●Basic Stage

(Fiscal Year 2003-2005)

Kumamoto Southern Area

Development of Biomass Recycling System for Land and Sea that Helps Environment Conservation

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Life Sciences
IT
Environment
Nanotech Materials
Others

Project Promotion

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Science and Technology Coordinator…Koremoto Morishita

Core Research Organizations

Sojo University, Kumamoto University, Prefectural University of Kumamoto, Yatsushiro National College of Technology

Major Participating Research Organizations

Industry…ASTOM CO., LTD, RBS Co. Ltd., SAKURAI SEIGI Co.,Ltd., M.T.L Co. Ltd ., Tanaka Shoten Co.Ltd, Iida Kogyosyo, Oju Pharmaceutical Co.Ltd
Academia…Sojo University, Kumamoto University , Prefectural University of Kumamoto, Yatsushiro National College of Technology
Government…Kumamoto Industrial Research Institute , Kumamoto Prefectural Agricultural Research Center , Kumamoto prefectural Fisheries Research Center , National Agricultural Research Center for Kyushu Okinawa Region , National Institute for Minamata Disease

Aim of research and development

Urgent issues are raised recently including the biomass in the region that has been treated as waste which need to have a value and used for resource, as well as the environmental issues such serious contamination of Ariake Sea and the Yasshiro Sea.
By combining the processing and recycling technologies of the biomass using an advanced microorganism control through the special coordination funds for promoting science and technology "Regional Research Program" accumulated in the center of the Kumamoto Prefecture south area, and the bioremediation technology that uses the alga cheek are bonded, and an integrated environmental purification system is developed for both land and sea areas.
Moreover, the biomass recycling system of land and the sea area is established for environmental preservation through verification of effectiveness of the bioactive component from various biomasses produced by the process and an advanced method is developed. In particular, the base of the industry-university-government cooperation is enforced to seek a new possibility through joint researches. The environmental recycle industry to cope with regional problems in a prompt manner in order to achieve the eco-friendly Urban Area.

✱Bioactive component
Useful elements existing in the body of living things, which controls a variety of physiologic phenomena.

Contents of research

1. Project of use of clarification function of algae (joint research project)
Searching for a possibility of eco-friendly recycle systems using sea weeds.
The fishery workers in the Minamata region are working on the trial cultivation of seaweeds including Konbu and Wakame seaweeds and development of the seagrass bed reeves in cooperation with other fishery workers and related organizations. They observed the conditions of parasitism of alga and living creatures which could live in the environment including young fishes.
In Ashikita region, the fishery workers and high school students in the regions try to increase the alga "Amamo". They grew the seeds to collect in summer for germination, planting and transplanting.


New activities for seaweed cultivation

2. Project of physiological activity material(joint research project)
In order to study various alga resources generated from "Alga Clarification Project" and the fermented byproducts from projects of Growing Stage, the separation and refinement technologies were developed along with its biological studies.
A technology to separate and refine polysaccharides related to alga is developed. The analysis for the contents and rheological analysis were conducted to study its effective use.


Development of technology to separate and refine functional components from seaweed and biomass

3. New development of dialyzer device and its practical use for environmental preservation (Result cultivation project)
A new membrane and device as the core for practical use of "the electric dialysis and fermentation system" as a new biomass system was tentatively fabricated, which combines the incomparable functions of bacteria and an electrochemical method obtained through the regional research programs. This is to review the performance of the system to remove and collect eutrophication materials in the drainage from livestock, collection of the organic acid in food-based liquid biomass, performance of bacteria for fermentatoin and durability of the membrane.

The main study results

1. Development and demonstration of pre-practical water treatment device for livestock related drainage
Approximately 50 patches of the practical demonstration test were conducted for the devices and systems for livestock drainage to obtain data for commercialization. The trial fabrication of the new electric dialysis device (ECO-EXPERT). The system is expected to be used for treatment of livestock related drainage and methane-based liquid upon fermentation and digestion.

2. Trial product development of desktop demonstration device for lab
The new cylinder type ion exchange membrane unit was developed for various biomasses. Upon demonstration of the performance, "the portable multi-purpose electric dialysis device for laboratory use" was tentatively produced. This device may be used for treatment of drainage, slurry biomass and food-related biomass as well as for removal and collection of heavy metal from the environment.

City Area Program in Kumamoto Southern Area

Commonly called as: Green Bio Area in southern Kumamoto Prefecture
Research and tests, collaboration promotion and commercialization with theme being "Environment"

<Joint research project>

①Project for utilization of purifying function by seaweed

Marine survey → Search for useful seaweed → Cultivation tests
Survey of inflow materials
Survey of seaweed bed
Survey of planktons
Understanding mass balance of nutrient enriched materials
Seaweed
Seaweed cultivation industry
～Activities for coastal environment reclamation～

②Project for bioactive materials

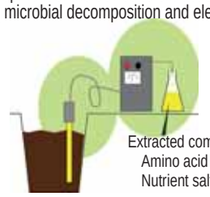
Local biomass → Search for functional components → Development of separating and refining technology
Food biomass
Seaweed

New products using functional components
～New products and new projects delivered from this area～

<Result cultivation project>

Development of new electric dialysis fermentation equipment and its commercialization to conserve environment

Biomass → Electric dialysis fermentation equipment → Manufacturing and sales of equipments
Shochu pot ale
Livestock excreta
Strained lees etc.
Development of the device to extract components using microbial decomposition and electrochemical power
～New products and new projects delivered from this area～



Extracted components
Amino acid
Nutrient salts (e.g. N-P-K)