

## **Abstract:**

The presence of phytoplankton and its products (AOM) in source water is a current challenge in water treatment processes. The production of AOM increases with anthropogenic eutrophication of ecosystems. AOM impair the water treatment processes and may form harmful disinfection by-products. The traditional water treatment process is a coagulation, which is very efficient in removing phytoplankton cells, but this is not the case when removing some kinds of AOM. Especially its nonproteinaceous fraction with low molecular weight, which can represent majority of total organic carbon, is removed with very low efficiency. The removal of AOM by coagulation can be enhanced by preoxidation. This thesis examines the influence of preoxidation by potassium permanganate of nonproteinaceous fraction of COM of algae *Chlorella vulgaris* on its coagulation by aluminium sulphate and polyaluminiumchloride. To compare, solutions with nonproteinaceous COM were coagulated with and without preoxidation by five different doses of permanganate (0,025; 0,05; 0,1; 0,15 a 0,2 mg  $\text{KMnO}_4$   $\text{mg}^{-1}$  DOC). The doses of permanganate and time need for oxidation (30 minutes) were determined by decreased DOC and permanganate during preoxidation experiments. The maximal DOC removals achieved both with and without preoxidation were 17 % after coagulation by aluminium sulphate and 22 % by polyaluminiumchloride. The lowest Al residuals with and without preoxidation after coagulation by polyaluminiumchloride were 0.40 and 0.29  $\text{mg L}^{-1}$  Al mg and 0.25  $\text{mg L}^{-1}$  Al after coagulation by aluminium sulphate in both cases. Optimum pH for coagulation by aluminium sulphate lied in 6.5 – 7.5 both with and without preoxidation. In the case of polyaluminiumchloride, preoxidation widened optimum pH from 7.5 – 7.6 to 7.3 – 7.6. The preoxidation did not improve the coagulation of nonproteinaceous organic matter but the benefit of preoxidation was that it slightly lowered the concentrations of residual aluminium and widened optimum pH for the coagulation by polyaluminiumchloride.

## **Key words:**

algal organic matter (AOM), nonproteinaceous matter, water treatment, coagulation, polyaluminiumchloride, aluminium sulphate, preoxidation, potassium permanganate