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ECONOMICALLY IMPORTANT SEAWEEDS

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
INDIAN COUNCIL OF AGRICULTURAL RESEARCH
DR. SALIM ALI ROAD, POST BOX NO. 1603, TATAPURAM - P. O.
ERNAKULAM, COCHIN - 682 014

ECONOMICALLY IMPORTANT SEaweEDS

**N. Kaliaperumal
S. Kalimuthu
J. R. Ramalingam**



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&
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Front cover : Seaweeds on the coral reefs in the subtidal region
at Kilakkarai

Front cover
(inside) : Seaweeds on the rocks in the intertidal region at
Mandapam coast

Back cover
(inside) : Seaweeds harvested by fishermen from Gulf of
Mannar Islands using boats.

Back cover
(outside) : Seaweeds collected by fisherwomen from subtidal
coral reefs at Kilakkarai

PREFACE

Seaweed industry is a promising and flourishing industry in India. About 700 species of seaweeds have been reported from east and west coasts of India and from lakshadweep and Andaman-Nicobar. They belong to four groups namely green, brown, red and blue-green algae.

At present the seaweeds exploited from natural seaweed beds are used for agar and sodium alginate only. They can also be used for the production of other phytochemicals such as agarose, carrageenan and also for fertilizer, human food and animal feed. Though many species of seaweeds viz. *Gelidiella acerosa*, *Gracilaria edulis*, *Gracilaria crassa*, *Gracilaria verrucosa*, *Sargassum* spp. and *Turbinaria* spp. are harvested from the natural seaweed beds, the fishermen involved in their collection are not fully aware of these species and also other economically important seaweeds growing in the vicinity.

This handbook attempts to give an illustrated information on 35 species of economically important agar, agaroid, algin yielding and also edible seaweeds which occur commonly and abundantly. I would like to place on record my appreciation of the efforts made by Dr. N. Kaliaperumal, Shri. S. Kalimuthu and Shri J. R. Ramalingam, Central Marine Fisheries Research Institute, in preparing this handbook. I hope and trust this handbook would serve as an useful field guide and ready reference for identifying commercially important seaweeds to all those interested in seaweed collection and processing.

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July 1995

M. DEVARAJ
Director

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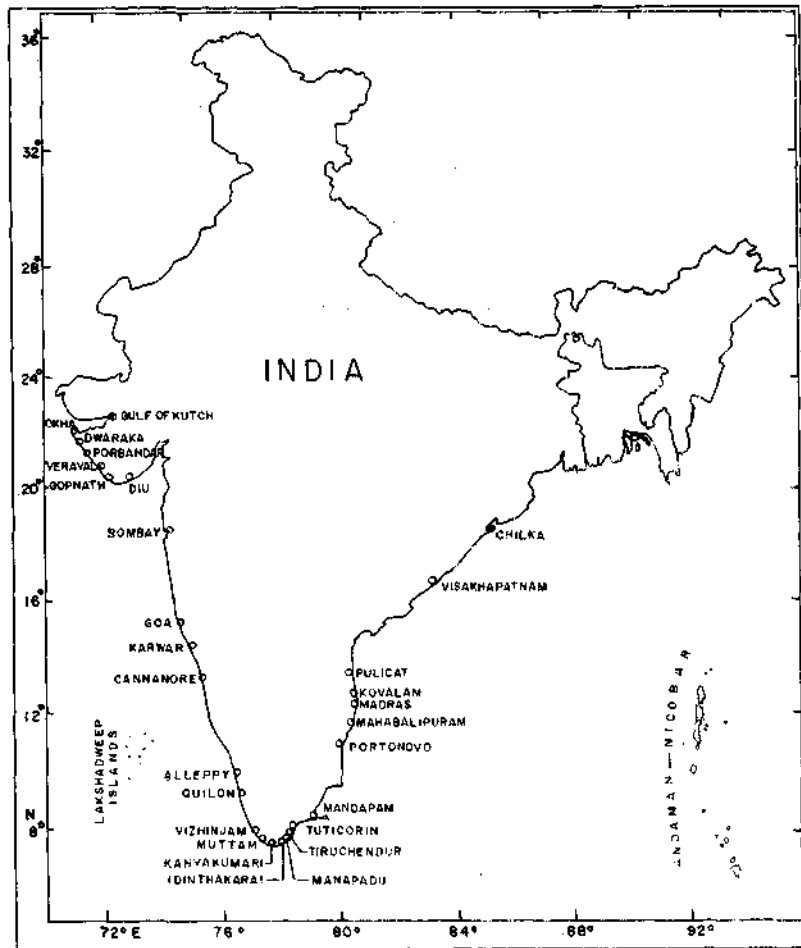


Fig 1

AGAR YIELDING SEAWEEDS

GELIDIELLA ACEROSA



Division : Rhodophyta
Class : Rhodophyceae

Order : Gelidiales
Family : Gelidiellaceae

Description : Plants brownish-red in colour and 1-6 cm tall; thallus composed of slender, cylindrical stolens that give rise to erect and decumbent branches above and coarse, short and simply branched rhizoids below; plants tufted, wiry, robust, cartilaginous, erect axes sparsely branched, provided with short determinate branchlets.

Habitat : Commonly encountered on rocky intertidal areas; grow throughout the year and available in exploitable quantities.

*Distribution** : Okha, Dwarka, Porbandar, Diu, Veraval, Manapad, Tuticorin, Mandapam, Lakshadweep and Andaman-Nicobar.

Agar : The maximum yield of agar from this seaweed is 50.8% with gel strength of 325 g/cm² at 1.5% concentration.

Uses : It is used as raw material for the manufacture of agar.

Tamil Name : Marikkolundu Pasi

*The locations mentioned throughout the text are indicated in Fig. 1.

GELIDIELLA INDICA



Division : Rhodophyta
Class : Rhodophyceae

Order : Gelidiales
Family : Gelidiellaceae

Description : Plants purple in colour, 3 to 4.5 cm high in entangled tufts, giving rise to stolon-like creeping branches from the base, these attached by discoid rhizoids; creeping stolons give rise to erect axes above; erect axes cylindrical or slightly complanate below, gradually expanding to flattened frond with obtuse apex, entire or branched above.

Habitat : It is growing in the intertidal rocky shore throughout the year but not available in harvestable quantities.

Distribution : Muttam, Kovalam, Idinthakarai, Manapad and Tiruchendur.

Agar : The yield of agar from this species is 44% with gel strength of 30 g/cm².

Uses : It can be used as raw material for production of agar.

GRACILARIA EDULIS



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Gracilariaceae

Description: Plants erect and grow upto 20 cm or more; brownish red or greenish; alternately irregularly branched; branches hardly constricted.

Habitat: It grows abundantly on seagrass beds in shallow lagoons formed between the shore and fringing coral reefs. It is also attached to small stones and shells on sandy and muddy areas. This agarophyte occurs throughout the year in harvestable quantities.

Distribution: Tuticorin, Mandapam, Lakshadweep and Andaman-Nicobar.

Agar: The yield of agar from this plant is 45% and the gel strength of agar is 139 g/cm².

Uses: It is used as raw material for the production of agar and also consumed in the form of porridge by coastal people. It can also be used for preparing jelly, payasam, wafer and pickle.

Tamil Name: Kanji Pasi

GRACILARIA CRASSA



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Gracilariaceae

Description: Plants brownish-red or greenish in colour; form dense cushions on the substratum with dichotomously and irregularly branched fronds; branches are upto 4 mm diameter, cylindrical and sometimes constricted with club-shaped or oblong articulations.

Habitat: It grows throughout the year on rocks and dead coral pieces as large tufts in the intertidal and subtidal regions. It is available in harvestable quantities.

Distribution: Tuticorin, Mandapam and Andaman-Nicobar.

Agar: The yield of agar from this plant is 23% and the gel strength is 140 g/cm².

Uses: It is used as a source for agar manufacture.

Tamil Name: Ver Pasi

GRACILARIA VERRUCOSA



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Gracilariaceae

Description: Plants dull purplish-red to purple, greyish, brownish or greenish, translucent and bushy; 15 to 25 cm high with several fronds arising from the holdfast; erect fronds are irregularly and multifariously branched and the branches are sometime loaded with small and unbranched branching; firm, fleshy, cartilaginous texture and cylindrical throughout; horny texture when dried.

Habitat: It is found in quiet, warm shallow bays and slightly brackish waters in protected locations. Plants grow on rocks or small stones in sandy beds of littoral and sublittoral regions of coastal waters. This seaweed grows almost throughout the year and available in harvestable quantities.

Distribution: Okha, Bombay, Goa, Tuticorin, Mandapam, Madras, Pulicat, Chilka and Andaman-Nicobar.

Agar: The yield of agar from this plant is 23% with gel strength of 41 g/cm².

Uses: It is used as raw material for agar manufacture. It is also eaten raw as salad or cooked with vegetables.

Tamil Name: Thadi Pasi or Koonthal Pasi

GRACILARIA ARCUATA



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Gracilariaceae

Description: Plants brownish-red and reach a height of 22 cm with several fronds arising from a discoid holdfast; fronds are alternately, secondarily branched at the upper parts; the branches and branchlets are slightly constricted near the bases.

Habitat: It is attached to rocks and stones in sheltered areas of intertidal and subtidal regions. This agar yielding seaweed occurs in all months of the year but not in exploitable quantities.

Distribution: Kanyakumari, Tiruchendur, Manapad, Idinthakarai, Tuticorin, Mandapam and Lakshadweep.

Agar: The yield and gel strength of agar from this alga are 48% and 67 g/cm² respectively.

Uses: It is used for the manufacture of agar along with *Gracilaria edulis*.

GRACILARIA CORTICATA VAR. CORTICATA



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Gracilariaceae

Description: Plants brownish-red in colour and 15 to 20 cm tall; regularly dichotomously branched with thick and cartilaginous fronds; margins entire and rarely proliferous.

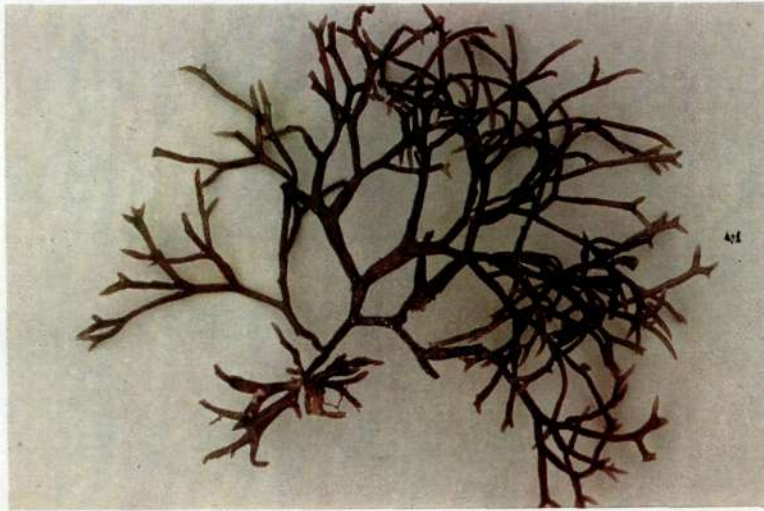
Habitat: Attached to rocks and stones in the intertidal area. It is found throughout the year and occurs in harvestable quantities.

Distribution: Dwarka, Bombay, Karwar, Goa, Quilon, Vizhinjam, Muttam, Idinthakarai, Manapad, Tiruchendur, Tuticorin, Mandapam, Mahabalipuram, Madras, Visakhapatnam and Andaman-Nicobar.

Agar: The yield of agar from this plant is 45% and gel strength is 134 g/cm².

Uses: It can be used for agar production.

GRACILARIA CORTICATA VAR. *CYLINDRICA*



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Gracilariaceae

Description: Plants 6 to 10 cm tall or more; attached by discs arising from the basal parts of fronds; dark red to yellowish-red in colour; often with variegated spots on fronds; fronds dichotomously, alternately and irregularly branched; flat or compressed at lower parts, subterete to cylindrical and closely branched above with pointed or spinous apices.

Habitat: It grows on rocks protected from wave wash in the sublittoral region and also in rock pools of the intertidal region. This seaweed occurs throughout the year but not in harvestable quantities.

Distribution: Idinthakarai, Manapad, Tuticorin, Mandapam and Andaman-Nicobar.

Agar: It gives 43% yield of agar with a gel strength of 15 g/cm².

Uses: It can be used for agar production.

GRACILARIA FOLIIFERA



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Gracilariaceae

Description: Plants are bushy, brownish-red 15 to 20 cm tall; polydichotomously, irregularly and sometimes pinnately branched with thin and brittle fronds; margins proliferous.

Habitat: It grows very rarely in the intertidal zone and abundantly in shallow lagoons and submerged coral reefs. It occurs in all months of the year but only in less quantities.

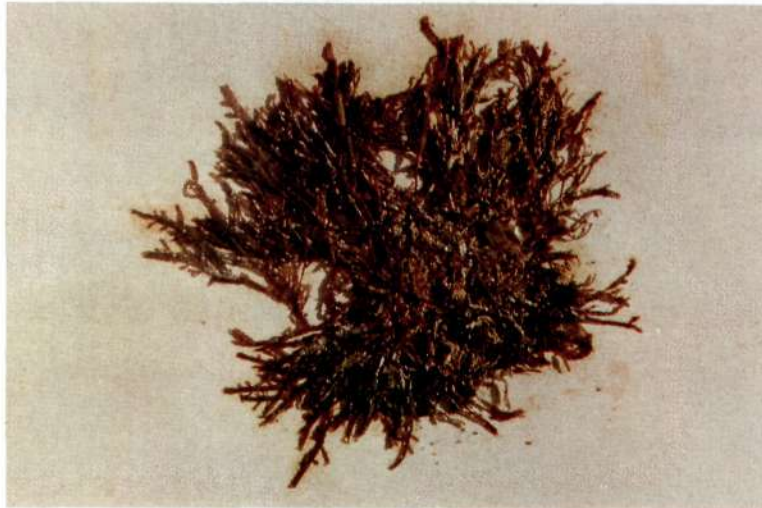
Distribution: Gopnath, Okah, Bombay, Muttam, Kovalam, Idinthakarai, Tuticorin and Mandapam.

Agar: The yield of agar from this seaweed is 50% and gel strength of agar is 55 g/cm².

Uses: It is used as an additional source for agar production.

Tamil Name: Cigarette Pasi

GELIDIUM PUSILLUM



Division : Rhodophyta
Class : Rhodophyceae

Order : Gelidiales
Family : Gelidiaceae

Description: Plants forming small or large low cushions of dark-red colour; firmly attached to the substratum by rhizoids given off from the decumbent branches; fronds seldom more than 1 cm high; some of the ramuli flattened, markedly attenuate at the base, irregularly arranged, apex broad, usually notched; cartilaginous in texture.

Habitat: It grows on exposed rocks in littoral region. The plants occur throughout the year but in less quantities.

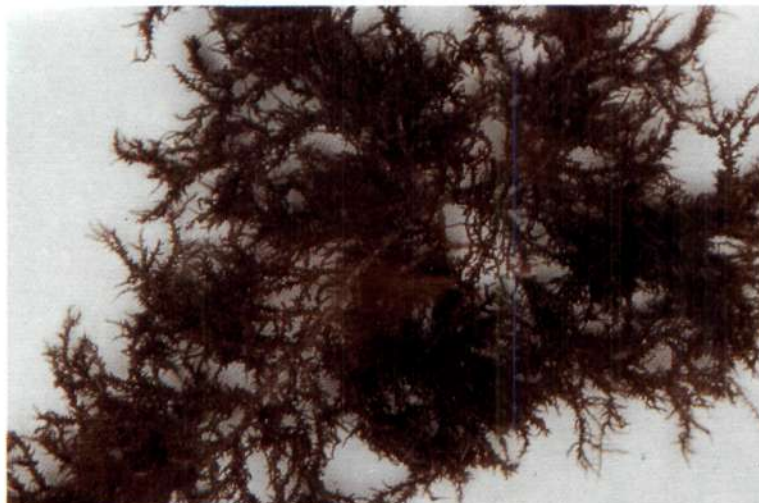
Distribution: Dwarka, Porbandar, Veraval, Bombay, Karwar, Cannanore, Quilon, Muttam, Kovalam, Idinthakarai, Tiruchendur, Mandapam, Madras, Visakhapatnam, Lakshadweep and Andaman-Nicobar.

Agar: The yield of agar from this plant is 50% and gel strength is 276 g/cm².

Uses: It is one of the potential species as source of agar.

AGAROID YIELDING SEaweEDS

HYPNEA MUSCIFORMIS



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Hypneaceae

Description: Plants very bushy, often entangled, texture some what fragile, fleshy, colour dull purplish red; the bases disc like, ill defined; erect branches 10-20 cm tall, about 1-2 mm diameter; the leading branches divided several times and abundantly covered with short branches or ramuli; terminal portion of the branches twisted as tendrils.

Habitat: Commonly grows on rocks, dead corals and shells in shallow and sheltered areas of the coastline. It is available in exploitable quantities.

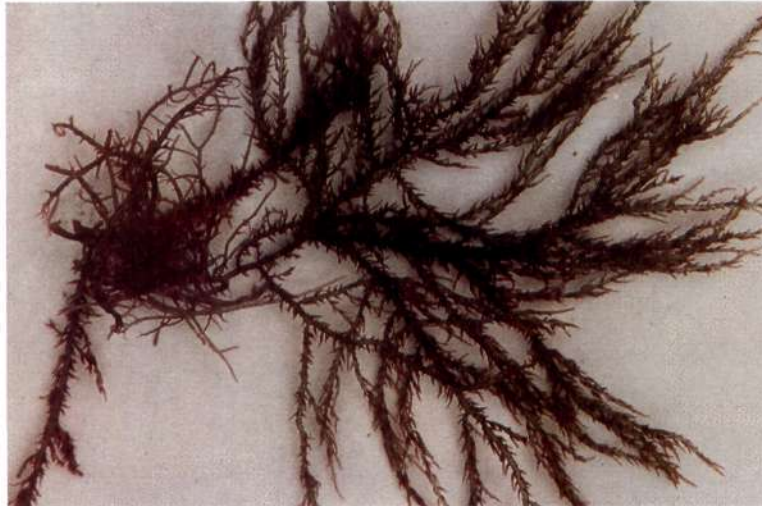
Distribution: Gopnath, Okha, Dwarka, Bombay, Goa, Karwar, Tuticorin, Mandapam, Visakhapatnam, Lakshadweep and Andaman-Nicobar.

Carrageenan: The yield of carrageenan from this seaweed is 51.6% with gel strength of 75 g/cm².

Uses: It forms a source for carrageenan.

Tamil Name: Sem Pasi.

HYPNEA VALENTIAE



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Hypneaceae

Description: Plants are erect and laxly branched with distinct cylindrical main axis; the ultimate branchlets are irregularly disposed around the axis; they are generally simple and filiform but may be occasionally forked.

Habitat: It grows throughout the year on rocks, dead corals, stones and pebbles in the intertidal and subtidal regions. It occurs in exploitable quantities.

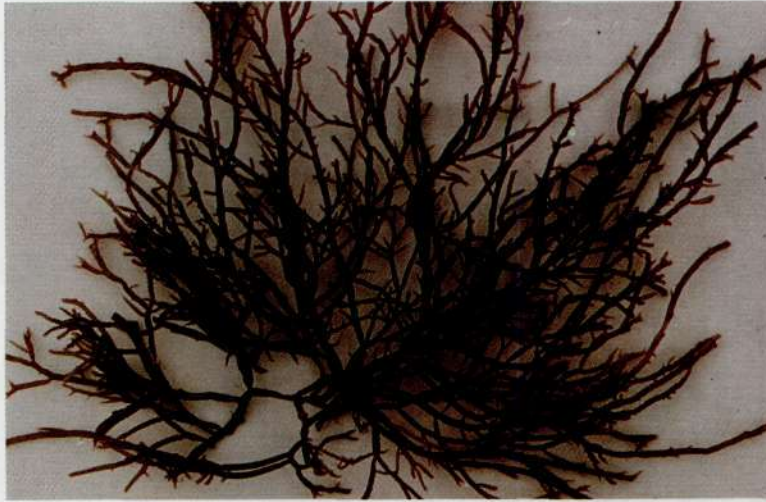
Distribution: Bombay, Muttam, Kovalam, Idinthakarai, Manapad, Tuticorin, Mandapam and Lakshadweep.

Carrageenan: The yield of carrageenan from this species is 39% with gel strength of 151 g/cm².

Uses: It is a carrageenan yielding plant. This seaweed is also edible and the freshly gathered seaweed is commonly prepared as salad.

Tamil Name: Sem Pasi

SARCONEMA FURCELLATUM



Division : Rhodophyta
Class : Rhodophyceae

Order : Gigartinales
Family : Solieriaceae

Description: Plants tufted, upto 15 cm high, 1-2 mm broad; repeatedly dichotomously branched, forming dense broad intricate tufts; colour brick-red or yellowish-red, fleshy consistency, plants breaking quickly when handled.

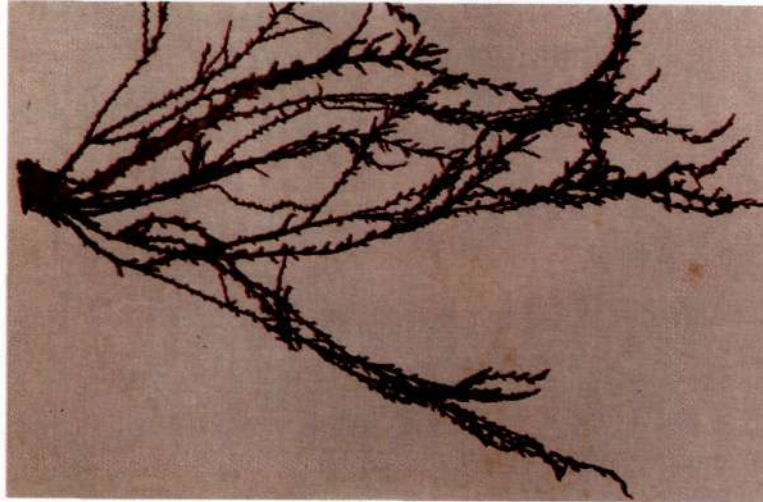
Habitat: It is seen on stones and shells near the low water mark. It grows almost throughout the year but in very less quantity.

Distribution: Kanyakumari and Mandapam.

Iodine: It consists of 357 mg/100 g dry weed.

Uses: It can be used for production of agaroid. It can also be used for human consumption as it controls goitre disease.

ACANTHOPHORA SPICIFERA



Division : Rhodophyta
Class : Rhodophyceae

Order : Ceramiales
Family : Rhodomelaceae

Description: Plants bushy, erect and 15 to 20 cm tall; cartilaginous, reddish to greenish and attached to solid substrates by small disc like holdfasts; determinate branches are spirally arranged along the main axes; each determinate branch is beset with numerous simple or compound spinose short lateral branchlets.

Habitat: It grows on rocks and stones in the intertidal and subtidal regions. This agaroidophyte is seen throughout the year. It occurs in harvestable quantities.

Distribution: Okha, Bombay, Goa, Karwar, Kovalam, Idinthakarai, Manapad, Tiruchendur, Tuticorin, Mandapam, Porto-Novo, Visakhapatnam and Lakshadweep.

Agaroid: The yield of phycocolloid from this species is 12%.

Uses: This seaweed is eaten in the form of curry. It contains lambda carrageenan.

LAURENCIA PAPILLOSA



Division : Rhodophyta
Class : Rhodophyceae

Order : Ceramiales
Family : Rhodomelaceae

Description: Plants are brownish-red and composed of several erect branches which are upto 12 cm long, 3.5 to 3.8 mm in diameter and arise from a common cylindrical stipe attached to the substrate by a discoid holdfast; branches are cylindrical decreasing in diameter from the primary to the tertiary branches; main axes and branches densely covered by short wart-like branchlets.

Habitat: It grows on rocks and stones of intertidal and subtidal regions and also in tide pools. This alga is seen almost throughout the year and occurs only in less quantities.

Distribution: Okha, Bombay, Manapad, Tiruchendur, Tuticorin, Mandapam, Lakshadweep and Andaman-Nicobar.

Agaroid: The yield of agaroid from this seaweed is 19%.

Uses: This species is economically important as a source of food and agaroid.

ALGIN YIELDING SEaweEDS

SARGASSUM WIGHTII



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants dark-brown, 20-30 cm in height with a well marked holdfast; upper portion richly branched; axes cylindrical, glabrous; leaves 5-8 cm long and 2-9 mm broad; leaves tapering at the base and apex; mid rib inconspicuous; vesicles large, spherical or ellipsoidal being 5-8 mm long and 3-4 mm broad; stipe of the vesicles 5-7 mm long, seldom ending into a long tip; receptacles in clusters and repeatedly branched.

Habitat: It grows throughout the year on rocks in the littoral and sublittoral regions. This algin yielding seaweed occurs in harvestable quantities.

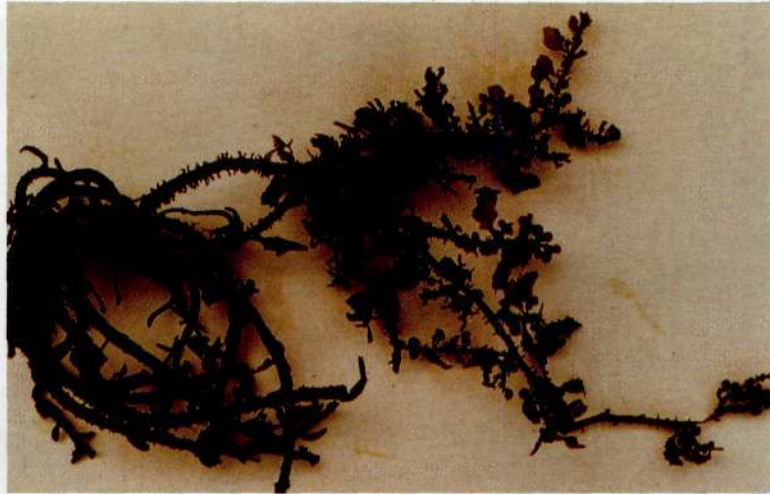
Distribution: Bombay, Goa, Alleppey, Muttam, Kovalam, Idinthakarai, Tiruchendur, Tuticorin, Mandapam, Madras and Andaman-Nicobar.

Algin: The yield of algin from this species is 31.7%

Uses: It is used as raw material for the production of sodium alginate. It also contain 8 - 10% of mannitol, which can be used as substitute for sugar.

Tamil Name: Kattaikkorai

SARGASSUM MYRIOCYSTUM



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants dark-brown, 20-30 cm in height with the basal portion forming a thick discoid holdfast; upper portion richly branched; axes of the plant rough due to presence of short processes; leaves about 2 cm long and 0.5 mm broad, becoming smaller upwards; margins of the leaves dentate and apex rounded; mid rib more or less conspicuous; vesicles small, spherical and 1-2 mm broad; receptacles somewhat spinulose and very much ramified.

Habitat: It grows in all months of the year on rocks, stones and dead corals in the littoral and sublittoral regions. This alginophyte is available in exploitable quantities.

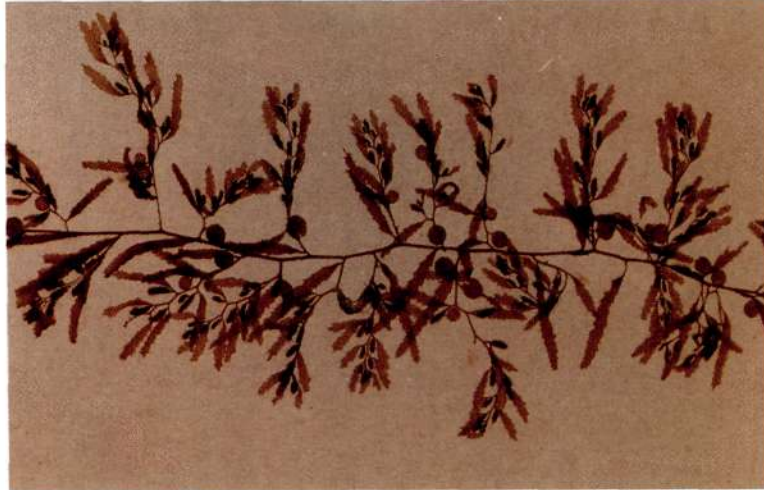
Distribution: Kovalam, Idinthakarai, Manapad, Tuticorin, Mandapam and Andaman-Nicobar.

Algin: The yield of algin from this brown alga is 34.5%

Uses: It is used as raw material along with other species of *Sargassum* for the production of sodium alginate.

Tamil Name: Kattaikkorai

SARGASSUM TENERRIMUM



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants pyramidal in form, delicate and with a disc shaped holdfast; yellowish-brown in colour; reach a height of 30-40 cm; axis glabrous and rounded; ultimate branchlets modified into vesicles and receptacles; leaves thin, translucent, 2-6 cm long and 0.5 - 1.5 cm broad; alternately arranged, being larger and broader in the lower portion becoming smaller and narrower towards the apex; margins of the leaves somewhat dentate; mid rib more or less prominent; vesicles stalked and spherical; receptacles richly branched and spinose.

Habitat: Growing on the rocks in the littoral and sublittoral regions and occurring in exploitable quantities throughout the year.

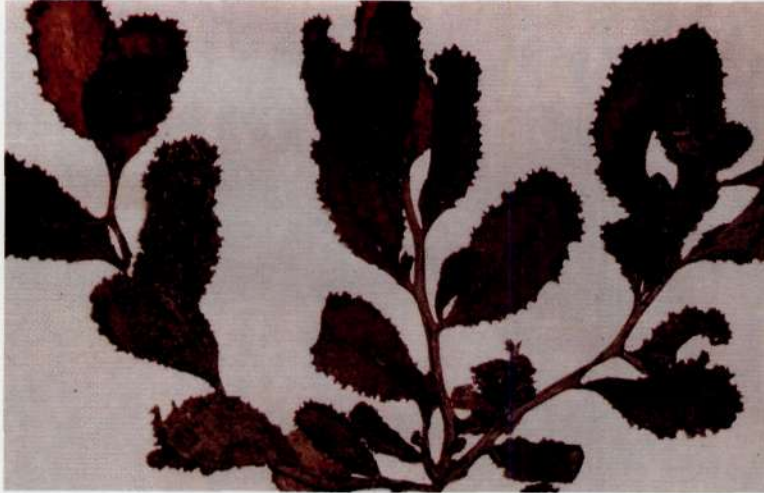
Distribution: Gulf of Kutch, Okha, Dwarka, Bombay, Goa, Karwar, Mandapam, Visakhapatnam and Andaman-Nicobar.

Algin: The yield of algin from this plant is 15.2%.

Uses: It forms a source for production of sodium alginate.

Tamil Name: Kattaikkorai

SARGASSUM DUPLICATUM



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants yellowish-brown in colour; leaves spatulate-obovate, margins dentate, mid rib inconspicuous; vesicles obovate-spherical; receptacles richly branched and spinose.

Habitat: It occurs on the reef in protected habitats and grows almost throughout the year. It is available in exploitable quantities.

Distribution: Muttam, Lakshadweep and Andaman-Nicobar.

Algin: The yield of algin from this brown alga is 19.1%.

Uses: It forms additional source for the production of sodium alginate.

Tamil Name: Kattaikkorai

TURBINARIA CONOIDES



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants characteristically cone-shaped, yellowish-brown in colour and 20-25 cm or more in height; basal portion formed of branched hapteron; plants generously branched; axes of the plant 2-2.5 mm thick, cylindrical and glabrous leaves not closely arranged, triangular or heart-shaped with a cylindrical stalk; leaves 1 cm long and 5-8 mm broad with dentate margins.

Habitat: It grows on the coral reefs in the subtidal region throughout the year. This species is available in exploitable quantities.

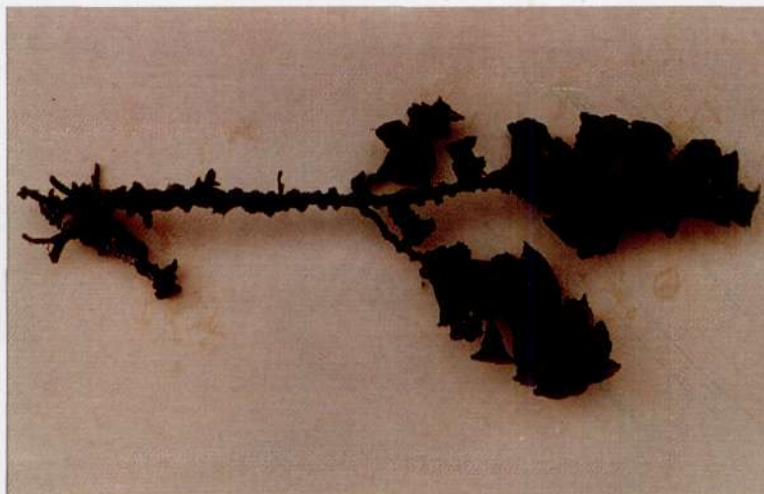
Distribution: Manapad, Tuticorin, Mandapam, Lakshadweep and Andaman-Nicobar.

Algin: The yield of algin from this plant is 35.6%.

Uses: It is used as raw material for the production of sodium alginate. It yields 8 - 10% of mannitol also.

Tamil Name: Pakkoda Pasi

TURBINARIA ORNATA



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants large, 30-50 cm in height, bushy, attached to the substratum by means of a fibrous branched holdfast; upper portion sparingly branched; branches of the lower portion longer than those of upper; axes roughened in the lower region due to the presence of old leaf bases; leaves alternate, 0.5 - 1.2 cm long, densely packed, arising all round the stem, rounded or somewhat triangular with characteristic double row of spines on the margins.

Habitat: It occurs in all months of the year on the coral reefs and rocks in the sublittoral region in harvestable quantities.

Distribution: Dwarka, Mandapam, Lakshadweep and Andaman-Nicobar.

Algin: The algin yield from this seaweed is 32.2%.

Uses: It is used as raw material for the manufacture of sodium alginate. It yields 8 - 10% of mannitol also.

Tamil Name: Pakkoda Pasi

TURBINARIA DECURRENS



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants yellowish-brown or brown in colour; 20-25 cm in height; possesses elongated cylindrical branches; leaves possessing angular margins.

Habitat: It is found in all months of the year on the rocks, stones and old corals in the subtidal region. It occurs only in less quantities.

Distribution: Tuticorin, Mandapam and Andaman-Nicobar.

Algin: It yields 26.3% of algin.

Uses: It forms a source for production of sodium alginate.

Tamil Name: Pakkoda Pasi

CYSTOSEIRA TRINODIS



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants 30-50 cm in height; dark-brown or brown in colour; basal portion composed of a thick prostrate rhizomatous holdfast; upper portion composed of a short cylindrical main axis usually giving rise to five primary branches of unlimited growth; primary branches richly provided with secondary short laterals which bear closely set ultimate branchlets; branches modified into vesicles or richly branched receptacles; axes of the plants richly covered with spiny processes; leaves mainly confined to the lower portion of the main axis and to the primary branches; leaves large, 4-5 cm long and 3-5 mm broad, linear, margins entire and apices more or less round.

Habitat: It occurs on coral reefs, rocks and stones in the sublittoral region. The availability of this plant is in less quantities.

Distribution: Okha, Dwarka, Bombay, Tuticorin and Mandapam.

Algin: The yield of algin from this plant is 30.5%

Uses: It is also a potential source of sodium alginate.

Tamil Name: Mani Pasi

HORMOPHYSA TRIQUETRA



Division : Phaeophyta
Class : Phaeophyceae

Order : Fucales
Family : Sargassaceae

Description: Plants are bushy, 15-20 cm or more in height and brownish in colour; attached to the substratum by disc-shaped holdfast from which branches arise; sparsely branched; branches articulated and triangular; margins membranous and dentate; this species is commonly associated with *Cystoseira* and *Sargassum*.

Habitat: It grows on the coral reefs, rocks and stones in the subtidal region. This seaweed is available only in less quantity.

Distribution: Okha, Manapad, Tuticorin, Mandapam and Andaman-Nicobar.

Algin: The yield of algin from this brown alga is 25.5%

Uses: This is one of the potential species as source of sodium alginate.

Tamil Name: Irrakkai Pasi

EDIBLE SEAWEEDS

ULVA LACTUCA



Division : Chlorophyta
Class : Chlorophyceae

Order : Ulvales
Family : Ulvaceae

Description: Plants bright yellowish-green; grows as large sheets and attached by small disc; leaf-like with undulating wide blades; blades upto 20 cm tall, much broad than long; heart or oval shaped and occasionally with some holes; like waxed paper to touch.

Habitat: It is found in moderately exposed situations on rocks, wood works or coarse algae, in pools and quiet shallow waters near the low tide mark. It also thrives in brackish water with organic pollution. This species occurs in all months of the year.

Distribution: Gulf of Kutch, Okha, Dwarka, Porbandar, Diu, Bombay, Goa, Karwar, Alleppey, Quilon, Kanyakumari, Tiruchendur, Tuticorin, Mandapam and Lakshadweep.

Chemical composition: It consists of 25.8% protein, 16.0% carbohydrate and 7.4% lipid.

Uses: It is used as soup, mixed sea vegetable salad, cooked with other vegetables and meat, powdered green sea vegetable seasoning and in the preparation of jam.

English Name: Sea Lettuce

Tamil Name: Pattu Pasi

ULVA RETICULATA



Division : Chlorophyta
Class : Chlorophyceae

Order : Ulvales
Family : Ulvaceae

Description: Plants pale or dark green in colour; reticulate or net-like or profusely perforated in appearance.

Habitat: It is attached to rocks or grow intermingled with other seaweeds in the intertidal and subtidal regions. It occurs almost throughout the year.

Distribution: Okha, Diu, Bombay, Goa, Karwar, Tiruchendur and Mandapam.

Chemical Composition: It contains 24.4% protein, 16.9% carbohydrate and 8.6% lipid.

Uses: Jam can be prepared from this marine alga.

Tamil Name: Pattu Pasi

ENTEROMORPHA COMPRESSA



Division : Chlorophyta
Class : Chlorophyceae

Order : Ulvales
Family : Ulvaceae

Description: Plants attached, light or bright-green in colour; adult plants usually tubular; more or less compressed, dilated towards the apex, tapering below, giving several branches from the gradually contracted stalk like base; branches similar to the main frond; fronds upto 1.5 cm high.

Habitat: It grows on rocks and stones in the intertidal region along the east and west coast of India. It occurs throughout the year.

Distribution: Bombay, Goa, Mandapam, Proto-Novo, Mahabalipuram and Visakhapatnam.

Chemical composition: It consists of 23.8% protein, 24.8% carbohydrate and 11.4% lipid.

Uses: It is used as vegetable and also in the form of salad, jam and powder.

CAULERPA RACEMOSA



Division : Chlorophyta
Class : Chlorophyceae

Order : Siphonales
Family : Caulerpaceae

Description: Plants green in colour and differentiated into rhizoids, horizontal stems and erect foliar elements; colourless basal portion creeps over the sea bottom and gives rise to green shoots that divide profusely around the axis; plastic- looking grapelike nodes borne on branches; holdfast penetrates sandy bottom forming a compact cushion.

Habitat: It is found below the low tide mark, rooted in sandy, muddy bottoms or attached to rocks or dead corals. This plant grows throughout the year.

Distribution: Okha, Dwarka, Bombay, Goa, Karwar, Vizhinjam, Mandapam and Lakshadweep.

Chemical composition: It contains 24.8% protein, 33.8% carbohydrate and 10.6% lipid.

Uses: It is eaten raw or as a salad or boiled with other foods.

English Name: Sea grapes

Tamil Name: Mookkuthi Pasi

CAULERPA SERTULARIOIDES



Division : Chlorophyta
Class : Chlorophyceae

Order : Siphonales
Family : Caulerpaceae

Description: Plants grass-green in colour consisting of erect, feather-like branches which are upto 4-5 cm tall; branches cylindrical with pointed tips.

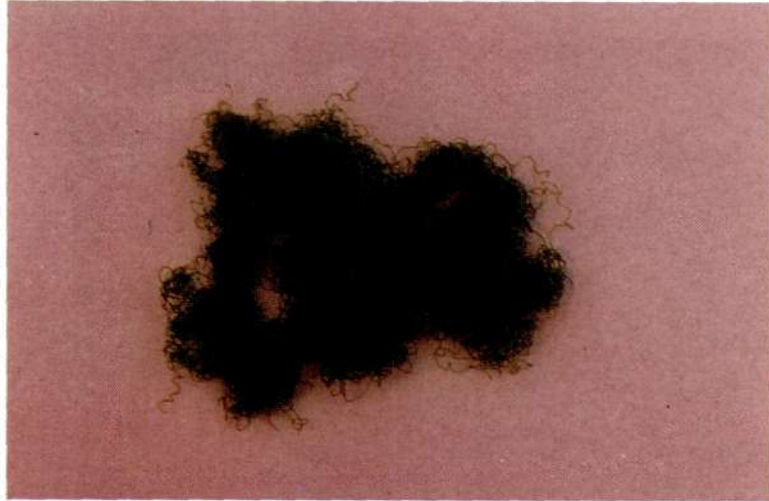
Habitat: It forms a sizable colony in sand and protected areas of the reef in the intertidal and subtidal regions. This green alga occurs in all months of the year.

Distribution: Dwarka, Bombay, Goa, Tuticorin, Tiruchendur, Idinthakarai, Mandapam, Visakhapatnam and Lakshadweep.

Chemical Composition: It consists of 22.7% protein, 49.5% carbohydrate and 7.0% lipid.

Uses: This species is edible and the slightly sour and pungent nature of the young and fresh thalli give it a spicy taste.

CHAETOMORPHA LINOIDES



Division : Chlorophyta
Class : Chlorophyceae

Order : Cladophorales
Family : Cladophoraceae

Description: Plants bright green to yellowish-green; composed of unbranched filaments; plants twist together to form clumps or tangles; tangles remain quite rigid when removed from water.

Habitat: It grows on rocks and stones or wound around other algae. This seaweed occurs in most part of the year.

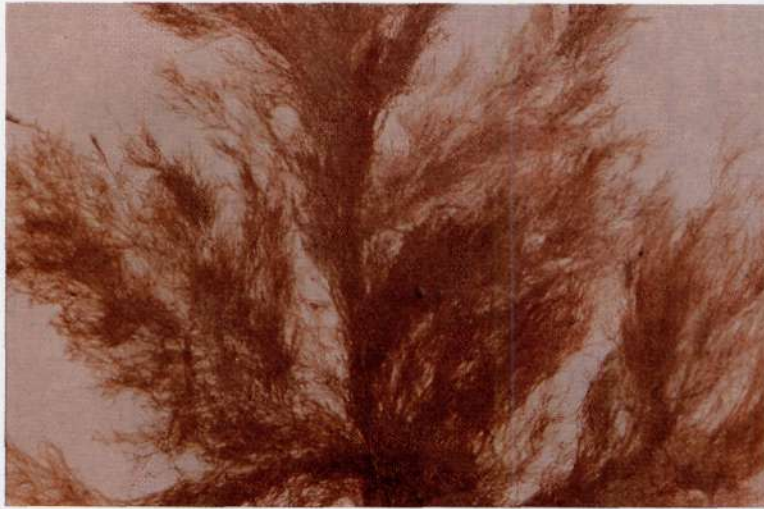
Distribution: Mandapam and Visakhapatnam

Chemical Composition: It contains 16.7% protein, 27.0% carbohydrate and 12.1% lipid.

Uses: It is eaten as salad or cooked with fish, meat etc.

Tamil Name: Nool Pasi

CLADOPHORA FASCICULARIS



Division : Chlorophyta
Class : Chlorophyceae

Order : Cladophorales
Family : Cladophoraceae

Description: Plants filamentous and grow in tufts, mats or loose floating masses; 20-25 cm or more in height; colour of the plants varies from bright green to yellowish green, grey-green or olive-green; the texture is stiff and somewhat coarse; the individual filaments are repeatedly branched.

Habitat: It grows on rocks, stones, sea shells, coral pieces and mud flats in the intertidal and subtidal regions and also in tide pools. It is seen almost throughout the year.

Distribution: Gopnath, Gulf of Kutch, Okha, Bombay, Alleppey and Mandapam.

Chemical composition: It consists of 16.3% protein, 49.5% carbohydrate and 15.7% lipid.

Uses: It is eaten with shrimp and salt.

CODIUM TOMENTOSUM



Division : Chlorophyta
Class : Chlorophyceae

Order : Siphonales
Family : Codiaceae

Description: Plants deep green in colour, spongy in texture and tubular in appearance; usually 15 to 20 cm tall and occasionally growing to 25 cm; plants cylindrical and numerous thin branches dividing in twos; they form large clusters and water-logged to the touch.

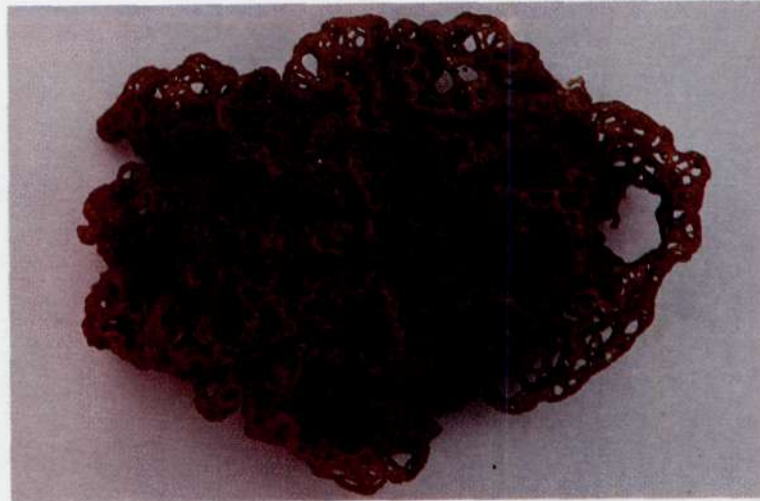
Habitat: It is found on sandy bottom in the subtidal area.

Distribution: Mandapam, Lakshadweep and Andaman-Nicobar.

Chemical Composition: It contains 5.1% protein, 29.3% carbohydrate and 7.2% lipid.

Uses: This seaweed is consumed as food in the form of salad or adding to soup and dried plants are prepared as tea.

HYDROCLATHRUS CLATHRATUS



Division : Phaeophyta
Class : Phaeophyceae

Order : Dictyosiphonales
Family : Punctariaceae

Description: Plants brownish in colour and forming circular expanse; unperforated when young and reticulately perforated when mature; plants clathrate, spongy and net-like.

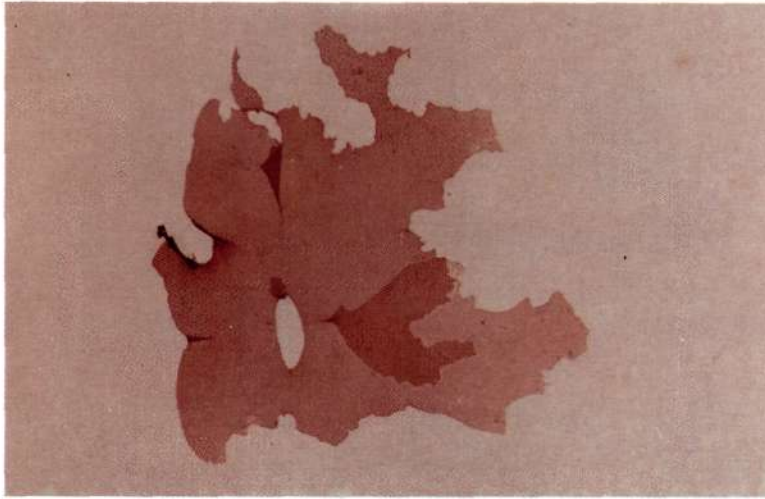
Habitat: It grows on the rocks and stones in the intertidal and subtidal regions. This plant occurs seasonally between November and February/March.

Distribution: Dwarka, Tuticorin, Mandapam and Andaman-Nicobar.

Uses: It is eaten as salad.

Tamil Name: Idiappam Pasi.

PORPHYRA INDICA



Division : Rhodophyta
Class : Rhodophyceae

Order : Bangiales
Family : Bangiaceae

Description: Plants 18 cm high and upto 11 cm broad through its broadest portion; thallus reddish pink with smooth margin without any spinulose processes; attached to the substratum by rhizines.

Habitat: It is found growing attached to rocks and shells at high tide level. This species occurs seasonally during January to June/August.

Distribution: Karwar, Okha and Gulf of Kutch.

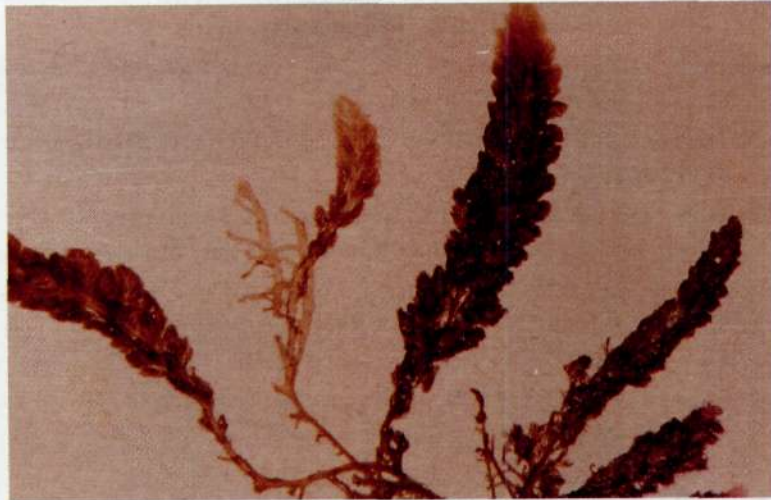
Chemical Composition: It contains about 16% protein.

Uses: It is used as snacks, salad or added to soups and various Oriental dishes.

English Name: Laver

Japanese Name: Nori

ASPARAGOPSIS TAXIFORMIS



Division : Rhodophyta
Class : Rhodophyceae

Order : Nemalionales
Family : Bonnemaisoniaceae

Description: Plants dark red to violet, tannish-pink, brown or olive in colour; 6-10 cm tall; creeping holdfast giving rise to erect blades; stipe soft, smooth and nude without branches or blades; all branches located at top of stipe; branching plume-like appearing as soft feathery tufts.

Habitat: It grows below the low tide mark on edges of reefs or in shallow pools and occurs almost throughout the year.

Distribution: Okha, Dwarka, Goa, Kanyakumari, Tuticorin, Mandapam and Lakshadweep.

Chemical Composition: It contains 16.2% protein and high iodine content of 499.3 mg/100 g dry weed.

Uses: It is eaten after cooking in beef stew or with fruit powder and pepper.

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