

Cultivation of algae, mussels, common reed and microbes could help to improve the Baltic Sea's condition

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Macroalgae *Cladophora* growing attached to ropes together with barnacles and blue mussels. Credit: Milla Suutari

The Finnish Environment Institute SYKE has participated in the SUBMARINER project, jointly performed by eight countries in order to

investigate new ways of utilising the Baltic Sea's resources. Over three years, the project has looked at various ways of utilising macroalgae and microalgae, mussels, common reed and microbes. New fish farming methods and future use of wave energy installations in the Baltic Sea were also examined, along with opportunities for using offshore wind park areas for other economic activities.

"Executed correctly, these new ways of using the sea would cause no harm to the [marine environment](#). Instead, by cultivating algae, mussels or common reed we can remove nutrients from the sea and even improve its condition," explains Senior Researcher Jukka Seppälä from SYKE's Marine Research Centre.

With the exception of Russia, all Baltic Sea coastal states are participating in the project. Finland is represented by SYKE. The project is mainly funded by the EU's Baltic Sea Region Programme, which is aimed at promoting an economically and ecologically sustainable Baltic Sea region. New methods of removing nutrients from the Baltic Sea

Finland's part of the project involved testing of [macroalgae](#) cultivation in the sea in Rymättylä and Tvärminne. In addition, the possibilities of cultivating microalgae in under Nordic conditions were investigated.

It was discovered that cultivating mussels on substrates constructed of ropes was a more efficient method of removing nutrients from the sea than macroalgae cultivation. The Baltic Sea region's ice winters pose a specific challenge to mussel and macroalgae cultivation, as the substrates need to be lowered below the water level. The project also looked into the possibilities of using mussel and algae mass as [animal feed](#), fertiliser or in the production of [biogas](#). At current raw material prices, the cultivation of [mussels](#) or algae in the Baltic Sea is not viable. This may change, however, if cultivators were paid compensation for the nutrients

removed from the sea along with the biomass.

Fuel from microalgae? Not quite yet

Wide-scale cultivation of microalgae for biofuel production has been envisaged as a future means of energy production. During the project, it was demonstrated that the Baltic Sea region is suitable, in principle, for the production of [microalgae](#). Estimated on the basis of sunlight available, annual production quantities would amount to approximately half of the quantities achieved in the world's regions with most light. However, wide-scale algae production has not, thus far, proven economically viable. The project recommends that the Baltic Sea region focus on technology development based on the combination of expertise from various business sectors.

Chemicals from marine organisms?

"Because the SUBMARINER project covered only part of the Baltic Sea's resources, a coordinated charting of the Baltic Sea's biotechnological resources is recommended. Chemicals produced by marine organisms, for example, are used in the pharmaceutical, cosmetics, food and chemical industries. However, existing resources have not been properly charted so far. They should be investigated as part of the EU's Blue Growth initiative," Jukka Seppälä says.

"Securing marine microbial biodiversity would be economically beneficial, since it may be possible to make use of the microbes. Microbial biodiversity can be secured only by protecting marine ecosystems," Seppälä continues.

Continuation of the project

The SUBMARINER project will end at the beginning of September. At the final conference, to be held in Gdansk, Poland, guidelines will be published for making a stronger link between the utilisation of Baltic marine resources and improvement of the Baltic Sea's condition. Work will be continued through a cooperation network, under the same name as the project. This includes implementing guidelines proposed by the project and promoting new forms of use, while linking them to the resolution of environmental issues. The cooperation network operates under the EU Strategy for the Baltic Sea Region.

Provided by Finnish Environment Institute

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