

Evaluation of seaweed bioremediation capability  
in the Sustainable Seaweed Integrated  
Aquaculture System (SSIAS)

해조류 수질 정화능력을 이용한  
해조 복합양식 시스템 개발 연구

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**Abstract**

Seaweeds are reconsidered as the biofilter and production component in the sustainable seaweed integrated aquaculture system (SSIAS) to reduce the environmental impact of nutrient rich effluent in the coastal ecosystem. The development of the SSIAS is initiated between China and Korea to remedy the coastal eutrophication caused by fed aquacultures. Several local cultivars and wild species have been investigated in terms of their nutrient removal capacity. The species- and site-specific combination of the SSIAS will be optimized with the nutrient removal and growth potential of the selected seaweeds. The SSIAS will enhance the health of coastal waters and benefit the aquaculture industry.

**Introduction**

The coastal waters have been suffered due to the cultural eutrophication. Recently the nutrient rich effluents from the intensive fed aquaculture are a new source of pollution and put enormous pressure on coastal habitats. An application of the old polyculture wisdom has been reintroduced in the marine

aquaculture to remove excess nutrients. To reduce the nutrient burden of fed culture effluents, the integration of seaweed cultivation with fed aquaculture has been proposed between Korea and China since 2002. We present the results of the several species as the candidate of the SSIAS.

## Materials and Methods

The ammonium uptake rates of several local seaweed cultivars and wild species are estimated with respect to their nutrient removal capacity and growth potential in the various experimental conditions. The species- and site-specific combination of the SSIAS will be developed and its effects are evaluated by the results of the practical operation and the model simulation.

## Results and Discussion

Several local cultivar species such as *Porphyra* and *Enteromorpha* are effective candidates based on their nutrient removal and growth characteristics. The application methods of those species are dependent on the location of farm and culture species; therefore, various aspects of their combination should be considered to get the optimum practical efficiency in the SSIAS. Each SSIAS is unique for its practice. In addition to the scientific and technical support of the SSIAS, the social and legislative infrastructures should be changed to get the sustainability of the marine living resources under the integrated coastal zone management.

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