



“Field-testing and demonstration of Digital and Space based technologies with Agro-ecological and Organic practices in systemic innovation”

A device to automatically follow growth and status of microalgae during cultivation



monitoring; growth; microalgae; optimization; AI

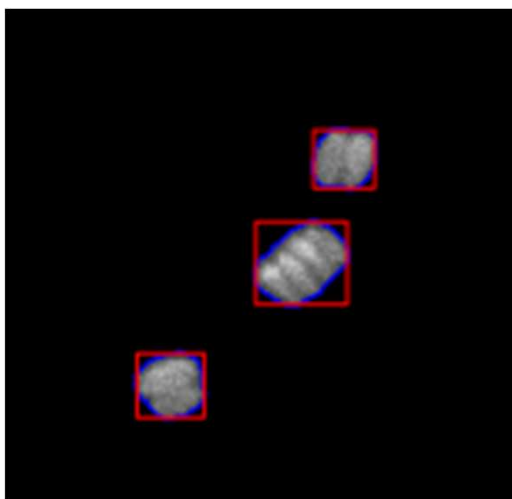
Sweden

The cultivation of microalgae for different purposes is increasing worldwide. Common to all types of cultivation is the importance of finding the best growing conditions to optimize production and quality of the harvested product.

In the PestNu project, we are developing a device that can monitor the growth of microalgae in real-time, as well as automatically evaluate the shape and size of the individual algae. The information can be used to optimize conditions and provide early warning of potential problems affecting the algae culture. Such problems might be caused by nutrient deficiencies, toxic substances, cross contamination by other microalgae, and even “infections” of the culture by grazing organisms that simply eat the microalgae.

The detection device itself takes small samples at pre-set times and passes them through a flow cell where a camera takes micro-pictures of the culture. The images are thereafter analysed to characterize the algae in terms of number, size, shape, as well as growth rate.

The camera system is designed to see the weak red fluorescence coming from the green chlorophyll inside microalgae when they are illuminated, making the algae shine in the dark depending on the load of chlorophyll. The collected images are automatically analysed by AI-based software, and information is transferred via a web-based interface to any computer or smartphone.



Example of an image used in automatic data processing for determination of the proportion of *Desmodesmus* microalgae growing in the preferred quadruple form indicating healthy growth.



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