

Abstract

When algal or cyanobacterial populations increase in drinking water reservoirs, water treatment technologies have to cope not only with increased cell numbers but also with algal organic matter (AOM). The presence of cells and AOM in raw water causes some problems in the drinking water treatment process that can lead to the drinking water production of unsatisfactory quality. Residual algae cells and AOM can form toxic disinfection by-products (DBPs). Therefore, to maintain the cell integrity and prevent the release of AOM, it is essential for algae-polluted water treatment.

This thesis examines the influence of AOM on coagulation of algal and cyanobacterial cells. The efficiency of coagulation is affected by various algae characteristics. The important have particularly the dependence of the coagulant dose on the cell surface area and the size and value of the surface charge of cells. It has been demonstrated that AOM can have not only negative but also positive influence on coagulation of cells. The presence of high concentrations particularly of low molecular weight (MW) AOM results in inhibition of coagulation. On the other hand, coagulation is improved by low concentration of high-MW AOM (particularly proteins) at approximately pH 4-6.

Nowadays, for removal coagulated cells dissolved air flotation and subsequent sand filtration are often used. A commonly employed treatment chain for algae and AOM removal is coagulation, sedimentation/flotation and filtration. Coagulation is the first and a necessary treatment step for these types of waters. Since the removal rate of cells and the influence of AOM on their removability are closely dependent on the composition and the concentration of AOM and the total charge of the system, the species and the growth phase of the microorganism, further work on coagulation of individual species of phytoplankton is required.

Keywords: AOM – Algal Organic Matter; coagulation; cyanobacteria; water treatment