

Titel	Next step in greener Ultrafiltration technology
Type	Project & Master thesis
Contact/supervisor	Tor Håkonsen (Norconsult /NTNU) and Stein Wold Østerhus
Location	NTNU (and/or Norconsult Lillestrøm)
<p><b>Project background:</b></p> <p>Membrane technology is by many predicted to be the dominating separation technology in water and wastewater treatment. There are several nanofiltration plants in Norway and these provides excellent NOM removal and a hygienic barrier without the use of chemicals in the water treatment. The recent market development seems to be along the lines of Ultrafiltration coupled with the use of coagulants, as this greatly increases flux over the membranes and provides a more compact and less costly plant.</p> <p>However, as this re-introduce coagulants in the water treatment, the effluent becomes influenced by the coagulant, limiting its release in the environment and consequently increased cost of disposal, in addition to the environmental impact.</p> <p>If such a plant could use biopolymers or other green chemicals, effluents from its could be released to a recipient, greatly increasing the feasibility of this method.</p> <p>The most promising alternative coagulant is chitosan, and this Master will aim at investigating the use of chitosan in an Ultrafiltration treatment process.</p> <p>The master will be performed at the water lab at NTNU, under support of both supervisors and a professional contact person from a Norwegian supplier of ultrafiltration plants.</p> <p>The results from this Master may lead to a practical full scale drinking water operation as the next step in development of this technology, and the candidate is likely to be given the opportunity to present the results in a technical conference/seminar.</p> <p><b>Student tasks:</b></p> <ul style="list-style-type: none"> <li>• Get familiar with basic Ultrafiltration plants and coagulation optimization</li> <li>• Get familiar with experimental set up in the water-lab and adaptation of it for this task</li> <li>• Planning of experimental design in collaboration with supervisor and NOKA AS</li> <li>• Carry out a series of bench scale experiments</li> <li>• Will chitosan foul the membranes or obtain comparable capacity? What is the influence of back-flush? What is the treatment efficiency? What are the optimum pH range and other operational settings?</li> <li>• Identify characteristics of the effluent and evaluate discharge options</li> </ul>	