CMFRI
bulletin 41

DECEMBER 1987

SEAWEED RESEARCH AND UTILIZATION IN INDIA

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PROSPECTS OF SEAWEED RESEARCH AND UTILIZATION

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Considerable work has been carried out on various aspects of Indian seaweeds. Owing to the utilisation of seaweeds in India for commercial production of agar and algin, the research on seaweeds has attained a new impetus. The assessment of available seaweed resource in India has been necessitated by more and more algin and agar industries coming up in the recent years. Survey of the seaweed resources on the coasts of Tamil Nadu, Goa, Maharashtra, Gujarat and Lakshadweep has been completed and the estimates of standing crop of these areas are available. The seaweed survey of Andhra Pradesh coast has been done recently. The resources survey on the rest of the Indian coastline and of Andaman-Nicobar Islands has to be undertaken to estimate the total standing crop and, in particular, the harvestable quantities of agarophytes and alginophytes.

Our knowledge on the taxonomy of seaweeds especially those of Andaman and Nicobar Islands is still incomplete. Much work in this direction has to be undertaken. Data on the local flora of each region will help the seaweed industry fo utilise the various commercially important seaweeds.

In order to meet the increasing demand of seaweeds for the agar and algin industries, large-scale cultivation of economically important algal species in coastal waters have to be undertaken. The suitable sites along the east and west coast have to be explored. Investigations on the growth and fruiting behaviour of economically important seaweeds growing in different areas must be made for proper utilization of the available resources and for cultivation of these seaweeds. Seaweed culture technology for the Indian agarophytes and alginophytes has not attained perfection in spite of continued effort by various research organisations. An economically viable and easy technology has to be evolved. Seaweed cultivation on commercial scale could augment the supply of seaweed and provide employment to the coastal population, which may help in improving their economic condition and thus help in rural upliftment.

Recently, agar industries use *Gelidiella acerosa* and *Gracilaria edulis* and algin industries use species of *Sargassum* and *Turbinaria* as raw materials, since the yield and quality of the product is good in these species. Other plants which are being wasted could be utilised properly. Species like *Hypnea,* which is available in large quantities in different parts of Indian coast, can be used for production of good quality carrageenan. Species of brown algae other than *Sargassum* and *Turbinaria* can be tried for alginate extraction after some chemical process. Economically important high-yielding seaweeds from other countries could be introduced in our coastal waters. *Eucheuma*, which is being cultivated on a large scale in South East Asian countries such as Philippines, Indonesia and U. S A. as a source of kappa carrageenan, is an ideal seaweed for introduction in our country. The growth of seaweeds in cultivation could be improved by using various growth

promoting harmones, fertilizers and genetical techniques.

In some developed countries, efforts are being made for using the seaweeds such as *Laminaria* and *Macrocystis* for production of methanol. In our country, species of *Sargassum* could be used for this purpose. Proper technology has to be evolved to utilise the hydrogen released by some seaweeds during photosynthesis. Seaweeds could be utilised for the production of biogas by fermantation technique. Efforts have to be taken to develop suitable techniques to utilise the cast-ashore seaweed in our coastline as a source of energy for producing methanol, hydrogen and biogas and for using as fodder, manure and liquid fertiliser.

Data collected by chemical analysis of some Indian seaweeds indicate that they are good sources of proteins, vitamins, iodine, minerals and trace elements. Much information remains to be collected on the chemical contents of yet other seaweeds.

Edible seaweeds such as *Gracilaria edulis*, *Caulerpa* spp., *Acanthophora spicifera*, *Codium* sp., *Porphyra* etc. can be cultivated for human consumption. These protein-rich seaweeds could provide supplementary diet and so should be made palatable and popularised. It is also possible to carry out seasonal cultivation of *Porphyra* sp. in Gujarat and other places as is being done in Japan, during winter months. *Porphyra* and *Monostroma* are popular food items in Japan, Korea and other South East Asian countries and they are cultivated there in a large scale. The occurrence of thes species have been reported along the east and west coasts of India.

Pond culture of seaweeds should also be taken up. There are immense possibilities for seaweed culture in brackishwater areas, too, where they form major component among aquatic macrophytes as well as in some estuarine areas and coastal inundated wates in our country.

The extraction of bio-active agents from seaweed is a new line of work which has opened up further possibility of utilising this resource. Connected with this would be the better utilisation of seaweeds for production of many important pharmacological products.

It is imperative that we develop on a large scale the simple techniques for culture of seaweeds at low cost in our inshore, estuarine and backwater areas. Recently, Malaysia has achieved a commendable lead in the culture of *Gracilaria*, and the techniqes should be appropriately and widely adopted in our coastal waters.

I also feel that if seaweed cultivation is to be taken as a coastal rural programme, it should also be combined with post-harvest processing units for extraction of some of the products, so as to bring better economic returns to the seaweed cultivators. The package of practices involving low-cost technology of product development has to be evolved so the research and development in this direction becomes very relevant.

Besides the selected areas along the coast including estuaries and lagoons, Andaman & Nicobar and Lakshadweed islands too have immense possibilities for culture of seaweeds. Hence technology-transfer programme should be planned to cover also these areas, where very productive results could be achieved. I am very optimistic that seaweed culture through proper techniques would yield far better results as its production potential is immense compared to exploiation from natural resources.

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