KADALEKUM KANIVUKAL

(Bounties of the Sea)

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SEAWEED CULTURE

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Seaweeds which are macroscopic marine algae belong to the primitive non flowering group - Thallophyta. They grow submerged and attached to hard substrata such as stones, rocks and coral reefs along the shallow coasts, lagoons, estuaries and brackishwater habitats of the Andaman - Nicobar and Lakshadweep islands and coastal areas of Tamil Nadu, Kerala, Karnataka, Maharashtra, Gujarat, Goa, Orissa and Andhra Pradesh. Based on their pigmentation and other morphological characteristics they are categorised into three major groups- chlorophyceae which is popularly known as green seaweeds, phaeophyceae or brown seaweeds and rhodophyceae or red seaweeds.

Uses of seaweeds

Seaweeds contain more than 60 trace elements in a concentration much higher than in land plants. They also contain vitamins, proteins, essential aminoacids, iodine, bromine and antibiotics and several bioactive substances. They are used as human food, feed for livestock, poultry, fish and prawn and as manure for many plantation crops.

Agar is mainly produced from red seaweeds such as *Gracilaria edulis, Gelidiella acerossa, Gracilaria verrucosa* and carrageenan from *Eucheuma* and *Hypnea*. Alginic acid and mannitol are manufactured from brown seaweeds such as *Sargassum* and *Turbinaria*. These phycocolloids are used in food, confectionery, pharmaceutical, biomedical, dairy, textile, paper and paint industries as gelling, stabilizing and thickening agents. In Japan, Malaysia, China, Philippines and Indonesia, green seaweeds such as *Ulva, Enteromorpha, Caulerpa, Codium* and *Monostroma;* brown seaweeds such as *Sargassum, Hydroclathrus, Laminaria, Undaria* and *Macrocystis* and red seaweeds such as *Porphyra, Gracilaria, Eucheuma, Hypnea, Laurencia* and *Acanthophora* are consumed as vegetables, in soups, salads, porridges and pickles.

Resource assessment surveys on seaweed conducted by CMFRI, CSMCRI and NIO indicate that the total standing crop along the Indian coastline consists of more than 1,00,000 tonnes wet weight per year belonging to 680 species of which 60 species are economically important. They comprise 8,000 tonnes of agar-yielding seaweeds, 6,000 tonnes of carrageenan-yielding seaweeds and 16,000 tonnes of algin yielding brown seaweeds. Edible and other green seaweeds constitute a bulk of 70,000 tonnes.

Why cultivate seaweeds?

In India there are about 50 seaweed industry units located in Ahmedabad, Baroda, Cochin, Hyderabad, Madurai and Ramanathapuram. They depend only on natural seaweed beds for their raw material. A rough estimate indicated that 8,100 tonnes dry weight of agar and algin-yielding seaweeds was utilized by the industry in the year 1995. As more and more new industries are coming up every year, exploitation rate exceeds the harvestable biomass. The indiscriminate exploitation of these resources from the natural beds leads to shrinking of stock. Hence, mariculture of seaweeds all along the Indian coast, estuaries and certain backwaters is the only way to increase the production of phycocolloids and thereby to make the industry commercially attractive.

Advantages of seaweed mariculture

a) Increases the seaweed production

b) Desirable varieties can be selected and cultivated on a large scale

c) Natural beds can be protected and conserved against over-exploitation

d) Exotic or oriental species of commercial seaweeds such as *Eucheuma* can be introduced, acclimatised and cultivated in our waters

e) Can support seaweed industry by regular supply of raw materials of same quality and maturity at low cost

How to culture seaweeds?

The Central Marine Fisheries Research Institute has developed technologies for mariculture of seaweeds especially

the agar-yielding red seaweed *Gracilaria edulis* by constant research since 1972. Calm and shallow coasts and bays and lagoons with sandy bottom are ideal sites for *G. edulis* culture. For optimum growth of this weed a salinity of 28 - 35 ppt is desirable. *G. edulis* can easily be grown to harvestable size within 60 days from small bits of vegetative fronds. This is cultivated in 5 x 2 m size net rafts made of coir ropes. *G. edulis* stock collected from natural bed are cut into small bits of approximately 5 cm size. These bits of about 5 g are inserted between the twists of the rope. These floating net rafts are tied to wooden poles that are staked from the sea floor or tied to floats and anchors in places where wooden stakes cannot be fixed. Like this about 900 net rafts can be accommodated in a hectare area. These rafts are submerged in 30-40 cm water column to avoid desiccation during the ebb tide.

Besides net rafts, *G. edulis* can also be cultivated in long-lines made of thick 10 m long coir ropes from which small seeded ropes be suspended at regular intervals. Seed stock for mariculture can be obtained from Rameshwaram and Kilakkarai of Tamil Nadu coasts or from the lagoons of Lakshadweep islands. Once in every fortnight cleaning the rafts is desirable to remove epiphytes and other attached weeds. The harvest is made after 60 days by cutting the loosely grown fronds, leaving the base attached to the rope. This forms the seed material for the second crop. Approximately 30 kg of seaweed per net can be harvested from 10 kg seed stock. In this way during the fair weather three or four crops can be cultivated in a year.

The harvested seaweed must be cleaned and dried well before storing. The moisture content in *G. edulis* ranges from 70- 75%. Hence the dry weed weighs one fourth of the weight of fresh seaweed. Dried seaweeds are sold to the industry at the rate of Rs. 4,000 to 5,000 per tonne. Agar is extracted from the dry seaweed.

Production of oyster, mussels, cuttlefish, finfishes, shrimps, lobsters and seaweeds through aquaculture has increased from just 10.4 million tonnes in 1980 to 22.6 million tonnes in 1990. This hike in production is attributed mainly due to 87.2% increase in seaweed. China achieved a record production of 2,75,000 tonnes dry weight of *Laminaria* in 1990

from just 62 tonnes in 1952. Today Japan stands first in the production of nori or *Porphyra,* China for *Laminaria,* South Korea for *Undaria edulis* and the Philippines for *Eucheuma.* India can take up *Gracilaria* culture and become the largest producer as she is endowed with 8,041 km long coastline and 51.2 km^2 of continental shelf area in the form of sheltered bays and lagoons. Venturing into mariculture of *G. edulis* along the Kerala coast with the public participation will be a highly profitable and spare time avocation.