ABSTRACT

This thesis is focused on the influence of kaolinite particles (that represent turbidity) and peptides/proteins derived from COM (Cellular Organic Matter) of cyanobacteria *Microcystis aeruginosa* on size, structure and shape of aggregates formed by different hydrodynamic forces during water treatment. Aggregation was conducted in Taylor-Couette reactor. Abovementioned compounds (kaolinite, COM peptides/proteins and their mixture) were coagulated by using aluminium sulphate or ferric sulphate. Aggregates were evaluated at steady state phase (after 60 minutes of mixing) when their size is homogeneous. The evaluated parameters were: size (diameter) of aggregates, fractal dimension D_2 and D_{pf} and size distribution. It was found that the size is dependent on the type of coagulant and polluting particles and on velocity gradient. The size of aggregates decreases with increasing velocity gradient. Ferric coagulant gives bigger aggregates compared to alum. The influence of impurities is as follows: the size of aggregates increases in ascending order kaolinit < COM < kaolinit + COM. The structure of aggregates becomes more compact with increasing velocity gradient. Aggregates produced by alum are more compact (higher D_2 value in comparison with ferric coagulant. The compactness of aggregates is dependent on the type of impurities (ascending order kaolinit > COM > kaolinit + COM) but there is no effect of the type of coagulant. The shape of aggregates (fractal dimension D_{pf}) becomes more regular (closer to spherical shape) with increasing velocity gradient. The value of D_{pf} increases in order kaolinit < COM < kaolinit + COM. It was found that the size of the aggregates does not change smoothly with velocity gradient (as assumed previously) - there is acritical value of velocity gradient at which a significant change of size occurs. This phenomenon depends on the character of interacting particles and on the mechanism of coagulation.

Keywords

AOM - Algal Organic Matter, Coagulation, Aggregation, velocity gradient, Aggregate structure, Water treatment