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The Greenhouse Pharmacy: Cultivating plants for Cosmeceuticals

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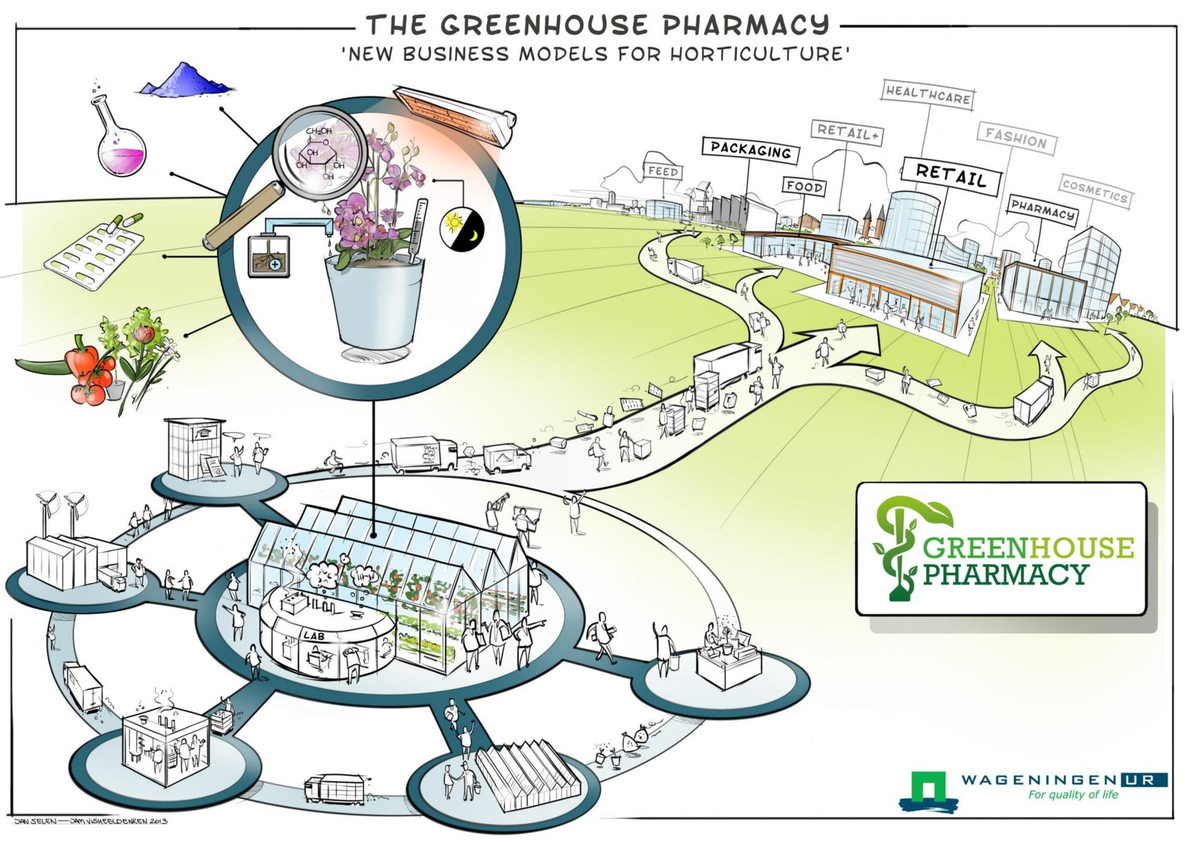
Background

There is a worldwide shortage of natural food ingredients, cosmeceuticals and plant-based medicines. The programme "The Greenhouse Pharmacy" aims to produce such compounds in high-tech production systems to provide increased sourcing stability and market stabilisation of valuable ingredients.

Objective

The industry wants to replace synthetic ingredients by natural ingredients. Selection, breeding and high-tech cultivation systems may open the road to a new and more secure sourcing of these ingredients, produced on demand in a high-tech, pesticide-free chain.



Start with Food Ingredients, Develop Cosmeceuticals

We started the programme with projects on several plants for food ingredients. Presently, our industrial partners have realized 4 startup companies that were based on this research. We now took up new research on the next step in the value pyramid: cosmeceuticals.

We developed a high-wire cultivation system in greenhouses for *Vanilla planifolia* that allows a secure delivery of vanilla pods. This system will contribute to a more stabile market situation.

Our cured vanilla pods are of excellent quality. Presently we are upscaling the cultivation system and investigating remaining bottlenecks in the production of vanilla in greenhouses.

Finding and Growing Plants for Cosmeceuticals

A new approach for value creation in horticulture: Fragrant rose buds may contain many interesting compounds. Shelf life should not be an issue, as long as they are cultivated in a closed chain for a dedicated partner that will process the plant compounds. We now propose the development of new multimodal crop systems, with fragrant cut flowers as a second outlet.

Multidisciplinary projects of Academic Consultancy Training (ACT) students of Wageningen University were carried out in close collaboration with industrial partners. Several discussions to define the exact needs were held and extensive literature search was carried out. Based on these ACT projects, we developed a general approach to match the needs from industry with the power of horticulture:

(1) A longlist of > 100 potential interesting species was prepared, based on the potential use in specific needs of the industrial partners.
(2) A new 5-parameter selection tool was developed with criteria: function, price, extraction, harvest and cultivation, each with specific weighing coefficients.
(3) Through the selection tool, the longlist could be shortened to 14 species for skin care applications and 16 plants for applications in massage oil.
(4) To illustrate the approach to all industrial partners, for 4 plant / compound combinations a full business model was calculated.
(5) Through further adjusting the weighing factors, discussions with industry and growers, and inclusion of ethnobotanical information a definitive list will be created.
(6) Wageningen University & Research will test and develop a cultivation protocol to enhance the valuable plant compounds.
(7) Growers will produce test samples for the industrial partners.

Long term perspective

Our goal is to develop an Ingredient Farm for our industrial partners.

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