

inFARMING® - Indoor horticultural systems of the future

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Abstract

Towards 2050, Germany and other countries will face a huge number of challenges. Besides issues related to the aging of the population, transition to renewable energy sources and urbanization, on the food supply side the pressure of supplying fresh and high-quality food with a low environmental footprint will be a defining feature. Several studies suggest that, on the supply side, the challenges facing the developed world will lie primarily in maintaining high yields while reducing the environmental impact of the agricultural intensification practices which make those yields possible, achieving food security through sustainability.

Especially fresh vegetables as tomatoes or cucumbers are grown hydroponically in protected horticultures already in significant rates where soil-independent water-based systems are used to ensure the supply of much of the vegetables. The site conditions are only linked to light, water, heat and nutrient availability. By integrating food production into new or existing building technologies (inFARMING®) synergies of Controlled Environment Agriculture (CEA) and the original building can be used effectively.

Building-integrated water recycling focusses on water savings in office buildings and housing complexes by separate collection and afterwards biological treatment of the various waste water streams. Moreover, the combination with aquaponics and hydroponics allows producing fresh food, namely vegetables and fish whereby water for irrigation purposes as well as transport costs for vegetables will be saved.

As part of the work to be presented new results of a pilot plant for building-integrated nutrient recovery from raw wastewater cycles will be shown. The work comprises results of the uptake and accumulation of inherent risks by the proposed greens.

Furthermore the presented work will give an overview to further needs for CEA as of lighting systems and responds to large scale test facilities. In 2019 the new Research and Demonstration Facility »Altmarktgarten« will be opened in Oberhausen. On more than 1,000 m² ultra regional products will be produced for the urban population of the Ruhr-Area. New technologies and products can be tested within an urban surrounding.