

1998

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Buendia, R. (1998). Seaweed markets in southeast Asia. SEAFDEC Asian Aquaculture, 20(1), 24-25.

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By **R Buondia**

World seaweed production has steadily increased over the years. China leads in harvests from aquaculture with 4.8 million tons followed by South Korea (650,000 tons), Japan (570,000 tons), the Philippines (465,000 tons), and North Korea and Indonesia with 110,000 tons each in 1995. Only small-scale farming of *Eucheuma* in Malaysia and *Gracilaria* in Thailand exist.

The three main commercial phycocolloids or processed chemical products from seaweeds marketed in Indonesia, Thailand, Malaysia and the Philippines are agar, alginate and carrageenan. Corresponding seaweed sources for these products are known as agarophytes, alginophytes and carrageenophytes.

Agar

Gracilaria is the only source of agar in the Southeast Asian region. This agarophyte is mostly farmed in South Sulawesi, Indonesia where 5,500 tons are harvested yearly. Farmgate price in 1993 ranged from Rupiah 600-1,000 per kg depending on quality. Food grade agar production in Indonesia reached 980 mt in 1994. Most of these were sold in the domestic food industry market at an average price of US\$22 per kg. In 1991, the country imported an estimated 169 mt of food grade agar (mainly from Chile) at US\$18 per kg.

Although *Gracilaria* is not farmed in Malaysia, a small-scale agar extraction company (Algae Bio Tech) in Selangor processes 70 kg of dry *Gracilaria* imported from Thailand daily. The factory produces 8 kg agar per day which is sold at Ringgit 72 per kg. No other industrial production is known. Imported agar mostly in the form of agar strips comes from South Korea and are generally utilized in the preparation of jelly products.

Village level cultivation of *Gracilaria* in southern Thailand produces around 50-400 tons per year. Due to this low production, agar imported in Thailand has steadily been increasing. In 1993, 473 tons of imports were valued at Baht 226.48 million. On the other hand, only 7.78 tons valued at B3.50 million were exported. Some imported agar in Thailand were mixed with additives, repacked, and sold to Malaysia.

In 1995, only 2 tons of *Gracilaria* were harvested from seaweed farms in the Philippines. Most of the agar produced in the country are processed into agar bars (popularly known as "gulaman") and sold in the local market. Its retail price in 1993 was Peso 6.50-7.50 per bar (about 5 g) or P1,300-1,500 per kg. Imports sharply declined from 30,213 tons in 1990 to only 6,571 tons in 1992 probably due to price increases (from US\$2.17 in 1990 to US\$5.65 per kg in 1992).

Alginate

Indonesia, the only alginate producer in the region, manufactures 100 tons yearly mainly for its textile industry. Estimated imports in 1994 was 4,000 tons.

Malaysia imports around 60 tons per year from USA, Europe and Japan via Singapore. About 25 tons are used by food processors, 8 tons by the pharmaceutical industry and 10 tons in beer and salad dressings. Price estimates for alginate in Malaysia range from US\$12-30 per kg depending on whether it is food, industrial or pharmaceutical grade.

Thailand also imports from the USA, Europe and Japan with estimates of 200 tons valued at US\$4 million in 1994 (3% duty was imposed). The price of alginate in the country ranges from US\$12 for industrial grade up to US\$22 for food grade.

There is no available information for the Philippines.

Carrageenan

Total production of carrageenophytes in Indonesia was 21,180 tons (Rp 505 per kg farm gate price) in 1993. Almost all of these are exported to Hong Kong (used as fresh condiment) and Japan (refined and semi-refined). Currently, the country imports around 200 tons of refined carrageenan for its food, beverage and pharmaceutical industries.

Limited production of carrageenophytes (about 1,500 tons per year) occurs in Sabah, Malaysia. There is no carrageenan processor in the country. Yearly import of refined carrageenan is 150 tons priced at US\$12 per kg. This is distributed to the toothpaste (90 tons), milk-ice cream (30 tons) and food (25 tons) industries. Imported semi-refined carrageenan for the production of air fresheners is around 10 tons per year valued at US\$8 per kg.

Both carrageenophyte and carrageenan are not produced in Thailand. Imported semi-refined carrageenan (annual estimate: 780 tons valued at US\$2.5 million) is consumed by pet food manufacturers. Meanwhile, the tuna processing and jelly/confectionery, and toothpaste industries use 120 tons and 100 tons imported refined carrageenan with a value of US\$2.4 and US\$2.0 million, respectively.

In the Philippines, production of carrageenophytes mostly comes from the Sulu Archipelago in western Mindanao. According to the Seaweed Industry Association of the Philippines, there are more than 95,000 companies or families involved in *Kappaphycus* farming with a total area of 46,750 hectares. On the average, the farms produce 45-54 tons per ha per crop

with 5-6 crops a year. There are also 10 processors for semi-refined carrageenan, three processors for refined carrageenan, and 10 carrageenan exporters.

The Seaweed Industry Association of the Philippines noted that the country produced about 24,000 tons of *Kappaphycus* (dry weight) in 1996 valued at almost US\$20,000. The country processed semi-refined and refined carrageenan valued at US\$31 million and US\$23 million, respectively. Export sales in 1996 for dried *Kappaphycus*, semi-refined carrageenan and refined carrageenan amounted to over US\$124 million, making the Philippines the largest supplier in the world market.

Future Prospects

With the currency crisis overshadowing the region, it is hard to determine the future of the seaweed market. Indonesia which is the only alginate producer and has a large market should focus on developing the industry. Malaysia and Thailand are foreseen to continue importing the phycocolloids because there is no viable large-scale farming areas in these countries. On the other hand, the carrageenan industry in the Philippines is well-established, and is expected to maintain, if not increase, its output in the coming years.

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Cage polyculture (seaweed with grouper) at AQD's field office-laboratory in Malalison Island, west central Philippines. This trial was part of AQD's alternative livelihood program within the Community Fishery Resource Management Project.



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