

COAGULATION / FLOCCULATION – MICROFILTRATION, AN ALTERNATIVE PROCESS FOR THE PRODUCTION OF POTABLE WATER?

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Production of potable water from surface water sources can be a challenge due to many factors, *i.e.* high content of natural organic matter (NOM) and contamination by pathogens. This study has investigated the potential of coagulation / flocculation coupled with MF filtration for the production of potable water using ceramic membranes.

Treatment efficiencies as a function of coagulant type and dose as well as three different pre-treatment options were investigated; a classical two stage flocculation, a simplified one-stage fast mixing step and an inline flocculation treatment. DOC and colour removal can be achieved at relatively low coagulant concentrations (76-81%, 5.5 mg C/L in raw water), however, efficiency strongly depends on the coagulation pH value. Residual metal concentration in the permeate as a function of pH region may be a limiting step. Flocculation was found to be a critical step, where the more compact, energy efficient inline configuration was found to be as efficient as the classical approach. Virus and bacteria removal capacities were determined by using MS2-bacteriophage and Escherichia coli respectively, resulting in > 4 LRV.

Coagulation - flocculation pre-treatment combined with MF ceramic membrane filtration are a promising alternative membrane process for the removal of NOM to produce potable water. Using microfiltration, high operating pressures can be avoided and high fluxes achieved. Coupled with coagulation - flocculation under optimal operating conditions the process can also be approved as a hygienic barrier. Ceramic membranes distinguish themselves by their outstanding mechanical strength and very high resistance against chemicals and heat and thus represent a robust treatment system. This paper will summarize findings with regard to process efficiency as a function coagulant type/dose, process configuration options, and compliance as a hygienic barrier.