

# All around ideally supplied algae

## Optimal conditions through holistic liquid analysis



In recent years, Jongerius ecoduna has succeeded in developing a continuously producing and sustainable technology for the industrial production of microalgae. The so-called photo-bioreactors are in operation 365 days and for 24 hours a day. After years of research, Jongerius ecoduna has brought the technology to maturity and in 2018 the first industrial plant could be opened in Bruck an der Leitha.

*"Endress+Hauser is a manufacturer with reputation. We particularly appreciate the quality and compact design of the sensors as well as the technically competent and dedicated support."*

Graduate engineer Lukas Neuwirth  
Quality Manager and Process Engineer  
Bruck an der Leitha  
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Graduate engineer Lukas Neuwirth



Algae cultivation under optimal conditions in linked vertical glass columns

**Algae are considered a true all-rounder. Among other products, they are used in food supplements, as fuel, and in cosmetics. Due to the numerous, also novel, applications, the demand for the green microalgae is increasing. Jongerius ecoduna in Austria is cultivating the algae on an industrial scale.**

### The advantages of the Endress+Hauser solution for Jongerius ecoduna

- Reliable inline analysis of optical density to monitor algae concentration at any time
- Determination of the CO<sub>2</sub> content by means of pH measurement to ensure the ideal supply of the microalgae
- Improved cross-flow filtration harvesting process: Optimal treatment of the water content in the filtrate, which is recycled into the process.

### Challenge

Algae also occur in nature, but the company Jongerius ecoduna has specialized in the industrial production of the eukaryotes. The algae are cultivated in glass columns around six meters high. More than 43,000 tubes, with around 230 km of glass used, are installed at the plant in Bruck an der Leitha. To achieve maximum product yield, various quality parameters are monitored. In addition to the pH value, this also includes conductivity as well as optical density. In this way, cell growth and CO<sub>2</sub> content (indirectly via the recording of the pH value) are monitored closely and without interruption. However, this monitoring is very time and resource intensive and requires a lot of know-how.

### Our solution

Endress+Hauser cooperates with Jongerius ecoduna as a solution partner for process automation. As a

result, algae cultivation can be made even more effective and profitable. Different parameters of the liquid analysis are measured in different process steps.

With the help of the sensors OUSBT66, CPS11D and CLS82D as well as the transmitter CM44P, the emerging challenges around the optimal growth and supply of the algae are mastered.

### Results

With sensors from Endress+Hauser, Jongerius ecoduna is able to monitor and support algae growth in a targeted manner. In this way, CO<sub>2</sub> or other nutrients can be added to the process whenever it is needed. This is done as required and thus ensures economic efficiency in the cultivation of the algae.

### Components of the measuring point

- Cell growth and biomass sensor OUSBT66
- Digital pH sensor Orbisint CPS11D
- Digital 4-electrode conductivity sensor Memosens CLS82D
- Digital nitrate or SAC sensor Viomax CAS51D
- Multichannel transmitter Liquiline CM44P
- 4-channel transmitter Liquiline CM444
- Additional instrumentation for other monitoring tasks such as pressure and temperature monitoring

### Where liquid analysis makes the difference in algae production



#### Capture optical density

Inline analysis of algae concentration to monitor cell growth and ensure ideal growth conditions.



#### Monitor CO<sub>2</sub> content

pH measurement to draw conclusions about the CO<sub>2</sub> content in the algae suspension and thus ensure optimal supply of the algae.



#### Processing of the filtrate

In cross-flow filtration for harvesting algae, conductivity is used as a parameter to monitor the amount of the water in the filtrate that is returned to the process.



Clear glass columns in which the algae breeding is started



Cultivated algae give the pipes a green color

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