

Does the type of feed induce changes in the DOM composition of RAS waters?

RESEARCH QUESTION:

Does the type of feed used in RAS induce changes in the DOM composition of RAS waters?

DURATION: 2017 - 2022

SALINITY TESTED: Brackish water and salt water

HIGHLIGHTS:

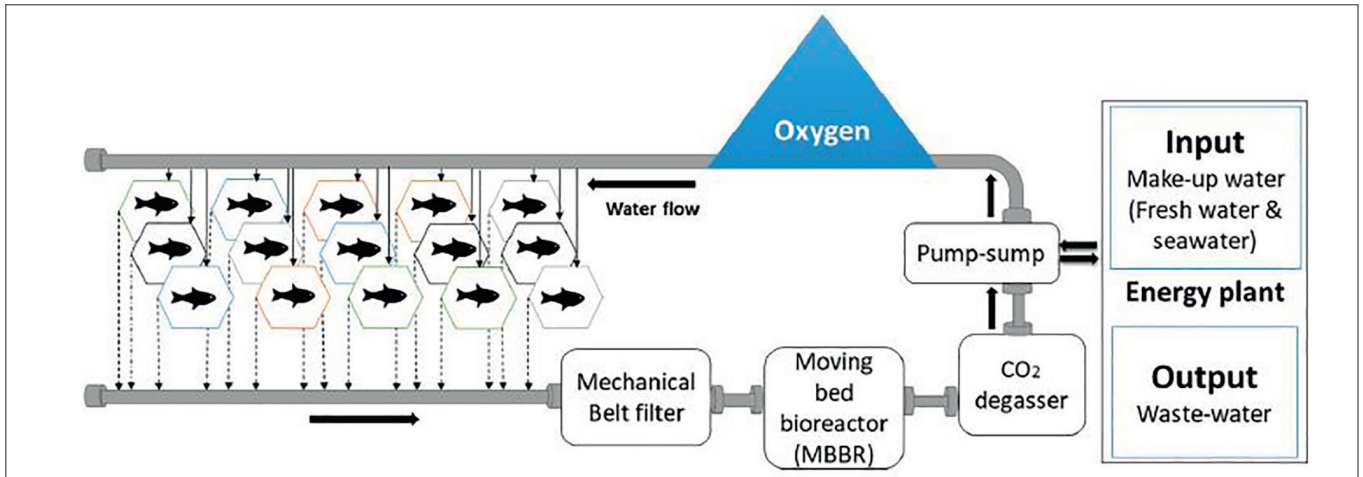
- Characterizing dissolved organic matter composition in recirculating aquaculture systems using two different and distinct feeds (commercial standard and RAS feed for Atlantic salmon).
- Samples were collected after the water treatment (pump-sump) and from the fish rearing tanks where the feeds were added to the system to gain insights on the effects of the water treatment processes on the composition of low molecular weight dissolved organic (LMW-DOM) matter.
- Untargeted high resolution mass spectrometry analysis showed molecular alterations of LMW-DOM in RAS.
- Standard feed (45-48% protein content) contributed to CHO, CHOS and lignin/ carboxyl-rich alicyclic molecules like chemical groups in dissolved organic matter.
- RAS feed (45-48 % protein content) contributed to CHNO, CHNOS and unsaturated hydrocarbon chemical groups in dissolved organic matter. Abbreviations:
 - CHO = molecules of only carbon, hydrogen and oxygen
 - CHOS = molecules also with sulfur
 - CHONS = molecules also with nitrogen in addition to sulphur

RECOMMENDATIONS:

- The molecular compositional change of the low molecule weigh dissolved organic matter in the water from the tanks compared to that in the water which was returned to the tanks after the water treatment processes (pump-sump), clearly reflected the removal of CHNO, CHNOS and halogenated chemical groups through the water treatment processes (when the RAS feed was used) -and potentially more favorable. Using RAS feed therefore indicated a significant effect.



The factsheet is ready for implementation, but with the note that the testing has not been done for all industrial relevant conditions.



Experimental setup of the recirculating aquaculture system for studying feed induce changes in the DOM composition of RAS waters.