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Agar from Cultured *Gracilaria edulis* (Gmel.) Silva

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Yield and quality of agar in the cultivated plants of *Gracilaria edulis* were determined. Methods of analysis are described. The yield of agar and the time of extraction, gel strength, gelling and melting temperatures of the agar were given. Based on the results, harvesting is advocated every three months after planting. An increase in gel strength of agar on addition of 5 % potassium chloride was noticed.

The necessity, principles and problems involved in the cultivation of marine algae have been discussed by Krishnamurthy (1967). The main reason for proposing the cultivation of marine algae in India is the growing demand for raw-material for economic exploitation. An attempt was made to cultivate *Gracilaria edulis* and the results were reported (Raju and Thomas 1971). Healthy plants of *Gracilaria edulis* were collected and 2 cm fragments were taken out from the apical portions of the plants. The fragments were inserted into the twists of rope at intervals of 5 cm and the ropes were tied to poles planted in the sea in such a way as to be held one foot below low water level. The average growth in length of the plants was ascertained by the measurement of 20 plants selected at random, while average increase in weight was determined on the basis of 10 plants which were harvested every month for the purpose. The harvesting was done by clipping the plants, leaving a small portion at the base. The ropes were then left undisturbed to observe further growth. The first harvesting was made at the end of five months and the second and third harvest were made at the end of four months each and the fourth harvest three months later. It has been found that the yield was greater in the second and third harvest compared to that of the first and fourth harvest.

It was desired to determine the percentage yield and quality of the agar of the cultivated plants. For this purpose plants obtained from each harvest of an experimental culture of *Gracilaria edulis* started on 30. 12. 68 were used. The harvested plants were first washed in fresh water to remove salts and other impurities on the surface. The plants were then bleached and dried by spreading them in the shade and sprinkling the plants with water at intervals and alternately drying them in air. After a few days, the plants were completely bleached and then they were allowed to dry. When the plants were completely dry, they were pulverised in a blender. Twenty-five grams of the powdered material were taken in a vessel and water was added in the ratio 1:20 and agar extracted under steam pressure of 15 lb in a pressure vessel. Extraction was carried out in six batches for periods ranging from one hour to six hours. The extractive was then filtered through a muslin cloth into a rectangular tray and frozen in the freezing chamber of a refrigerator for twenty-four hours, defrozen, thawed and dried at 50 °C to constant weight. The residue left after the first extraction was re-extracted by giving the same period under the same pressure. The percentage yield of agar was calculated from the total weight of the agar obtained in both the extractions. The maximum yield was obtained in four hours extraction. Though the percentage yield of agar in all the harvests was more or less uniform, there was a slight increase in yield from plants of the second and third harvest.

Gel strength

The *Gracilaria* extractive was dissolved by adding 100 ml of water to 1.5 g of the agar and heating in a water bath until a clear solution was obtained. The solution was then allowed to set by allowing it to stand at room temperature for twelve hours. The gel strength was determined by means of a penetrometer. It consists of a glass vessel drawn out into a tube with a flat base of 1 cm^2 area. Mercury was poured into the glass vessel. The weight of the mercury required for the base to penetrate into the gel was taken as the gel strength of the extractive of that particular concentration. The gel strength is expressed in g/cm^2.

Gelling and melting temperatures

1.5 percent *Gracilaria* extractive was prepared and the gelling temperature was recorded by inserting a thermo-