DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Algae are a valuable source of biologically active compounds, e.g. lipids, carbohydrates, proteins, and others. Many algal species have not been explored in this respect. They are represented by unicellular algae from the class Eustigmatophyceae, which are poorly known in their physiological, biochemical, and ecological aspects.

The aim of the project is to investigate selected physiological processes (including the photosynthetic activity, metabolic profile, and the growth capacity) in *Eustigmatos calaminaris* and *Eustigmatos magnus* algae as a potential source of valuable bioactive substances: saturated and unsaturated fatty acids.

Stress conditions prevailing in the environment induce changes in the growth and metabolism of algal cells, e.g. at nitrogen limitation, the content of lipids in the cell increases at the cost of inhibition of cellular divisions.It is desirable to achieve an "equilibrium" state between the maximum cell growth rate and obtaining high contents of valuable metabolites. The use of stress factors in the designed research is aimed at induction of changes in the metabolic pathways to increase production of selected bioactive compounds. Interactions between the cellular components of microalgae, e.g. the content of chlorophyll, proteins, and lipids as well as changes in the fatty acid profile induced in stress conditions with simultaneous supplementation of indole-3-acetic acid, are poorly known and should be further explored. Depending on the fatty acid profile, the Eustigmatophyceae species chosen for the investigations in the project can be used as producers of eicosapentaenoic acid (EPA), which is a representative of unsaturated fatty acids, necessary for normal function of the human nervous system and tested for the potential in production of biodiesel from algal biomass.

To assess the relationships between the physiological and photochemical parameters and the changes in the *E. calaminaris* and *E. magnus* metabolism induced by nutritional or light stress and indole-3-acetic acid, we plant to compare changes in the content of lipids, carbohydrates, and the fatty acid profile with the growth parameters, pigment content, and photosynthetic efficiency.

The results will broaden the knowledge of physiology and biochemistry of the poorly recognised unicellular algae from the genus Eustigmatophyceae.