

***Cultivation of Chlorella sorokiniana microalgae under nitrogen limitation with composition monitored by FTIR spectroscopy using the KBr-micropellet technique***

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Sustainable energy production is one of the most important issues in future utilisation of renewable energy resources. Compared with superior plants, microalgae show a higher photosynthetic efficiency. Besides the aspect of total biomass production, especially the extraction of lipids from microalgae for biofuel production aroused great interest for lowering CO<sub>2</sub> emissions and reducing today's dependence on fossil fuels. Since the phytoplankton reacts to changes in nutrient status by redistributing its resources, the effects of nutrients on the biomass production have been a subject of intense research. In the past, several strains of *Chlorella* green microalgae were studied, e.g. [1, 2]. In our study, *Chlorella sorokiniana* from Bioproducte Prof. Steinberg (Klötze, Germany) were grown under the conditions of a static monoculture with the experiments run in 1 L sterile Duran glass flasks at 35 °C ± 2 °C over seven days without CO<sub>2</sub>-enriched air. Fluorescent lamps were used to provide ambient lighting with a 12-12 h light-dark cycle simulating natural photoperiodicity. A modified Bold's basal medium was used with nitrate changes for simulating also stress conditions under nitrogen limitation

For studying the intracellular composition rapidly and non-destructively, infrared spectroscopy has been repeatedly employed; see for example [3, 4]. Because of the small amounts of available dried microalgae, the KBr-micropellet method was used. All spectra were corrected for baseline variations and atmospheric water vapour absorption. As a further pre-treatment, a spectrum normalisation was carried out using the amide II band maximum. Quantification was done using reference spectra of vegetable oil and pure starch. Changes in lipid and carbohydrate composition are manifested for four media different in nitrate concentration with an increase in lipid content found under nitrogen starvation for this phytoplankton.

#### References

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