

●Basic Stage

(Fiscal Year 2008–2010)

# Okinawan Coastal Area

Utilization of diverse subtropical bio-resources in Okinawa for the creation of a marine bioindustry and establishment of branded algal products

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## Framework for Project Promotion

- Project Director.....Dr. Shigemitsu Shokita
- Chief Scientist.....Dr. Takeshi Yasumoto
- Science and Technology Coordinator.....Jun-ya Nanao

## Core Research Organizations

- Okinawa Science and Technology Promotion Center, Core Laboratory,
- University of the Ryukyus, Okinawa Prefectural Fisheries and Ocean Research Center,
- Okinawa Prefectural Industrial Technology Center,
- Okinawa Prefectural Institute of Health and Environment,
- Okinawa Prefectural Deep Sea Water Research Center

## Major Participating Research Organizations

- Industry...Okinawa Science and Technology Promotion Center, Core Laboratory
- Academia...University of the Ryukyus, Tohoku University, Niigata University, Oita University, Fukuoka University.
- Government...Okinawa Prefectural Fisheries and Ocean Research Center, Okinawa Prefectural Industrial Technology Center, Okinawa Prefectural Institute of Health and Environment, Okinawa Prefectural Deep Sea Water Research Center, National Institute of Advanced Industrial Science and Technology

## Aims of Project

The aim of this project is to lay the foundations for collaborations among industrial, academic, and prefectural institutions in Okinawa to utilize diverse marine resources for the creation of new marine bioindustries in subtropical Okinawa. Technological advances are planned in the utilization of bioactive molecules, and the processing and culture of algae. The resulting innovations are expected to bring about financial benefits for related industries.

Fucoanthin in brown algae and bioactive molecules within microalgae are the targets for the advanced use of algal constituents. The study is expected to build an industrial base for advanced bioindustries in Okinawa. We will seek to develop the ideal conditions for the production of raw or processed *Caulelpa lentillifera*, a green alga known as "marine grape." Technology will be developed to ensure the stable production of *Cladosiphon okamuranum* and related species, collectively called "mozuku."



Culture ground of Cladosiphon okamuranum

## Contents of Project

### 1 Innovative use of bioactive substances

#### 1) Utilization of fucoxanthin and other algal constituents

The bacteriostatic effects of algal polysaccharides and polyphenols will be studied for their potential use as food additives. The known potential of fucoxanthin to prevent or cure Adult T-cell Leukemia will be studied to assess the possible synergistic effect of another anti-ATL candidate fucoidan: the sulfated polysaccharide of the same algae.

#### 2) Production and Utilization of bioactive substances via the mass culture of microalgae

We will develop a method to mass-culture microalgae that produce useful substances. The bioactive compounds will be used as analytical standards and in the preparation of assay kits that are widely desired in terms of Ciguatera fish poisoning.

### 2 Development of seaweed-processing technology

#### 1) Development of a hygienic process for the culture and production of sea grape (*Caulerpa lentillifera*).

We will establish hygienic management techniques to be used at each step of the culturing and processing of sea grape. We also plan to develop seasoned processed food that is easy to market.

#### 2) Research and development of Okinawan endogenous marine algae for use in the cosmetics industry

We will seek to screen biological activity applicable to use in the cosmetics industry from extracts of Okinawan endogenous marine algae and their unused processing residue, with the final aim of commercialization as a cosmetics product.

### 3 Development of an Aquaculture Technique for Marine Algae

#### 1) Development of an aquaculture technique for the stable production of Mozuku

With the aim of achieving the stable production of *Cladosiphon okamuranus*, we will seek to improve the techniques used to raise seedlings, and seek high-quality seedlings. We will also establish practical techniques for the mass-cultivation of *C. okamuranus* thalli with enhanced functional constituents.

#### 2) Development of an aquaculture technique for the stable production of *Caulerpa lentillifera*

We will analyze the nitrogen requirements of *C. lentillifera* and develop a new fertilizer for its stable production, improving upon existing fertilizers.

#### 3) Development of an aquaculture technique for the cultivation of new species of marine algae

We will seek to optimize the water temperature and other environmental factors for the mass culturing of *Gracilaria blodgettii*, and explore the conditions required to stimulate the release of its spores. This will help in the exploitation of coastal waters for the cultivation of new algal species.

