods, ready for sowing whenever you need them," adds De Bresser. "Besides that, from a logistics perspective, it's much easier and cheaper to ship 50,000 seeds – amounting to around 1 kg – around the world than it is to ship 50,000 cuttings or other starting materials. This opens up interesting opportunities for further internationalization," he continues.

4. Automation potential

While the 15% improvement in gross margin demonstrated by the trial is impressive, the potential savings are actually even higher, according to Janssen: "Our stone wool solutions are ideally suited for automatic seeding, initial wetting, germination and transplanting and it's common practice to automate many of these activities in vegetable cultivation. These processes are mostly still performed manually in the medicinal crop industry, but there's no reason why they can't be automated too by switching to seeds as starting materials." Additionally, the use of Grodan sensors and e-Gro can generate significant gains in terms of both efficiency and sustainability by minimizing the use of inputs such as energy, water and fertilizer without compromising on production results. Meanwhile, F1 hybrid seed varieties with in-built resistances contribute to sustainability by reducing the need for chemicals to prevent pests and diseases.

Supporting the transition

Both companies are excited about the outcome of this initial trial and now plan to conduct further research to confirm the findings and explore the possibilities in more detail. "Besides setting up new trials with other types of F1 hybrid seeds, we are approaching existing and new customers together with F1 SeedTech to test the results at growers' own facilities," states Janssen. "We expect this to enable us to further improve on the existing results and build our knowledge so that we can optimally advise and support growers of medicinal crops in the transition from mother plants, cuttings and clones,to F1 hybrid seeds, plugs and blocks."

"There will probably always be room for some niche or boutique growers, but I can envisage a not-too-distant future in which the bulk of the medicinal crop industry has a classical value chain based around companies with a particular area of specialism – breeders, propagators, growers, processors – as is already the case in the vegetable industry, rather than being vertically integrated as it is today," says De Bresser.

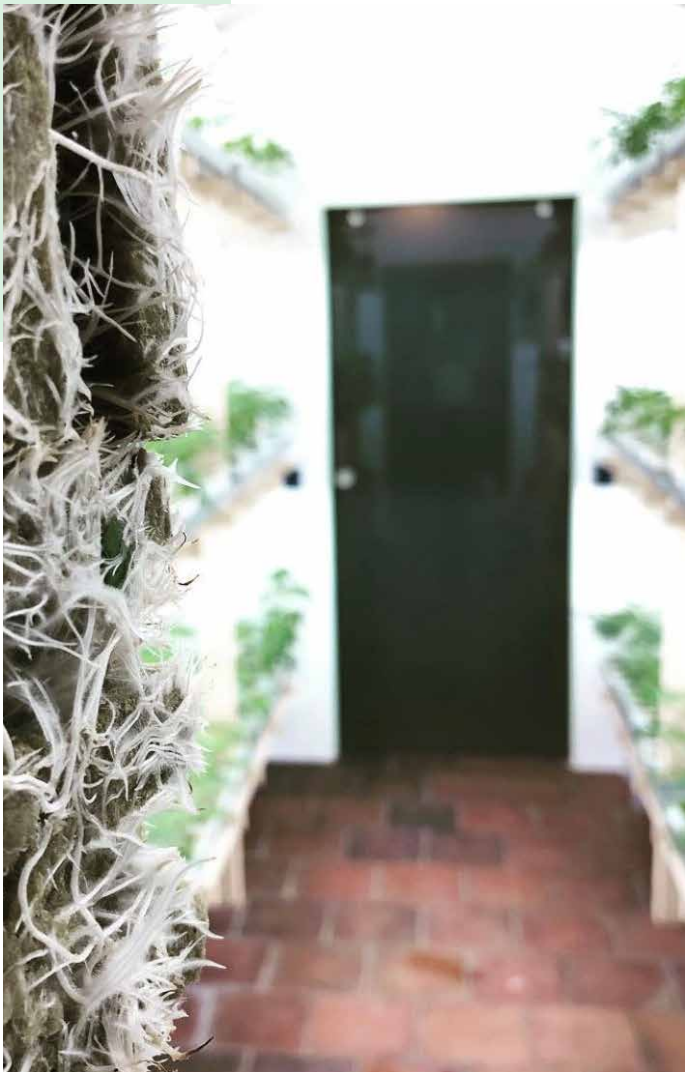
Upswing in the innovation curve

"Now that we can add seed genetics into the mix of a precisely controlled greenhouse climate and optimally steerable rootzone environment, we are approaching the sweet spot where everything comes together to enable uniformity, consistency and repeatability," adds Janssen.

"That's why the combination of technologies from Grodan and F1 SeedTech is a match made in heaven; we have the potential to facilitate the next steep upswing in the innovation curve and to take the medicinal crop industry to the next level in terms of scalability, professionalization and ultimately profitability. We envision that F1 hybrid seeds will become the leading starting material over the next five to ten years," concludes De Bresser.

More information

For more information about the trial or to discuss the opportunities for improving your efficiency by combining F1 hybrid seeds with Grodan growing media, please contact Frank Janssen (frank.janssen@grodan.com) or Maikel de Bresser (maikel@f1seedtech.com).



ROCKWOOL BV / Grodan
Industrieweg 15
6065 JG ROERMOND
Postbus 1160
6040 KD ROERMOND
The Netherlands
T +31 (0)475 35 30 20
F +32 (0)475 35 37 16
info@grodan.com
www.grodan.com