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RELEASE OF TECHNOLOGY ON

SEAWEED CULTURE

Central Marine Fisheries Research Institute
Cochin - 18

Seaweeds And Their Importance

Seaweeds, as the name implies covers the macroscopic plant life of the sea except the flowering plants. Most of the seaweeds are attached to rocks and also grow on other plants as epiphytes. Along the coastline of India, seaweeds are abundant where rocky or coral formations occur. This sort of substratum is found in the states of Tamil Nadu and Gujarat and in the vicinity of Bombay, Ratnagiri, Goa, Karwar, Vizhinjam, Varkala, Vishakapatnam and in the Lakshadweep and Andaman-Nicobar Islands. The seaweeds are classified into three important groups namely Green, Brown and Red seaweeds. Seaweeds contain different vitamins, minerals, trace elements and proteins. Seaweeds are also a rich source of iodine. As seaweeds are cheap sources for minerals and trace elements, meals prepared from seaweeds can be utilized as supplements to the rations of cattle, poultry and farm animals. From time immemorial seaweeds have been used as manure in the coastal areas. As the minerals and trace elements occur in water soluble form, these chemical constituents are readily absorbed by plants when the manure is applied. Deficiency diseases are also controlled by the minerals and trace elements present in them. There are certain medicinal properties for the seaweeds. Seaweeds rich in iodine such as **Asparagopsis taxiformis** and **Sarconema** sp. can also be used for controlling goitre disease caused by enlargement of thyroid gland. Indian marine algae have all the essential aminoacids needed in the human diet which are not available in other vegetable food materials.

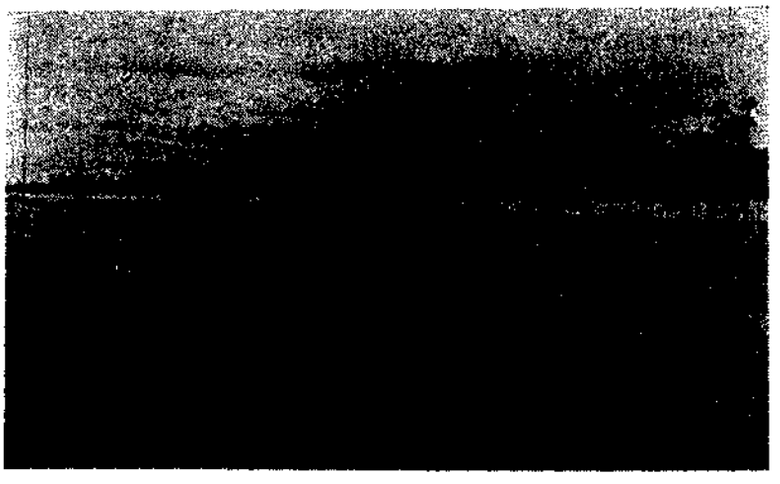
Seaweeds yield the most important products such as agar-agar and algin. They are colloidal carbohydrates present in the cell walls of these algae. Agar-agar is extracted from seaweeds such as **Gelidiella acerosa, Gracilaria edulis, G. follifera, G. corticata** and **G. verrucosa.** Algin is extracted from **Sargassum** spp. and **Turbinaria** spp.

Need For Seaweed Culture

In our country there are some factories which manufacture agar–agar and algin (Madurai, Tiruchirapalli, Ahmedabad, Baroda, Hyderabad etc.). In recent years, many entrepreneurs are coming forward to start these industries as a result of which there will be great demand and competition for the raw material and a day may come when acute shortage of raw material will be felt in which case the country or the whole world may find it difficult to prepare certain life saving vaccines since agar–agar is used as a culture medium for the bacteria and moulds. In order to meet this, a process to augment the supplies of these seaweeds by culture practices has to be developed.

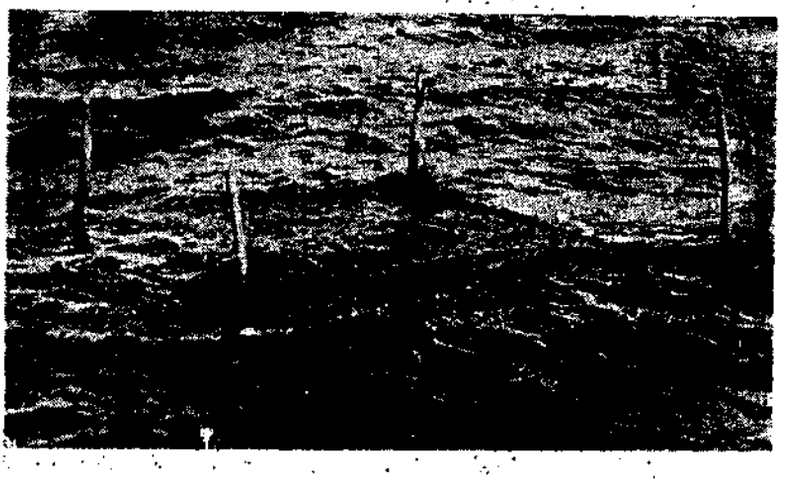
Culture of Seaweeds

Since 1972, the Central Marine Fisheries Research Institute has been engaged in the cultivation of several economically important seaweeds and the method of cultivation of **Gracilaria edulis,** a fast growing species with minimum of seed material, has been standardized. These culture experiments have been done by introducing fragments of the seed material in the twists of coir ropes which are fabricated in the form of 5 x 2 metre size nets and these coir nets were tied to wooden poles fixed in the coastal waters. The plants reach harvestable size after 80 days growth. The yield from a coir net is approximately 30 kg fresh weight.

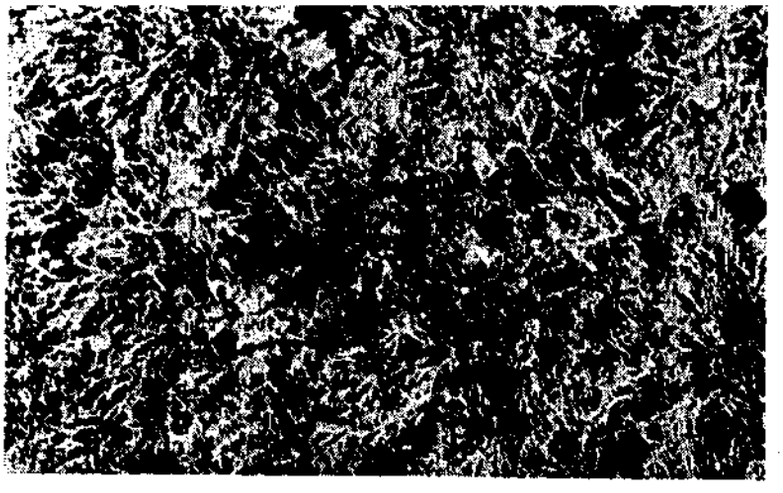


Seaweed culture farm in the coastal waters.

Insertion of seed materials into the twists of coir ropes.



Fixing the coir net with seed material in coastal waters.



Seaweed (*Gracilaria edulis*) ready for harvest after 80 days growth.

Experiments were also conducted using coir ropes. The difference between coir net method and coir rope method is that the former gives a very good support to the growing plants and it also withstands for four harvests while the latter does not give much support as it is at the mercy of the waves, tides and winds. Further, the seed material sometimes may loose its grip and fall off. The coir rope stands only for two harvests.

Advantages of Culturing the Seaweeds

1. To augment the supply of seaweeds.
2. A single species of alga can be maintained in a steady crop.
3. The algae will be uniform in quality.
4. If the cultured algae is utilized by the industry, our natural resources can be conserved and can be used as mother material.
5. A continuous supply of the alga can be maintained.
6. By introducing improved techniques and by using modern materials, the yield can be increased and cost of the cultivated seaweeds can be brought down considerably.
7. There is a possibility of improving the quality of the seaweeds by adopting scientific breeding and other techniques of crop improvement.
8. The other economic marine algae which do not grow on our coasts could be introduced for cultivation in our waters, thereby augmenting our resources.

Uses of Agar–Agar and Algin

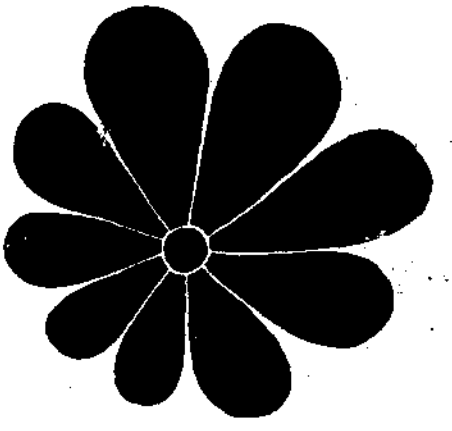
In general, both agar and algin serve as stabilizers, emulsifiers, thickeners, body-producers and gelling agents. Agar–agar is often used where firm gel is needed and algin for soft and viscous products. In ice-cream industry, both agar and algin are used as stabilizing agents to give smooth body and texture to the ice-cream and also to prevent the formation of large ice crystals. Similarly, these two seaweed colloids are employed in icings to prevent adhesion of the

sugar coating to wrappers, in canning industry as coating materials for preserving fish, meat and other products, in the preparation of milk puddings, dental impression materials and agricultural sprays.

There are certain specific uses for each of these two extracts. For instance, agar is used in smoking tobacco and fruit cakes to serve as moisture retaining agent, in confectionary industry for making gelly candies, in drawing tungsten wires as a lubricant, in hectograph duplicators, in photofilms and plates. It is also widely used as microbiological culture medium, therapeutic agent in constipation and as coating material for capsules.

Algin is used for sizing textiles and paper, thickening textile paints and for boiler water treatment. This is the most useful colloidal carbohydrate in cosmetic industry for preparing creams, beauty milks, mouth washes, hair pomades, tooth pastes etc. It is also used in the preparation of tablets and pills as granulating and binding agents, in rubber industry as a creaming agent to separate the rubber, in the manufacture of lignite briquettes, in liquor clarification, in varnishes, paints, adhesives, leather polishing materials etc. Sodium alginate and other salts are used in the manufacture of seaweed rayon. Alginic acid and its salts are used as blood anti-coagulants.

Hence, the culture and utilization of seaweeds can contribute to rural development and thus to the economy of the country as a whole.



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