Press release

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Precision Growing on Mars provides useful lessons for horticulture on Earth

Grodan substrate supports space mission

If everything goes according to plan, the first manned mission to Mars will take place in 2035. The journey will take the 'martianauts' about two and a half years. Taking along food supplies for the entire journey is impossible; that would amount to around fifteen hundred kilograms per person. The solution lies in growing their own food. What that requires is a light and compact growth medium which yields maximum results with the use of minimal resources. Precisely the characteristics of the stone wool substrate developed by Grodan for the horticultural sector.

Conditions on Mars differ completely to those on Earth. For example, the atmosphere there is very thin. Plants cannot survive in such an environment. In order to be able to grow their own vegetables on the planet, the martianauts will have to take along greenhouses that have an artificial atmosphere. All the elements required by plants for growth, such as carbon, sunlight, nitrogen, oxygen and phosphorus are present on Mars, however sometimes in very small quantities.

Plants as the basis

In a research centre at the University of Guelph in Ontario (Canada), studies are being conducted into biological life support systems for space missions to distant destinations such as Mars. Plants form the basis of this kind of system. Plants are not only exceptionally well suited for the production of food and oxygen- they can also process carbon dioxide and purify water. In the laboratories the scientists are investigating how to grow as many plants as possible on the smallest possible surface area and how to recycle water and other nutrients in a closed system. Hypobaric chambers are used to find the lowest atmospheric pressure in which plants can still flourish. The air pressure on Mars is less than one percent of that on Earth! In the meantime a six metre long, rather bulky and heavy prototype of a tunnel shaped greenhouse has been constructed for further testing. The ultimate aim is to be able to produce a considerably lighter weight greenhouse that can rolled up like a mat and carried under the arm.

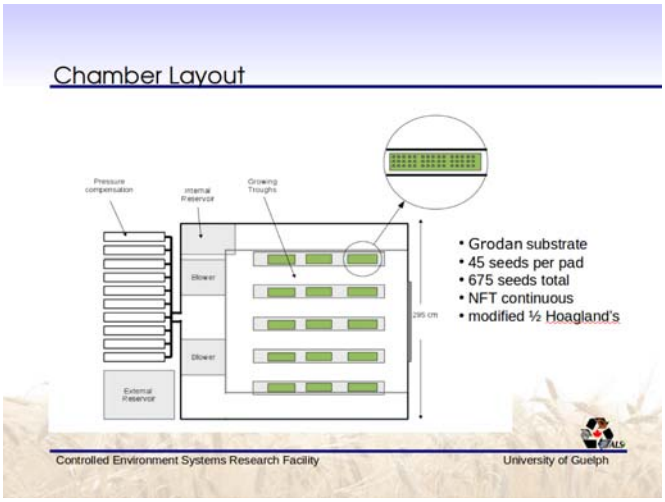
Grodan substrates used in research

Grodan plays a significant role in this research project. The plants being studied in Canada are grown on stone wool substrate from Grodan. In a certified process, Grodan processes a natural solidified lava, basalt, to create a stone wool-based substrate for horticulture and floriculture. One cubic metre of basalt produces fifty cubic metres of stone wool. Enough to grow 350,000 kg of tomatoes or 1 million cucumbers! The use of stone wool substrate offers many advantages. With minimum use of water and nutrients maximum yield per square metre can be achieved. Plus the material is lightweight, thus easy to handle. Stone wool is eminently suitable for use in closed cultivation systems, where water is recirculated and reused. These characteristics make it ideal for use on Mars and during the journey there.

Further developing Precision Growing methods

These advanced, recyclable, Grodan substrates have been especially developed for 'Precision Growing'. Precision Growing is the most efficient, effective and sustainable form of growing, whereby minimum input (water, energy, nutrients, space) is used to generate maximum output (yield, quality, production time). And that is precisely what the researchers in Canada are aiming for. This cooperation has plenty of advantages for Grodan. The results generated by this research can be utilised by Grodan to fine-tune the objectives of Precision Growing. This will propel Precision Growing to a higher level, allowing growers even better control of the growing process in their greenhouses and improving their operational results at the same time. That's how a space mission to Mars can help increase the sustainability of high tech horticulture, which Grodan is extremely happy to contribute towards.

Lettuce growing on Grodan substrates in a hyperbaric chamber.



Wheat growing on Grodan substrates inside a hyperbaric chamber.

Image source: University of Guelph Controlled Environment Systems Research Facility

Corporate information:

Grodan supplies innovative and sustainable substrate solutions for the professional horticultural sector, based on Precision Growing principles. These solutions are, amongst others, applied for the cultivation of vegetables and flowers, such as tomatoes, cucumbers, sweet peppers, aubergines, roses and gerberas.

High tech stone wool substrates are offered together with tailor-made advice and tools to support Precision Growing and thus a sustainable cultivation. Sustainability plays a prominent role within Grodan, from production of Grodan substrates to end of life solutions.

Grodan, founded in 1969, is active in more than sixty countries worldwide. The head office is located in Roermond, the Netherlands.

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Background information

- In 1969 man first set foot on the Moon, in 2035 the first manned mission to Mars will take place, provided all goes according to plan.
- The distance between the Moon and the Earth varies, with the shortest being 356,410 kilometres and the longest 406,697 kilometres. The distance between the Earth and Mars fluctuates widely: between 56 to 380 million kilometres, depending on the position of the planets compared to the Sun. The next time that Mars makes its ‘closest’ approach to the Earth will be in 2018. And that is not enough time to organise a manned mission to Mars.
- 2035 offers a new opportunity as Mars will be less than 57 million kilometres from the Earth. This should be achievable according to space agencies in the USA and Europe. Two years after the launch of the martianauts, the planets will be positioned relatively close together: the next so-called ‘launch window’.
- While the door to door trip to the Moon took some eight days, the entire voyage to Mars would take about two and a half years: seven months there, seven months back and eighteen months on the planet itself.