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## 6.3 Million Euros to bake bread on Mars



**Brussels, Belgium, 27 November 2019** — Will the first people to bake and eat bread on Mars do it thanks to new research starting in January? This is the challenge facing the SpaceBakery project, a unique consortium composed of seven Belgian organisations and led by the global bakery, pastry and chocolate expert Puratos. However, before they use their research to help feed the first people on the red planet later this century, the project aims to have a clear impact on Earth today. The project will focus on how we can produce food in a more sustainable way and will help provide a nutritional staple food for many regions across the globe. The consortium has just been awarded a new subsidy of 4.5 million euros, contributing to a total of over 6.3 million euros in funding.

Four large interconnected containers will soon be installed at Puratos' headquarters near Brussels, Belgium. From the outside they may seem ordinary, but on 1 January 2020 researchers will start working in the enclosed ecological plant cultivation system and bakery. What they discover could have a huge impact on our food production on Earth, as well as on Mars once humans launch their space exploration efforts.

Using the impressive plant cultivation infrastructure, researchers from the seven members of the consortium will learn how to create the ideal environment for the »

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efficient production of wheat crops, as well as other plants that could be included in bread to increase its nutritional value. But, why focus on bread? Because it is highly nutritional and consumed all over the world, making it an ideal candidate as a staple food for space exploration.

Speaking about the project, Upstream R&D Director at Puratos, Filip Arnaut said: *“With this consortium, we are bringing together various knowledge domains and expertise in order to answer a very important question: how can we further improve nutritional value, sustainability and the efficient use of energy to produce food – here bread, one of our main specialties – today, but also tomorrow in more challenging environments.”*

The environment on Mars is very different from ours on Earth; the lack of atmosphere, cold temperatures and dust storms don't provide the right conditions for crop growth. It's for this reason that the research will take place in the coupled containers, a closed and self-sustainable system in which the climate can be adapted to make it suitable for crop growth, with optimal use of resources.

In parallel to the research on crops, the consortium will also study many other aspects involved in the entire food production cycle, such as the use and recycling of resources, the monitoring of microbial climate, influence of radiation, and pollination through automated drones.

The consortium is led by **Puratos**, an international producer of ingredients and innovative solutions for the bakery, pastry and chocolate sector, headquartered in Belgium. Their century-long expertise in bread-making and innovation will be key as food consumed on Mars or on Earth must be nutritional - and also tasty.

**Urban Crop Solutions**, a solution provider for vertical farming, developed the plant growth infrastructure and will further engineer a variable climate biosphere, a hermetically sealed building in which different climatic conditions can be simulated to support the growth of a diverse range of crops, combined with human habitation. The company will also work on the development of an AI algorithm to optimise crop growth and minimise the resource inputs.

**Magics Instruments**, a technology company specialised in the development of semiconductor chips and machine learning-based smart sensors, will focus on the automation of pollination and work with Urban Crop Solutions to investigate how artificial intelligence can optimise crop growth.

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**SCK•CEN**, the BioSciences research group, will study the effect of microorganisms on the release of nutrients to plants and monitor the overall microbial climate in the closed environment. Additionally, they will investigate the impact of increased ionising radiation, as is present in space and on Mars, on wheat growth.

**Ghent University**, through its applied plant eco-physiological research at the Faculty of Bioscience Engineering, will create a 3D model of wheat growth and development using functional-structural plant modelling and data from innovative plant sensors. This “virtual 3D-crop” will then be used to determine the most optimal and sustainable way to grow wheat in the closed biosphere system.

The **University of Hasselt**, with its centre for environmental science, will analyse how the waste of the wheat plant can be used to make the closed biosphere system circular by reusing organic matter.

**Flanders Food**, the agri-food spearhead cluster and supporter of the project, will focus on collaboration across the food value chain. They will also guide the further coordination and dissemination of the project.

Inge Arents, Managing Director of Flanders' FOOD, said: *“The SpaceBakery project is important for Flanders' FOOD's strategy. It is an example of sustainable and resilient agri-food systems, emphasising how agriculture and food production can allow future generations to enjoy tasty food for a healthy lifestyle. We hope that this project inspires other companies in the broad ecosystem around the food industry. We are grateful to Vlaio that we were able to support the funding of this project.”*

The unique consortium was recently launched and will start its research in Belgium on 1 January 2020 for a period of two-and-a-half years. A total of 6.3 million euros will be invested by the seven partners to fund the research.

The Space Bakery project prioritises sustainability, health and the efficient use of resources, providing solutions that will be extremely relevant for space technology tomorrow and here on Earth today.

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## About the consortium's partners

### Puratos

Puratos is an international group, which offers a full range of innovative products and application expertise for artisans, industry, retailers and food service customers in the bakery, patisserie and chocolate sectors. Its headquarters are located on the outskirts of Brussels (Belgium), where the company was founded in 1919. Puratos counts 9400 employees. Products and services are available in over 100 countries around the world. In many cases, they are produced locally by our subsidiaries. Above all, we aim to be 'reliable partners in innovation' across the globe to help our customers deliver nutritious and tasty food to their local communities.

More information: [www.puratos.com](http://www.puratos.com)



### Urban Crop Solutions

Urban Crop Solutions is a Belgium-based pioneer in the emerging 'Indoor Vertical Farming' technology. Over five years of research, they've developed more than 220 plant growth recipes. All drivers for healthy plant growth, such as optimal LED spectrum and intensity, nutrient mix, irrigation strategy, and climate settings are tested and validated daily in its Indoor Farming Research Lab in Beveren-Leie (Belgium). To date, Urban Crop Solutions has manufactured 24 Container Farms and one Plant Factory for clients across Europe and North America. Urban Crop Solutions' commercial farms are used for vegetables, herbs, micro-greens for food retail, food service and industrial use. Research institutions use Urban Crop Solutions' infrastructure for scientific research on banana seedlings, flowers and hemp.

More information: [urbancropsolutions.com](http://urbancropsolutions.com)



### Magics Instruments

Magics Instruments is a young SME company, founded in 2015. Magics Instruments employs 12 people and has a turnover of more than 1.2 million euros. Magics' core mission is the development of intelligent electronic solutions for smart and reliable machines, which are essential to responding to mankind's ever-increasing resource needs (e.g., energy, food, and key materials). Magics is achieving this by leveraging its world-class expertise in integration circuits design, machine learning, and radiation hardening.

More information: [www.magics.tech](http://www.magics.tech)



### SCK•CEN, Expert group for interdisciplinary biosciences

SCK•CEN is one of the largest research institutions in Belgium, with more than 800 employees developing peaceful applications of radioactivity. The developments have already led to a long list of innovative applications for the medical world, industry and the energy sector. SCK•CEN is also known for its space research, in particular for investigating the impact of cosmic radiation and space flight conditions on human health and biological life support systems in space.

*In this specific project*, the BioSciences research group of SCK•CEN will study the effect of microorganisms on the release of nutrients to plants and monitor the overall microbial climate in the closed environment. In addition, they will investigate the impact of increased ionising radiation, as is present in space and on Mars, on wheat growth.

More information: [www.sckcen.be](http://www.sckcen.be)

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## **Ghent University, Faculty of Bioscience Engineering**

The Faculty of Bioscience Engineering of Ghent University is a European research leader in the field of applied biological and life sciences or bioengineering, and is, across many areas, internationally recognised for its applied plant eco-physiological research conducted at the Laboratory of Plant Ecology within the Department of Plants and Crops. The Laboratory of Plant Ecology has unique expertise in the use and development of sophisticated plant sensors and advanced plant models to study the dynamic responses of crops and trees to their environment. Plant water relations and carbon metabolism are jointly investigated to better understand the dynamic plant-environment interplay, and to develop generic “virtual plants” that can be used in a series of novel applications. In Space Bakery, a virtual 3D wheat crop that mimics actual crop development and growth will be used to define optimal growth conditions in the innovative biosphere production system. This will support sustainable production through optimal use of resources, which has huge potential for applications here on Earth as well as in space. In this line, the Laboratory of Plant Ecology is also a member of CropFit, a research network of Ghent University professors with expertise in biostimulants and biopesticides.

More information: [www.plantecology.ugent.be](http://www.plantecology.ugent.be)



## **University Hasselt, centre for environmental sciences**

The Centre for Environmental Sciences (Hasselt University) is a multidisciplinary research institute with more than 100 biologists, chemists, economists and jurists. CMK strives to be an international academic leader in holistic, multi-and-transdisciplinary analyses pertaining to the environment, a source of robust science-driven advice to public and private decision-makers from the local to the international level, and an active promoter of academic and educational expertise in developed and developing countries. CMK is an agent of societal change at the local and global level, by means of academic discovery, dissemination and implementation: CMK research addresses challenges of high societal urgency that require analyses that span across the boundaries of different scientific domains and disciplines and require fundamental as well as applied research. The strategic research topics are: (i) understanding influences of the environment on organisms, (ii) developing and assessing sustainable clean technologies to mitigate influences of the environment on organisms and (iii) monitoring, valuing and optimising biodiversity and ecosystem services under different stress conditions, including climate change.

More information: [www.uhasselt.be/CMK-en](http://www.uhasselt.be/CMK-en)

## **Flanders' FOOD**

Flanders 'FOOD is the spearhead agri-food cluster and focusses on collaboration across the value chain, as well as cross-border and cross-sectoral collaboration. It is a unique, strategy-driven platform that contributes to a more competitive, innovative and sustainable agri-food industry through innovation. Flanders 'FOOD strengthens the innovative power of the target group by increasing the scientific and technological knowledge and thus contributes to the economic and social development of Flanders.

More information: [www.flandersfood.com](http://www.flandersfood.com)

