Photosynthesis based method to control glycogen content under nitrogen-deprived conditions in *Synechocystis* sp.

Gergely Lakatos, Karolína Ranglová, Tomáš Grivalský, João Manoel, Jiří Masojidek

Centre Algatech, Laboratory of Algal Biotechnology, Institute of Microbiology, Trebon, Czech Republic

The increasing demand for new alternative energy sources to replace the fossil fuels is a mighty challenge to cope with. Third generation biofuels produced from green algae and cyanobacteria biomass have great potentials to overcome these challenges. As promising raw material, high carbohydrate containing microalgae biomass has remarkable potential as a novel feedstock for third generation biofuel production.

Algenetics is an ongoing project founded under the Czech-Austrian Interreg program. *Synechocystis* sp. PCC 6803 NIX is a promising strain that is being studied in the project. It will be used as a model microorganism for genetic modifications to promote carbohydarate accumulation. Nitrogen starvation is widely used technique to enhance carbohydrate accumulation in microalgae cells. Several studies have proved its operability but the physiological status monitoring of the culture is still slow and difficult. Chlorophyll fluorescence technique provides easy to use solution to indicate the proper time point for harvesting high glycogen biomass under nitrogen limitation.

As part of the Algenetics project, the effect of nutrient starvation of the cyanobacterium *Synechocystis* sp. PCC 6803 NIX was investigated by growing the strain in nitrogen, phosphorus and double depleted BG11 media. Chlorophyll fluorescence records, nitrate and glycogen contents were measured to monitor the physiological changes of the cultures. Obtained data were used for the determination of the most suitable solution for achieving high glycogen content in biomass together with high growth rate.