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A village level technology of extracting agar

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Is there a bright prospect for the agar processing industry?

Yes. There is a high demand in the world market for this phycocolloid. In 1987, agar-producing seaweeds and their products accounted for roughly 9% of the total fish and fishery product exports of the Philippines. About 12 million metric tons of the seaweeds and their products, valued at around ₱-193 million, were exported. The purified form of agar known as agarose commands a price of US\$1,000 per kilogram. In the event that advanced seaweed processing is successfully done locally, the country would be less dependent on expensive imports of agar products. This would in turn benefit the other local industries which depend highly on agar.

Source: **PCAMRD-DOST Technology Primer**, No. 4, March 1990.

Item Five

A Village Level Technology of Extracting Agar

Modifications in agar extraction were made to adapt the technology for use in Indian villages.

Materials

To conduct agar extraction trials, the following materials were used: clean seaweed; fresh water; tubs to soak and wash the seaweed; a pan (50 l) to boil the seaweed; wooden spoons; a kerosene or wood-fuelled stove; a screw press; two planks and some heavy stones; filter cloths; trays and a platform to dry the agar in the sun. All materials were purchased locally. The screw press was a larger version of the coconut press used in Thailand.

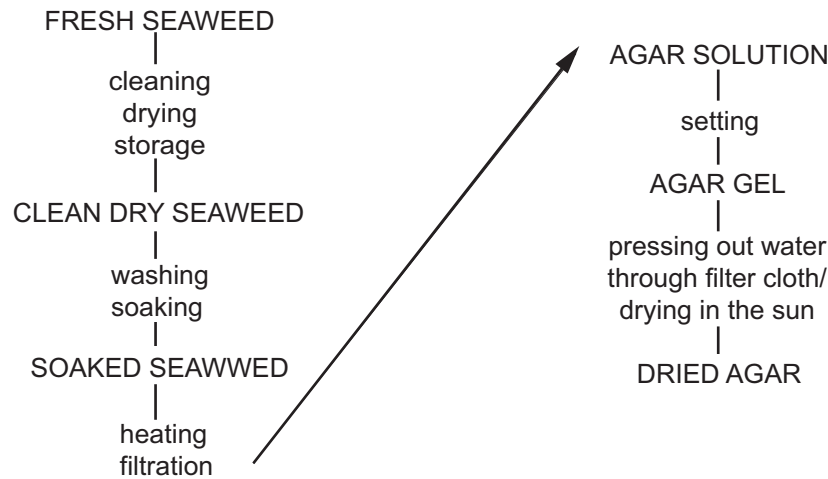
Agar extraction procedure

Seaweed collected from natural seaweed grounds, or from a seaweed farm, was cleaned and fully dried in the sun, so that it could be stored for (3-6 months). Before processing, the seaweed was washed and then soaked in freshwater for several hours until soft. It was then heated in freshwater, the time depending on the amount and variety of seaweed. After heating, the seaweed was filtered through a cloth with a screw press. The filtration had to be done quickly, and the screw press pre-heated with hot water to prevent the agar solution from setting during the process. The agar formed a gel after cooling. To remove the water from the agar, the gel was enclosed in a thick filter cloth and put under pressure either in the screw press or between two planks weighted with heavy stones for larger quantities. This process takes at least half a day, after which the agar needs drying in the sun for several days.



Village folks dry seaweeds for agar processing.

An outline of the agar extraction procedure is given below:



Extraction trials

Trials were conducted with small (100 g/l) and large (1 kg/10 l and 2 kg/20 l) samples of seaweed. The small (100 g) samples of seaweed (ground or un-ground, bleached or un-bleached) were heated in 1 l of water for 1, 1.5, 2, or 2.5 h in a water bath, or heated directly. The larger samples were heated directly for 2, 3, or 4 h. All trials were conducted with samples from the same batch of seaweed, which was collected from a seaweed farm and fully dried. Water was added if substantial evaporation occurred during heating, and the water temperature was kept at 90-95°C. The seaweed residue was heated for a second time in 500 ml water for 20 min (100-g samples), in 4.75 l for 1 h (1-kg samples) or in 10 l of water for 1.5h (2-kg samples).

The data have not been analyzed statistically, since trials are continuing. The average agar yield obtained using this extraction method was 16% and is considered satisfactory. There were no big differences in agar yield between heating the seaweed in a water bath or heating it directly.

Source: *Extraction of Agar from Gracilaria edulis as a Village Level Technology - Preliminary Results* by B.A. Lalkman in **Gracilaria Production and Utilization in the Bay of Bengal**, Bay of Bengal Programme for Fisheries Development, Madras, India, November 1990.

Item six

Make Your Own Gulaman from Seaweeds

Seaweeds are locally produced into gulaman, a favorite dessert among children and adults. Gulaman is sold at the local markets in bars and is relatively easy to prepare.

Materials needed:

raw seaweeds (*Gracilaria*, *Gracilariopsis*, *Pterocladia*, *Gelidium*, *Getidiella*)
vinegar or 0.1 N sulfuric acid (H₂SO₄) available at the drugstore