ABSTRACT

The aim of the diploma thesis is a characterisation of organic matter produced by the cyanobacteria *Anabaena flos-aquae* and *Microcystis aeruginosa* and the green algae *Scenedesmus quadricauda* and a description of their eventual complex formation which have effect on process of destabilization during water treatment. The algogenic organic matter (AOM) can be divided into the so-called extracellular organic matter (EOM), which is produced by metabolism into the water, and into the so-called intracellular organic matter (IOM), which gets into the aqueous media after cell's damage or death. The other aim of the diploma thesis is to find eventual differences in the structures of EOM and IOM and find out how AOM differ among individual species of cyanobacteria and algae.

The concentrations of AOM increased during their cultivation for all monitored microorganisms. The highest values of concentrations were detected in the culture of cyanobacteria *M. aeruginosa*, conversely, the lowest values were found for the green algae *S. quadricauda* where the lowest portions of proteins were also observed. The higher portions of proteins were found for cyanobacteria. EOM of *A. flos-aquae* included proteins of relative molecular weight (MW) around 18 thousand and more than 900 thousand. For EOM of *M. aeruginosa* proteins of relative MW around 21 thousand and more than 900 thousand were isolated. For EOM of *S. quadricauda* proteins of relative MW around 16 thousand were detected. IOM of *A. flos-aquae* contained proteins of relative MW around 18, 73, 190, 360 thousand and more than 900 thousand. IOM of *M. aeruginosa* included proteins of relative MW around 21, 85, 234, 359, 470 thousand and more than 900 thousand and for IOM of *S. quadricauda* proteins of relative MW around 16, 73, 223 thousand and more than 900 thousand were detected. These results prove that the compositions of EOM and IOM differ.

Using affinity chromatography the proteins able to form complexes with multivalent cations (Al^{3+}, Fe^{3+}) were isolated. For cyanobacteria *A. flos-aquae* and *M. aeruginosa* proteins of relative MW around 60 thousand was detected. These proteins could cause serious problems during water treatment because of forming the complexes with multivalent cations, which are part of used destabilization reagents. The formation of these complexes causes decrease of efficiency of the process of destabilization and aggregation and increase of consumed destabilization reagents.