CARRYING CAPACITY OF RESIDUES FROM BIOGAS STATION STUDYING ON PHOTOSYNTHETIC OXYGEN RELEASING

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Aim of the project

- Testing of a new machine (BVT company Brno)
- Measuring content of $O_2$ (produced oxygen is indicator of photosynthetical intensity)
- Carrying capacity of residues from biogas station studying on photosynthetic oxygen releasing
Photosynthesis

Light reactions

Calvins cycle

Saccharide

H₂O → ATP + NADPH → CO₂ + saccharide → O₂

Pictures: www.wikipedia.cz
Tested organism

- *Scenedesmus quadricauda*
- *Chlorella kessleri*
- $\frac{1}{2}$ Simmer – Šetlik medium
The preparation of samples

1. Centrifugation
2. Taking samples from algae culture
3. Dilution by medium to have needed OD
Measuring machine

- PC
- Bioanalyzer
- Faraday cage
- Filtres
Other machines

- Densilametr III
- Centrifuge
- Suction bottle
- Cryostat
Density of the suspension
(influence of the dilution)

Chlorella, 20°C

![Graph showing the density of the suspension over time for Chlorella at 20°C. The graph plots O₂ concentration in μM/l against time in seconds. The x-axis represents time in seconds ranging from 1 to 301, and the y-axis represents O₂ concentration ranging from 240 to 270. There are four curves, each representing different dilution levels: OD 1.25, OD 2.5, OD 5.0, and OD 10.](image)

The graph indicates that the density of the suspension increases with time, and the rate of increase is influenced by the dilution level. Higher dilution levels result in lower O₂ concentrations at any given time.
The incident energy

- 3 grey filters
  a) 1080 μE (filter I)
  b) 602 μE (filter II)
  c) 140 μE (filter III)

![Graph showing the effect of different incident energies on Scenedesmus OD 5,0 at 20°C](image)
Dependence on the temperature
Cycles of 40 seconds light and 40 seconds dark

Scenedesmus, 37°C
Biogas facility, digestates
Measuring of the digestates

Chlorella, OD 5, 20°C

O₂ [µM/l]
Production of O$_2$: 13.7 μM/l

Production of O$_2$: 44.8 μM/l
Thanks for their advices and help at working on the project

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Thank you for your attention

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