Kelp farming on Sweden's west coast: Environmentally friendly aquaculture

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There is a growing interest of the cultivation of macro algae. A new dissertation studies the best conditions for sustainable cultivation of the brown algae sugar kelp.

The negative environmental effects of kelp cultivation is very limited,

especially compared to other kinds of aquaculture, according to studies from experiments in a two-hectare test farm in Kosterhavet at the Swedish west coast. The results are presented in a new dissertation by Wouter Visch, who has studied the brown algae sugar kelp, Saccharina latissima.

"Rather, macroalgae cultivation can be advantageous from an environmental standpoint given the positive impact on benthic fauna. And kelp's uptake of nutrients can counteract eutrophication. We only found minor negative effects on certain cultural ecosystem services related to outdoor recreation and aesthetic values," says Wouter Visch.

Farm site is crucial

Choosing a suitable farm location is crucial for establishing and developing a well-functioning macroalgae farm, according to the studies.

"My results indicate some variation in absorption of nutrients and growth, depending on the location. In addition, more wave exposed farm locations, the quantity of fouling organisms declined, but so did the growth rate of the kelp. This indicates that wave exposure is an important factor for the selection of suitable cultivation sites in relation to the yield and quality of the farmed seaweeds."

Knowledge of species important for successful farming

Successful farming requires basic knowledge of population structure and genetic variation of the relevant species.

Wouter Visch has studied these factors in sugar kelp using DNA sequencing and the results showed that there are three locally adapted

subpopulations of sugar kelp along the west coast of Sweden. At the same time, genetic exchange—also called gene-flow—between them is sufficient to form a well-connected metapopulation.

"Protecting and preserving genetic diversity is important not only on land, but also in the marine environment, and is very importance for a successful kelp farming industry."

Deep-freezing to secure material for farming

Deep freezing of the sugar kelps' microscopic life stages (i.e. gametophytes) was found to be a suitable method for the long-term storage and preservation the kelp's genetic variation, according to the studies.

"After freezing, the thawed gametophytes can then be used as seed for farming or in a breeding program" says Wouter Visch.

Kelp farming is still in its infancy in Sweden despite good growing conditions and a long coastline.

"There is a huge potential for farming kelp sustainably along the Swedish west coast, however, current legislation is an obstacle," says Wouter Visch.

More information: Sustainable Kelp Aquaculture in Sweden: hdl.handle.net/2077/62099

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