

García Victoria, N; Labrie, C; Verkerke, W; Poot, E; van Noort, F

Wageningen UR Greenhouse Horticulture, The Netherlands

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Production of natural pharmaceuticals is the top of the 'green value pyramid' of the biobased economy. Wageningen UR Greenhouse Horticulture is developing new business models for the effective production of high value phytochemicals for growers within the programme "The Greenhouse Pharmacy". We combine the knowledge about high technological cultivation systems with the craftsmanship in the horticultural sector and the experience at Wageningen UR on breeding and extraction methods. The scope is wide: from microalgae in photobioreactors for production of food supplements like astaxanthin and high value proteins, to system development for the cultivation of tropical high value crops in The Netherlands (such as Vanilla) and crops that are obtained uncontrolled from nature for human consumption, and whose cultivation will contribute to protect natural environments and biodiversity. To this category belong among others Dendrobium and Saleb orchids.

High-tech cultivation systems in greenhouses provide the conditions to increase both production and value of the products. New cover materials, screens, fogging, light, heating and cooling allow a better control of the climate. This enables year round cultivation of seasonal plants and therefore higher yields. The closed environment greatly improves the hygiene conditions for plant growing and lowers pest pressure, reducing drastically the need for crop protection chemicals. The control of the water streams that enter and leave the greenhouse in soilless cultures allow for a highly sustainable cultivation with high water use efficiency and without emissions of minerals or pesticides to the environment.

Next to these general advantages, specific growing conditions in greenhouses offer new opportunities in the cultivation of plants grown for interesting high value compounds. We have found evidence that the concentrations of target compounds can be increased through cultivation measures. A few examples will be shown of recent achievements in our research facilities. We succeeded in increasing bioactive compounds such as vitamin C in tomato and strawberries or of flavonoids in Basil by LED lighting of the plants during cultivation. Connecting the horticultural sector with new partners from industry is crucial to develop successful and sustainable new business models, ensuring high quality production in a sustainable and corporate responsible way