

A Comparative study of the Yield and Physical properties of agar-agar from Different Blends of seaweeds

V. S. Krishnamurty Chennubhotla, M. Najmuddin

and

Bidyadhar Nayak

Central Marine Fisheries Research Institute, Mandapam Camp.

The agar-agar obtained from *Gracilaria verrucosa* growing in commercial quantities in Chilka Lake, Orissa, was found to be having an yield of 23% and gel strength of 41 gm/cm². In order to exploit this agarophyte for the same with other agarophytes like *Gelidiella acerosa* and *Gracilaria edulis* in three different proportions was studied.

A cottage industry method was developed by Thivy (1960) for the manufacture of pure *Gracilaria* agar from *Gracilaria edulis*. This method was later found to be applicable to most other *Gracilaria* spp. In this method the impurities are removed from the seaweeds before extraction by leaching with water. This technique with slight changes was used in extracting agar from different seaweeds and their blends here described.

Material and Methods

Agar-agar was prepared from *Gracilaria edulis*, *Gelidiella acerosa* collected from Mandapam area and *Gracilaria verrucosa* collected from Chilka lake in Orissa. These seaweeds were mixed in different proportions as given in Table 1 and the agar was extracted. The yield, gel strength, setting temperature and melting temperature of the agar obtained were determined.

Table 1.

Percentage composition of different blends.

Seaweed	B I	B II	B III
<i>Gelidiella acerosa</i>	44	25	25
<i>Gracilaria edulis</i>	15	50	25
<i>Gracilaria verrucosa</i>	40	25	50

The seaweeds were collected, washed thoroughly and dried in the sun for 3 days sprinkling water occasionally. They were ground thoroughly, sand and other foreign matter were removed and again dried. 20 g. of the dried material was soaked in soft water overnight. The weed was then ground to a pulp. The pulp was heated with 10 times of its weight of soft water at a temperature of 90°C in a water bath. The pulp was stirred from time to time to prevent charring. pH of the solution was maintained at 6.5 to 7.0 by adding acetic acid, as at this particular pH extraction was found to be very effective (Chapman 1970). The boiling was continued for 4 hours for *Gracilaria* sop. (soft weed) and 6 hours for *Gelidiella acerosa* (hard weed). Extraction of the agar-agar was done by filtering the hot solution through an organdy cloth. The residue obtained was again boiled with 5 times its weight of water to get a second extract. Both the extracts were mixed and allowed to cool at room temperature for setting. The agar gel was cut into required shapes and sizes and the set agar was kept in the refrigerator for 24 hours. It was removed and allowed to thaw in order to remove the water soluble impurities. The agar strips were kept in the sunlight on plastic nettings for drying.)

The yield of the agar-agar in each experiment was determined by weighing the dried agar strips and expressed as percentage. A 1.5% solution of the agar was prepared and the incipient temperature at which it started setting was taken as the setting temperature. The gel strength was determined with the help of a standard penetrometer consisting of a glass vessel drawn into a short tube of 1 sq. cm cross section area. The weight in g. of the mercury that was required to enable the tube to penetrate the solidified gel was taken as the gel strength of that particular concentration in g/sq. cm. The melting temperature of the agar was taken as that temperature at which the solidified gel of 1.5% agar solution allows a 1.5 gm weight of iron ball to drop into it on heating.

Results and Discussion

The present studies were carried out to have a comparative idea about the relative yield and gel strength of the three different agarophytes and their blends. Taking *Gelidiella* agar as control a comparison was attempted with the three blends.

As can be seen from Fig 1, the yield was found to be highest in blend III. The gel strength, setting temperature and melting temperature were found to be maximum in blend II. In blend III where the yield was found to be greater, the setting temperature, gel strength and melting temperature were low. In blend II the gel

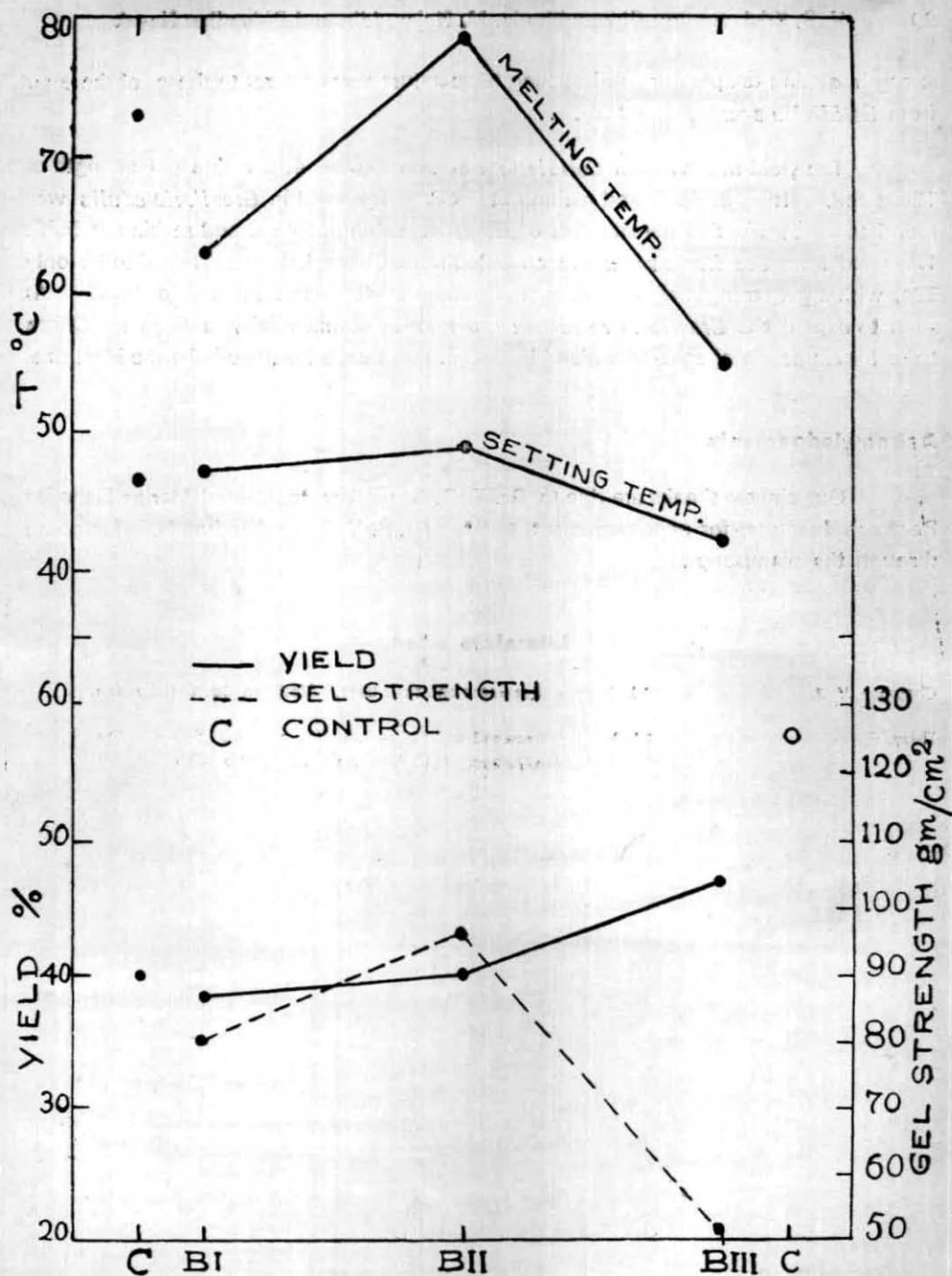


Fig. 1. The percentage yield, gel strength, setting temperature and melting temperature in different blends

strength, setting temperature and melting temperature were nearer to those of the agar from *Gelidiella acerosa* (control).

The yield of agar from *Gelidiella* was found to be 40% with a gel strength of 125 g/cm². setting at 46°C and melting at 73°C. The yield in *Gracilaria edulis* was found to be 55% with a gel strength of 63 g/cm² setting at 48°C and melting at 65°C. The yield from *Gracilaria verrucosa* collected from Chilka Lake was found to be only 23% with a gel strength of only 41 g/cm² setting at 40°C and melting at 55°C. As such to exploit the *Gracilaria verrucosa* growing in commercial quantities in Chilka Lake for extraction of agar-agar blend II used in these experiments will be the ideal one.

Acknowledgements

Our sincere thanks are due to Dr. E. G. Silas, Director, Central Marine Fisheries Research Institute, for encouragement and to Dr. P. V. Ramachandran Nair for going through the manuscript.

Literature cited

- | | | |
|----------------|------|--|
| Chapman, V. J. | 1970 | Seaweeds and their uses, Methuen Co. Ltd. London. |
| Thivy, F. | 1960 | Seaweed utilization in India. Proc. Symp. on Algology, I. C. A. R. New Delhi, pp 345 |