

Enhancing the efficiency of DAF – advanced diagnostics and novel developments

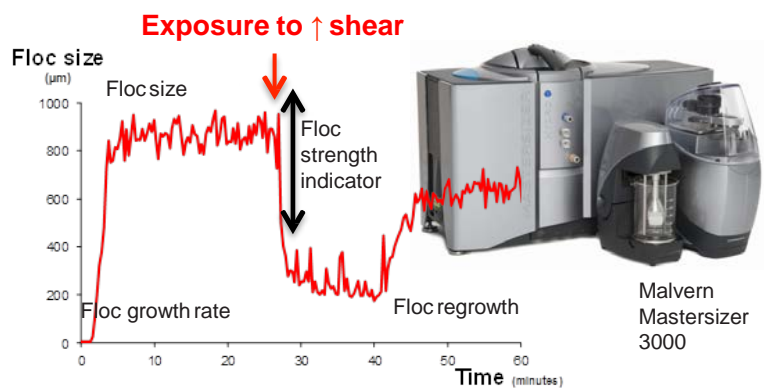
What we do

Using both bench- and pilot-scale dissolved air (DAF) flotation equipment and associated state-of-the-art characterisation techniques, we combine fundamental scientific and mechanistic understanding of the flotation process and the in material being separated to optimise separation water and wastewater systems

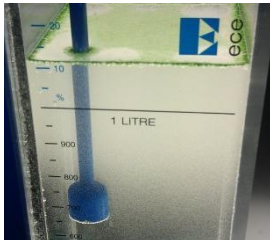


DAF pre-treatment

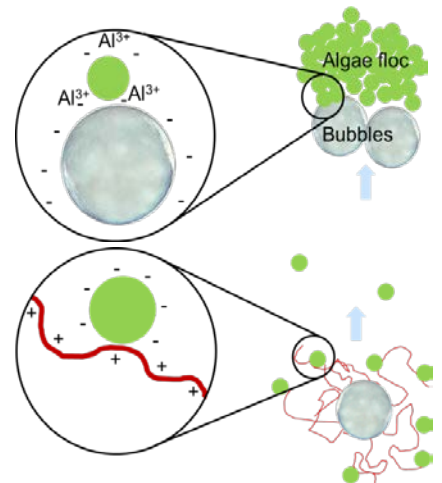
Coagulation-flocculation to form flocs is a necessary pretreatment stage in DAF systems. We apply state-of-the-art techniques including: 1) particle size and charge analysis using the Malvern Mastersizer 3000 and ZetaNanosizer to characterise floc properties that contribute to flotation performance and 2) organic characterisation using fluorescence and size exclusion chromatography with organic carbon detectors (LC-OCD) to evaluate performance.



Optimisation of the DAF process



With two bench-scale DAF jar testers, one suitable for seawater, we are able to test DAF performance under varying conditions; for example, comparison of novel coagulants. One particular project is investigating the use of specially designed polymers to modify the bubble surface to attract and float algae (PosiDAF™) such that coagulation is no longer necessary, saving chemicals, reducing footprint, and reducing waste.



Portable Pilot DAF Plant

A portable, 5 m³/h, pilot DAF plant within an insulated 20ft container comprising multiple coagulant dosing lines, a single stage upflow flocculator and flotation system with automated recycle flow has been commissioned. It is currently stationed in Adelaide.



The DAF pilot plant has been used to demonstrate the PosiDAF™ process. In the above photo, (A) illustrates the float layer when using conventional DAF to treat an algal bloom while (B) shows the thicker layer formed when using PosiDAF™.