Co-cultivation of bivalves and macroalgae: multi-trophic aquaculture without a fed species in Sweden

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Population rise is putting increasing pressure on food production systems. Aquaculture is the fastest growing global sector, but is still underrepresented in the West. In Sweden there has been an emphasis on cultivation of extractive species, which are widely regarded to hold promise as sustainable species for mass cultivation. However, commonly cultivated extractive species such as the blue mussel still produce potentially harmful waste products, primarily in the form of ammonium. Of which, high levels can contribute to coastal eutrophication and environmental degradation. A semi-enclosed system was designed to cultivate the seaweeds Saccharina latissima and Ulva lactuca with two bivalve species, the blue mussel (Mytilus edulis) and the Pacific oyster (Magallana gigas). Bivalves as much as doubled ammonium concentration in comparison to ambient environmental levels, which resulted in enhanced seaweed growth. Bivalves were seen as a potential novel biofilter, causing a reduction in epiphyte coverage on seaweeds. Seaweeds reduced ammonium concentration to ambient, pre-bivalve levels.

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