Coagulation and Sedimentation of Algae in Wastewater

Hala Hammadi

M.Sc. of Environmental Engineering

Department of Environmental Science, Szent Istvan University, Gödöllő, Hungary

Primary thesis advisor: András Sebők, Assistant Researcher, Department of Soil Science and Agrochemistry

The pollutants can enter water bodies at various points and non-point sources, and wastewater discharge remains a major pathway. The increasing occurrence of harmful algae blooms globally poses significant challenges to water management. In water treatment utilities, coagulation is the first treatment process of the multi-barrier strategy designed to address algae-laden source water. Since the coagulation efficiency directly impacts all downstream treatment processes, it is critical to optimize coagulation conditions to remove algal cells to the extent possible without causing cell damage. This work was motivated by the assumption that the induced coagulation of particles may accelerate sedimentation in such wetlands and by that help reduce the amount of material that is lost from the vicinity of the diffuse source. Our specific aim was to laboratory-test the effectiveness of calcium cation coagulantsin accelerating the process of sedimentation. We tested the effect of Ca^{+2} in 400, 800 mg/L doses added to cylinders filled of algae samples with distilled water compared with the control cylinder which does not have any cation inside and photographs were taken every 5 minutes for 35 minutes, it yielded rapid stabilization of algae. This proves the effectiveness of Ca^{+2} to increase t efficiency of coagulation and therefore sedimentation and this cation is environmentally friendly, and it is not harmful for humans and animals.