

Hakodate Area

Development and Research for More Value-added Kjellmaniella Crassifolia Miyabe(GAGOME) and Squid

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Project Promotion

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Core Research Organizations

Hokkaido University, Hokkaido Industrial Technology Center

Major Participating Research Organizations

Industry... Kyowa Concrete Industry Co., Ltd., Readjust, Tetsugumi Underwater Operation Co., Ltd., NIPPON CHEMICAL FEED Co., Ltd., i JARD, S.K.K.Co., Ltd., SEC Corporation Ltd, Handa Co., Ltd., CHIBASUISAN, Co., Ltd., Towa Denki Seisakusho Co., Ltd., TAIYO SEISAKUSHO Co., Ltd., DENSEI, INC., KYOSEI Pharmaceutical Co., Ltd., DOHSUI Co., Ltd.,

MARUKICHI SHOKUHIN. Co., Ltd., Northgiken Co., Ltd., BIO CREATE Co., Ltd, Kamada Shouten Co., Ltd, Matsunagashouken Co., Ltd, Konbu Roudo Kenkyusho Co., Ltd., Human Life and Science company Youki Co., Ltd., TOKIKANECHIKUHAN Co., Ltd, Hakodate Sobaya Communications, KAJIWARA KONBUTEN Co., Ltd, FURUTASHOUTEN Co., Ltd., KYUNO CORPORATION, WAKI SHOJI Co., Ltd, Hokkaido Conf. Co. Ltd., Dounan Shokuhin Co., Ltd, MARUNAMA KOSEI Corporation Co., Inc, Kouseimaru Inc, TERASHIMA SHOUKAI Co., Ltd., YAMAICHI SHOKUHIN Co., Ltd, ISHIO SHOKUHIN Co., Ltd., DEGUCHI SEIMEN Co., Ltd., JOKKI Co., Ltd, SUGA Co., Ltd., Miyakawa Co., Ltd., Fuji Ocean Works Co., Ltd, Yamadai Foods Processing Co., Ltd., Notosuisan Inc, Japan Fisheries Cooperatives Minamikayabe, Gotoken Co., Ltd, Hokkaiyamato. Co., Ltd., Yoshida Shokuhin Unlimited Partnership, MICHIBA, Sushidokoro, KIHARA, Ishikawaseimenjo Hakodate Yanagiya Co., Ltd, Touro Kudo (Fishery), Maruhachi Muramatsu Inc, Academia... Faculty of Fisheries Sciences Hokkaido University, FUTURE UNIVERSITY-HAKODATE, Hakodate National College of Technology, Government... Hokkaido Industrial Technology Center

Aim of research and development

The science and technology of the rich originality related to the fishery and the ocean in the Hakodate area was united and the adding further value that aimed at the brand power strengthening and advanced use of the Kelp and squid that were typical ocean resource of this area was advanced.

The establishment of the sea and land-based cultivation technology and promotion of the fucoidan related industry were attempted by clarifying the life cycle (history of life) of Gagome which produced good quality fucoidan voluminously and operating it.

In the squid, the scientific elucidation and the promotion of industrial engineering technology were aimed at concerning following theme, which were the mechanism of keeping of freshness in the squid, the relationship between moisture status and the quality in the drying food, the speed up of the rapidity bacterial detection for sea foods and the method of separation and decentralizing of the fine squid ink particles with high purity.

The overall resource development of the marine organism was aimed at and it tied to the creation of high value added new industry, information industry and others.

* Gagome

Large scale brown algae of seaweed, *Kjellmaniella crassifolia Miyabe*, specially produced in surrounding ocean area in Hakodate (length about 2m).

* Fucoidan

Sulfated polysaccharide of which main ingredient is fucose and a part of water soluble vegetable fiber. Multi-function material that has anti-hypertensive, anti-tumor and anti-allergic effects.

Contents of research

1. Development investigation concerning operation of life cycle and other of Gagome

The life cycle of Gagome was clarified and the growth of Gagome resource was attempted with the seaweed bed reef and the net system in the sea. Moreover, the land-based cultivation technology of Gagome, extraction technology of viscous polysaccharide such as fucoidan. The land-based cultivation system of Gagome was produced experimentally, and the cultivation technology of blade and the consecutive extraction technology of mucilaginous polysaccharides were developed. In addition, biological information concerning Gagome was collected for publication.

2. Development investigation concerning formation of high value and integrity securing of squid.

Development investigation of the following four sub themes were done to aim at making the high value and effective use of squid's resource.

- 1) In the development investigation of quality retention technology for squid, squid's super-high freshness transportation technology as the live or fresh fish was developed.
- 2) In the development investigation concerning high-quality dried squid by using bacterial growth controlling, an innovated technology for the production of high quality dried squid was effectively developed.
- 3) In the development investigation concerning rapid bacterial detection analyzer based on bioinformatics and genetic information, rapid specific bacterial detection analyzer applied fluorescence in situ hybridization method was developed.
- 4) In the development investigation concerning separation and purification of squid ink particle, the technology of the squid ink particle separation and purification with diameter of submicron was developed.

The main study results

1. Developmental study of mariculture and reproductive technologies of Gagome
The mariculture and reproductive examination of Gagome was executed by setting up the kelp beds and the net systems around coasts of Hakodate, and it was confirmed that Gagome grew up to about 2m in the net systems by the half a year.



Mariculture and reproduction of Gagome (Kjellmaniella Crassifolia miyabe) around coasts with net system (kelpgrowing system)

2. Developmental study of land-based cultivation technologies of Gagome (*Kjellmaniella Crassifolia miyabe*)
The land-based cultivation system of Gagome was produced experimentally, and the cultivation technology of blade and the consecutive extraction technology of mucilaginous polysaccharides were developed.



Land-based cultivation of Gagome (Kjellmaniella Crassifolia miyabe)

3. New high value products from Gagome materials in Hokkaido
New products: Beauty and skin soap (Gagome kelp soap), healthy and dietary supplement (Laminest) with a content of kelp polysaccharide, skin conditioner (Aquist) etc.



New value-added products made from Gagome (Kjellmaniella Crassifolia miyabe)

4. Development of transportation technology for live fish and fresh squid
The sealed pack transportation examination of live squid was done, and succeeded to be living up to 56 hours. Moreover, the transportation technology for fresh fish as living tissue was developed.



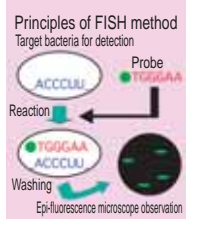
Operation of packaging a squid in plastic bag for transportation

5. Development of a test dryer for evaluating the high-quality dried squid manufacturing
The specified procedure derived by controlling temperature, drying air humidity, and drying air flow rate was developed, which is an efficient manufactured technology for producing a high-quality dried squid. Based on this technology, an evaluation-aided test dryer was also developed.



Drying equipment for evaluation

6. Development of Fluorescence in situ hybridization (FISH) following cultivation was developed
FISH following cultivation method was developed for rapid specific detection of viable bacteria, and the method could be applied to various foods.



Principles of FISH method

7. Development of separation purification technology of squid ink pigment particles
The technology that was efficient separation, and purifications of the globular squid ink pigment particles of monodisperse with about 0.3 microns was developed.



Separated and refined squid ink pigment

