

## Abstract

This thesis deals with the evaluation of modification possibilities for Chemical Oxygen Demand (COD) reduction in waste water from CP Kelco GmbH, a Pectin production company based in Grossenbrode, Germany. CP Kelco has a problem of high COD in the effluent going into Baltic Sea for which they have to pay sewage taxes. In this thesis, Eutectic Freeze Crystallization (EFC), a novel separation technology as a means to reduce COD in waste water is evaluated. EFC can in principle achieve a 100 percent separation of a binary solution into ice and salt crystals (Van der Ham et al., 1998) so a scaled up industrial EFC process can be used to make the plant a Zero Waste facility in accordance with new EU regulations of a zero waste programme for Europe.

The waste water samples collected from various locations in the plant were analyzed for salt content and phase diagrams were determined. The results of these analyses and phase diagrams have been discussed in detail in the following chapters. From the available data it was evaluated if such a separation process is practical and can be scaled up for industrial application.

This thesis also looks into the possibility of using the principle of deposition as another method to reduce COD. COD reduction by means of de-watering the feed by applying the principle of de-sublimation (deposition) was considered as another option. An experimental setup was installed at FH Luebeck to verify this hypothesis and its results and observations are discussed in detail.