Use of fluorescence spectroscopy to control ozone dosage in recirculating aquaculture systems - DTU Orbit (04/12/2018)

**Use of fluorescence spectroscopy to control ozone dosage in recirculating aquaculture systems**

The aim of this study was to investigate the potential of fluorescence spectroscopy to be used as an ozone dosage determination tool in recirculating aquaculture systems (RASs), by studying the relationship between fluorescence intensities and dissolved organic matter (DOM) degradation by ozone, in order to optimise ozonation treatment. Water samples from six different Danish facilities (two rearing units from a commercial trout RAS, a commercial eel RAS, a pilot RAS and two marine water aquariums) were treated with different O₃ dosages (1.0–20.0 mg/L ozone) in bench-scale experiments, following which fluorescence intensity degradation was eventually determined. Ozonation kinetic experiments showed that RAS water contains fluorescent organic matter, which is easily oxidised upon ozonation in relatively low concentrations (0–5 mg O₃/L). Fluorescence spectroscopy has a high level of sensitivity and selectivity in relation to associated fluorophores, and it is able to determine accurately the ozone demand of each system. The findings can potentially be used to design offline or online sensors based on the reduction by ozone of natural fluorescent-dissolved organic matter in RAS. The suggested indirect determination of ozone delivered into water can potentially contribute to a safer and more adequate ozone-based treatment to improve water quality.

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