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# EXPERIMENT 12 EXTRACTION OF AGAR

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## 12.1 INTRODUCTION

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Agar is naturally present in certain seaweeds. Those seaweeds (marine algae) rich in agar are called agarophytes. Generally, seaweeds are brought in the dry form to the plant where agar is manufactured.

### Objective

After performing this experiment, you will be able to:

- extract agar from seaweed and purify it.

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## 12.2 EXPERIMENT

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### 12.2.1 Principle

Agar occurring in the seaweed is to be separated from rest of the components. It is present in the cell wall of the plant. By grinding the seaweed, agar is well exposed. Agar has the property of dissolving in water upon heating and gelling upon cooling. The gel consisting of agar and water is subjected to freezing followed by thawing. Much of the water present in the gel is removed by this process. Agar is further dried to a stable level.

### 12.2.2 Requirements

- Dried agarophyte
- Dilute hydrochloric acid
- pH paper
- Cloth bag, plastic bottle
- Stainless steel vessels, other utensils
- Wet and dry grinders
- Basket press
- Stove
- Freezer
- Drier

### 12.2.3 Procedure

- 1) Weigh the given dried seaweed.
- 2) Soak in water till the material becomes soft.
- 3) Grind in a wet grinder to a slurry.
- 4) Filter through a piece of cloth. Transfer the material retained in the cloth to a vessel.
- 5) Add dilute hydrochloric acid until the pH of the suspension is reduced to 6.0. This can be checked using a pH paper.
- 6) Heat the suspension at a temperature of 90–95°C for a period of 1–2 hours with stirring.
- 7) Allow the material to stand undisturbed but in the hot condition (above a temperature of 50°C) until most of the suspended particles settle.
- 8) Transfer the hot supernatant into a cloth bag and press out the liquid using a basket press.
- 9) Collect the hot liquid in another vessel and allow it to cool to room temperature until a gel is formed.
- 10) Cut the gel into pieces and transfer to a freezer maintained at about –10°C. Freeze for a day.
- 11) Take out the frozen gel and thaw it at room temperature. Allow the water and impurities to escape.
- 12) Dry the solid material either by sun drying or using a drier to a final moisture content of less than 10%.
- 13) Pulverize the material to powder using a dry grinder.
- 14) Weigh and pack in a plastic bottle.

### 12.2.4 Observations

Name of the seaweed : \_\_\_\_\_

Weight of dry seaweed (x) = \_\_\_\_\_

Weight of agar (y) = \_\_\_\_\_

Yield of agar from dry seaweed =  $y/x \times 100$  = .....%

### 12.2.5 Results

The yield of the product from raw material is ..... %.

The colour and odour of the product are ..... and ....., respectively.

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## 12.3 PRECAUTIONS

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- Once agar goes into solution by heating, the solution must be maintained hot during the processes of settling and pressing in order to prevent any solidification of the agar solution. However, do not excessively heat the solution.