



UNIT 13. SEAWEEDS

Introduction:

1) Availability of Seaweed:

- Shallow coastal water
- Rocky shore areas

2) Seaweeds are broadly grouped into:

- Green
- Brown red
- Blue green algae

3) Uses of Seaweed:

- Food
- Fodder
- Manure
- Medicine
- Cosmetics

4) Protein rich Seaweed species:

- *Caulerpa, Porphyra, Gracillaria, Acanthophora* and *Laurancia*.

5) Seaweeds contains :

- Proteins, Iodine, Potash, Bromine, Vitamins
- 60 Trace elements

6) Seaweed resources along Indian coast :

- Gulf of Mannar, Palk Bay, Gulf of Kutch and Bays and Lagoons of Lakshadweep and Andaman – Nicobar Islands.
- It is near about 73, 000 tones.

7) Institute engage in Seaweed cultivation and utilization :

- Central Marine Fisheries Research Institute (CMFRI) and Central Salt and Chemical Research Institute (CSCRI)



Seaweed Collection site along the Indian coast

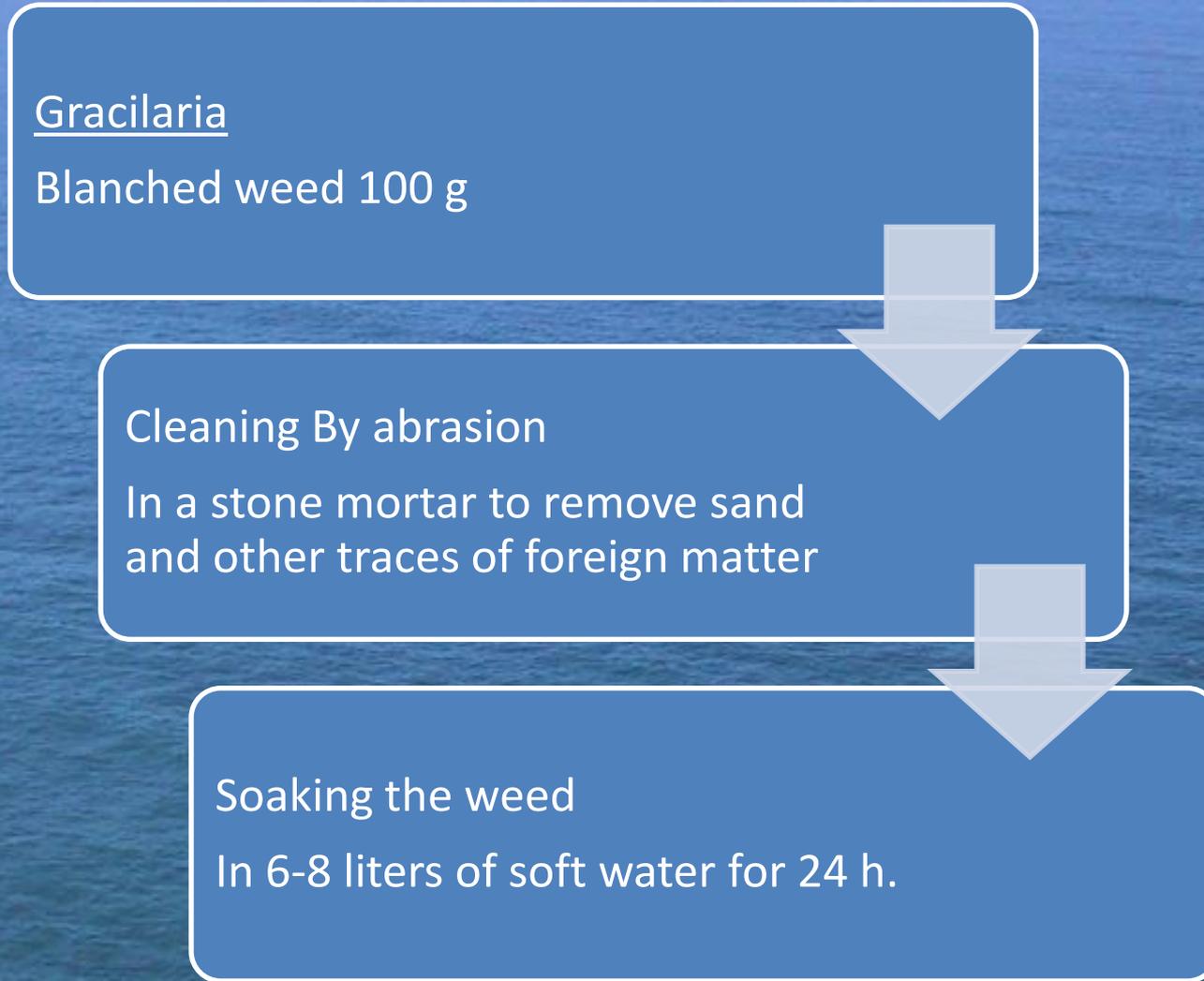
Edible seaweed Sp. Its chemical composition and uses

Sr. no.	Edible seaweed species	Chemical composition	Uses
1.	<i>Ulva lactuca</i>	25.8% protein, 16.0% carbohydrate and 7.4% lipid.	Soup, salad, jam, cooked with other vegetables and meat.
2.	<i>Ulva reticulata</i>	24.4% protein, 16.9% carbohydrate and 8.6% lipid.	Jam
3.	<i>Enteromorpha compressa</i>	23.8% protein, 24.8% carbohydrate and 11.4% lipid.	Vegetable, salad, jam and powder.
4.	<i>Caulerpa racemosa</i>	24.8% protein, 33.8% carbohydrate and 10.6% lipid.	Raw, salad, boiled with other foods.

Product prepared from Seaweed

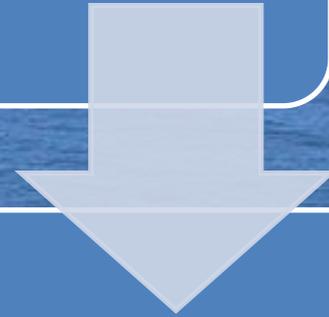
The product prepared from seaweed is agar-agar, algin, carrageenan, salad, and soup, mix with vegetable. The procedure of some of this product is as follows,

1) Extraction of agar-agar from *gracilaria* species:



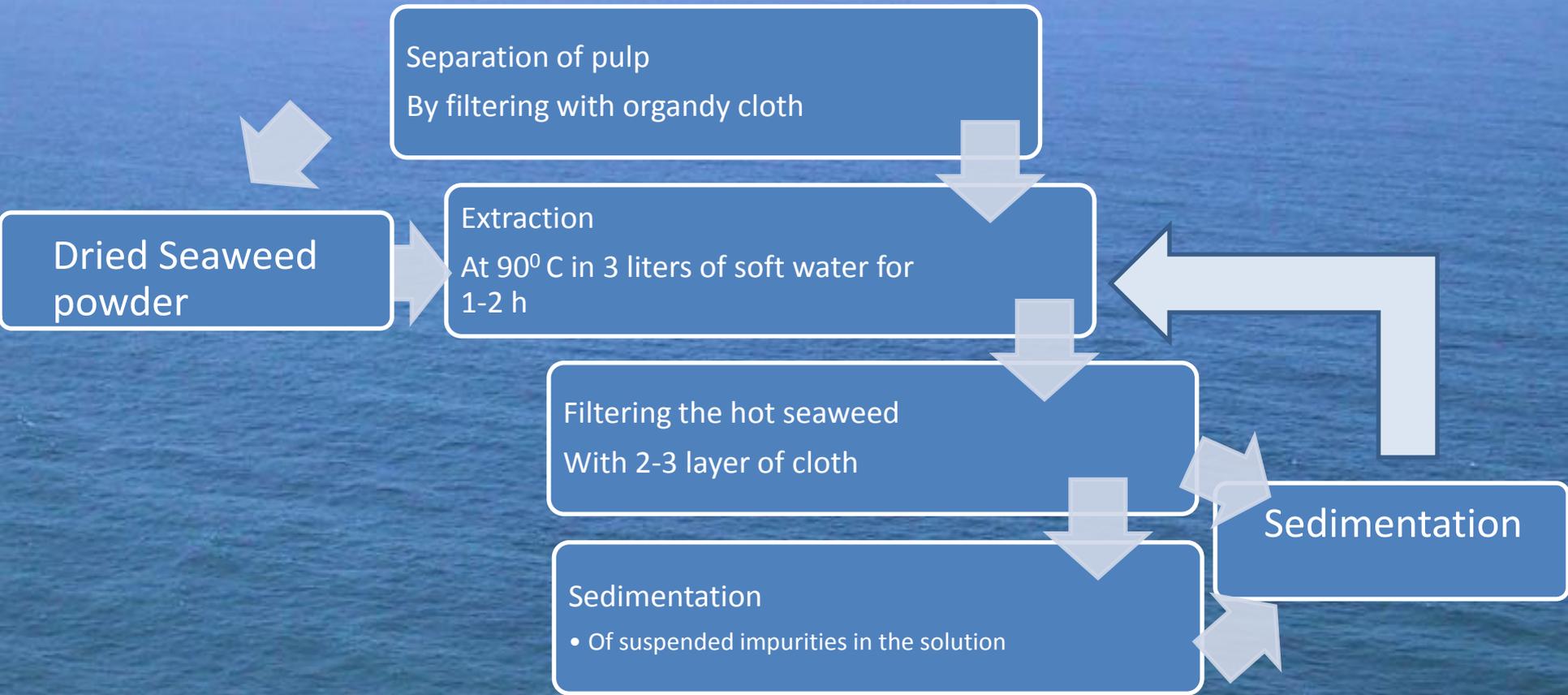
Wet grinding the
weed

In stone mortar into
pulp using soft water



Leaching the pulp

In soft water of
about 6-7 liters for
a period of 24 h



Dried Seaweed powder

Separation of pulp
By filtering with organdy cloth

Extraction
At 90° C in 3 liters of soft water for
1-2 h

Filtering the hot seaweed
With 2-3 layer of cloth

Sedimentation
• Of suspended impurities in the solution

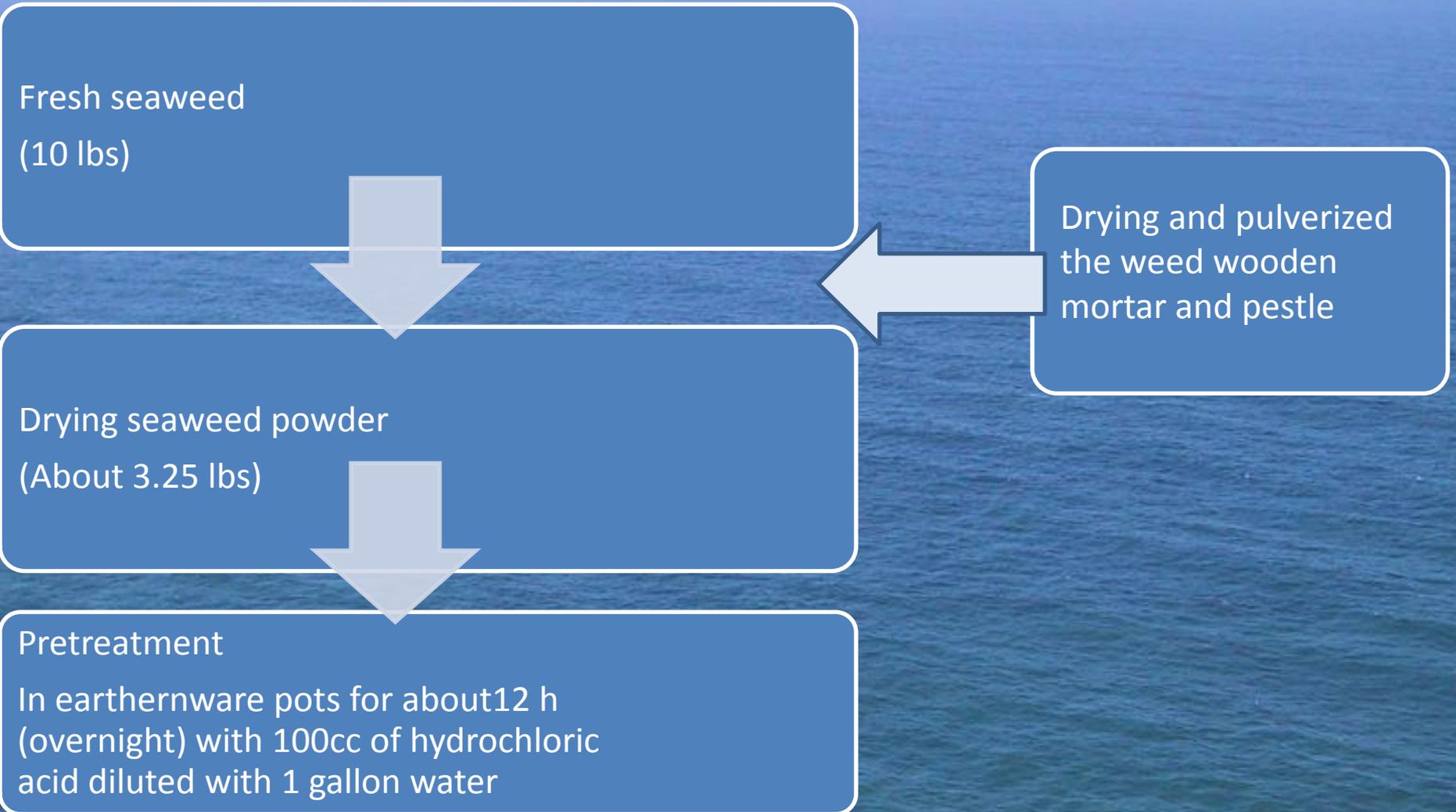
Sedimentation

Cooling the agar solution
At room temperature`

Shredding of agar gel and sun-
drying the gel strips on plastic
netting

Agar- agar

2) Process for extraction of alginic acid



Extraction

For 4 h at room temperature with 0.25 lb of sodium carbonate dissolved in 1 gallon of water.

Dilution with water

Water seaweed residue

Filtration
(With cloth bag)

Bleaching

With 10 % acetic acid solution
and 1.5 % solution of sodium
hypochlorite

Precipitation

With filtrate of 10-15% calcium
chloride solution

Calcium alginate

Washing with water

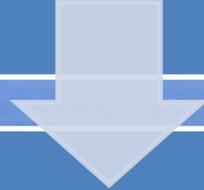
Carrageenan



3) Process for extraction of alginic acid

The cell wall of brown macro algae contains a range of different polysaccharides including alginic acids (alginates), laminarins (laminarans) and fucoidans (sulphated fucans). Alginic acid are used as thickeners, emulsifier, stabilisers, binding and gel forming agents in the food, cosmetic, textile, construction and pharmaceutical / biomedical industries.

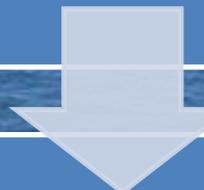
Dry seaweed



Boiling with water
(for 30 min.)



Boiling with 0.3 % hydrochloric acid
(at 100⁰ C for 30 min.)

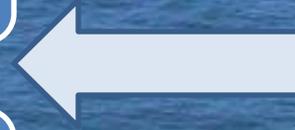


Digestion at room temperature
(with 2 % soda ash solution for
1-2h)

Washing with water



Washing with water



Filtration

Crude sodium alginate

Precipitation of alginic acid
(with 5 % hydrochloric acid at a
pH of 2.5)

Filtration

Bleaching
With 2 % potassium permanganate
and 5% hydrochloric acid

Dilution with water

Filtration



Alginic acid

Washing with water

