SEMINAR PAPERS: SESSION III
MARKETING AND MARKET POTENTIAL FOR AGAROPHYTES AND EXTRACTS IN BOBP REGION

UTILIZATION AND MARKETING OF SEAWEED IN SRI LANKA

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ABSTRACT

Out of nearly 260 species of seaweed growing in the coastal waters of Sri Lanka, only two species are exploited commercially at present: ***Gracilaria verrucosa*** and Gracilaria edulis. Various factors-like non-availability of resource data, deficiencies and difficulties in collection and marketing, and lack of adequate investment or interest from the industrial sector-hamper development of a seaweed production and processing industry. The export of dried ***Gracifaria*** has been highly variable partly because of the unsettled conditions in the country.

1. General

Sri Lanka has a coastline of approximately 1700 km along which many varieties of marine algae are found. Most of these marine weeds are of limited economic potential, except for a few species of Chlorophyceae, Rhodophyceae and Phaeophyceae. However, only two species of algae are commercially exploited in Sri Lanka at present, namely ***Gracilaria verrucosa*** and ***Gracilaria*** edulis. Since the mid-19th century, various studies have been carried out on taxonomical aspects and on the commercial importance of the seaweeds of Sri Lanka (Sigmond, 1841; Harvey, 1853; Svedelius, 1903: Tressler, 1923; Deraniyagala, 1933; Boergesen, 1936).

2. Present status of the seaweed industry

In the 1970s about 50-100 tonnes of dried ***Gracilaria*** were exported annually from Sri Lanka. The quantity exported in 1972 was around 50 tonnes with an export value of Rs.76,000 (FOB). In 1986, exports increased to 150 tonnes, of which 70 tonnes were from the Kalpitiya area and the balance from Trincomalee. Over the last two years (1987 and 1988) there was no harvesting of Gracilaria in Trincomalee due to the unsettled conditions which prevailed in the area during this period. There are no figures available with the Sri Lanka customs or the Export Development Board for 1987/1988. However, according to one of the main exporters there was a sharp drop in exports in 1987, with only 10 tonnes of dried ***Gracilaria*** being exported. In 1988 this was further reduced to 5 tonnes. However, it appears that there is a renewed demand by the importer countries, as evidenced by an export order from Japan for 20 tonnes of dried Gracilaria received by a Sri Lankan exporter recently.

During May to November, wild Gracilaria grows well in the Puttalam lagoon. Harvesting is normally carried out during the phase of vegetative growth from May to November. This coincides with the south west monsoon period and also the season for prawn fishing in the lagoon. This coincidence could possibly be a reason for the lack of interest shown by fishermen for harvesting seaweeds during this season.

The shrimp fishery is the main livelihood of people in the Puttalam lagoon area. They fish in the lagoon with drag nets and cast nets during the monsoon season. Their average daily income derived from the shrimp fishery is around 200 to 250 rupees (6-8 US$). A boatload of fresh seaweed weighing'around 200 kg, with a dry weight of around 30 kg can be collected by two people in 5-8 hours. The collectors receive 350 rupees (10-11 US$) for 50 kg of dried seaweed from agents who represent export companies based in Colombo. As a maximum of two operations only are possible in a day, the total income rarely exceeds 700 Rs/day. This income has to be shared with all those who were involved in the collection. A recent NARA socio-economic survey (1988) revealed that only one quarter of those engaged in seaweed harvesting have their own boats. Furthermore, the

collectors have to hire boats from outside sources and also have to pay for fuel. Thus, they end up with a very small profit margin from these operations. In comparison, shrimp fishing is more attractive as it gives a better and more reliable income, due to the steady market potential of shrimp.

Sargassum is not exploited on a commercial basis at present. However, there have been several enquiries about the purchase of *Sargassum* from importing countries such as Japan. Because of uncertainties in the supply of raw material, exporters are not in a position to undertake orders. It appears also that difficulties in detailed identification of the plant have posed difficulties to these exporters.

3. Marketing network

Seaweed collected by the boats is unloaded on the beach and allowed to sun-dry for 4-5 days. The dried weed is tightly packed in gunny bags and transported by cart to the purchasing centres. Even though some cleaning is done by the collectors during sun drying, further cleaning is carried out at the purchasing centres. Here, the seaweed is sieved to remove particulate matter such as sand and sea shells, and then stacked to await transportation to Colombo. The middleman gets around Rs.10-12 for the dried seaweed. Further cleaning is carried out by the exporters prior to bailing for shipment. 'A bail of dried seaweed weighs approximately 150 kg.

A very small percentage of the dried seaweed is sold locally. Retail packs, weighing 50 to 100 g, are sold at most supermarkets, pharmacies and grocers in Colombo and its suburbs. Packeting of seaweed is carried out by traders who get their supplies from their agents. These agents visit the producer areas periodically and purchase the dried weed direct from the collectors. A retail pack of 100 g is sold at Rs.20-30, with the retailer getting a 15-20% commission. According to most Colombo traders, packeted seaweed is a slow-moving item except during the Islamic festive season, when demand is good. However, according to these traders, over the last few years there has been a growth in seaweed sales and it is used increasingly in local cuisine. They also believe that the local seaweed is superior to the imported, as evidenced by consumer preference for the former.

Seaweed is a popular item of food in producer areas as well. A recent socio-economic survey carried out by the National Aquatic Resources Agency (1988) revealed that 9 out of 10 people living in the Puttalam lagoon area use *Gracilaria* for domestic consumption. The most popular preparation is a porridge made by washing the dried seaweed several times and cooking it in water for 15-20 minutes. The thick soup obtained is sieved using a cloth strainer or wire mesh sieve, and coconut cream and lime are added to taste. The villagers believe this porridge to be highly nutritious and it is considered a must during the fasting season. The porridge is sold at kiosks in the Kalpitiya area at Rs.2/glass, and enjoys a very good demand among the local fishermen who rarely miss taking it on their return from the sea around noon time. According to a Kalpitiya boutique owner, the "commercial" recipe for the porridge includes 2 kg seaweed, three limes and 600 g sugar giving 30 glasses of the porridge. Seaweed jelly cube is another common sweetmeat of the area. Seaweed is washed several times until it becomes lighter in colour and is cooked in a little water. Lime and colouring are added to the syrupy mass obtained, which is then allowed to set for about an hour to a jelly like mass. The jelly is then cut into cubes.

4. Limiting factors and constraints

Over the last few decades, interest in the seaweed resources of Sri Lanka has surfaced periodically. There has been no continuing interest in the commercial exploitation of this resource, in spite of the marked growth in seaweed consumption and the seaweed-based industries worldwide. In Sri Lanka, the seaweed industry has always been a subsidiary of the fishing industry, with the collection and processing of seaweed being carried out by the fishermen to supplement their income. Unlike other countries of the region, the industry in Sri Lanka has so far not attracted adequate investment or interest from the industrial sector.

There are nearly 260 species of seaweeds growing in the coastal waters of Sri Lanka, of which nearly 20 species are of commercial interest (Durairatnam, 1961). Of these, only two species of *Gracilaria* are of any commercial importance at present. The under-utilization of the country's seaweed resources can be attributed to several limiting factors and constraints.

Non-availabillty of resource data

Information on *Gracilaria* spp is scanty. The lack of resource data has hampered the expansion of the industry, the collectors and exporters depending heavily on the resources from traditional collecting grounds. Exporters have often experienced difficulties in getting adequate supplies of dried seaweed to fulfil export orders. The unsettled conditions prevailing in the North and the East have also deprived exporters of access to the resources of the Trincomalee area, an area which used to provide 50-70 tonnes of dried seaweed annually. This has created a vacuum in the export market, a vacuum which could have been filled if alternative collecting grounds were available. In a heavily export-oriented industry like the seaweed industry, uncertainties in the supply situation could restrict growth. The unavailability of resource data can thus be considered as one of the factors limiting the expansion of the seaweed industry in Sri Lanka.

Deficiencies and difficulties in collection and marketing

Several deficiencies and difficulties in the collection and marketing of the economically important species of seaweeds of Sri Lanka can be identified. *Gracilaria* caters mainly to an export-oriented market, whereas *Surgussum-based* products have a fairly important local market. Imports of alginates, agar-agar, alginic acid substitutes like gelatine and related products in 1987 have been valued at Rs. 29 million.

When considering the past production figures for *Gracilaria* from the Eastern and North-western coasts, the potential production using traditional harvesting practices can be estimated at around 200 tonnes of dried seaweed. However, if other potential sites on the North-western and Northern coasts are considered, there is no doubt that there could be a significant increase in potential production. In the Kalpitiya area, Gracilaria is collected by waders, who often face difficulties due to the presence of poisonous sea snakes, sting rays and sharp edged shells of the razor shell oyster (Pinna). In the Mannar and Trincomalee areas, the collectors depend mainly on the seaweed cast ashore as only a very few beds have been located, and these are found mostly at depths ranging from 10-20 feet.

Production in the Kalpitiya area consists mainly of *Gracilaria* collected from shallow coastal beds. Collection is undertaken in response to demand for the dried seaweed from middlemen who supply the exporters. The collector fishermen cannot, therefore, depend on seaweeds for a regular income because the demand and market price are influenced by the variable export market. It is interesting to note that, at times, even the seaweed cast ashore is not collected by fishermen, because of difficulty in marketing it. Hence, it is important to devise a scheme for purchasing the product, independent of the middlemen, possibly through state intervention, in order to encourage the collector fishermen and to assure them a steady income.

As discussed earlier, most of the *Gracilaria* produced in Sri Lanka is exported in dried form without any further processing. Most countries exporting this seaweed have realised the benefits of exporting processed products rather than the dried seaweed. Export of the unprocessed product has two distinct disadvantages: the high costs of packaging and transport force down the price paid to collectors, and the raw material being processed elsewhere means that the benefits of gainful employment in manufacture are lost to Sri Lanka. A close look at the feasibility of further processing the seaweed locally is necessary, in order to improve the profitability and employment generation capacity of the industry.

Imports of seaweed products and substitutes

During the period 1960-1970, several pilot-scale operations were undertaken to examine the feasibility of extracting alginic acid and agar from local seaweeds. The locally manufactured alginic acid and agar were found to be of international standard. Encouraged by the results of these trials, the Government decided to expand the industry, and action was taken to set up a network of collection centres and processing plants under the management of the District Development Councils. Interest in this direction was catalysed by the introduction by the Government of an import quota system for manufacturers.

A change in Government policy in the mid-1970s meant the removal of the import quota system,

and the local market once again became open to imported seaweed products. This acted as a disincentive for investment in the local seaweed processing industry, and to date has resulted in Sri Lanka remaining as an exporter of dried seaweed.

Attempts were also made in the 1970s to popularise the incorporation of dried powdered seaweed (Ulva spp) as a green supplement for poultry feed in place of imported alfalfa preparations. Laboratory studies were encouraging, with seaweed preparations showing promising results. Research and development activities on this subject were abandoned with the influx of cheaper feed material.

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SEAWEED MARKETING AND AGAR INDUSTRIES IN MALAYSIA

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ABSTRACT

Agar is imported and marketed in Malaysia in four main forms: agar strips, bacteriological agar (powder), agar desserts (jellies) and flavoured powder mixes. The domestic marketing of agar entails a host of different intermediaries, each performing varied functions such as importing, wholesaling, processing, distributing, merchandising, financing and retailing. Malaysia imported 172 tonnes of agar strips worth M$ 6.55 millions in 1988, which suggest that a large domestic market exists to support the production and processing of seaweed in the country. However, competition from other countries in the region may be a serious constraint for the development of Malaysian seaweed processing and agar production.

1. Introduction

1.1 Objective

The objective of this study was to assess seaweed processing and agar-utilising industries in Malaysia by:

1. Locating all information on the production and marketing of agarophytes, especially *Gracilaria* spp, in Malaysia.

2. Interviewing a representative cross-section of the people concerned with agar production and marketing, including the main processors, dealers and consumers of agar so as to get an idea of the demand for agar in the country.

3. Determining the total volume and value of agar imported into Malaysia by interpreting national trade statistics and by interviewing a sample of importers so as to give an indication of the supply of agar.

1.2 *Methodology*

The study relied on secondary sources and field surveys during which interviews were carried out with importers, processors and dealers involved in the agar trade. Total trade volumes and values of agar imported for the last five years were obtained from the external trade statistics of the Department of Statistics. Preliminary surveys of agar products sold by retailers indicated that the main exporters of agar to Malaysia were Korea, Japan and Singapore. Therefore the export figures of agar from these countries into Malaysia were obtained from the Japanese External Trade Organisation, and the Korean Trade Centre in Kuala Lumpur, and the Singapore Trade Statistics Department in Singapore.

Agar is imported and marketed in Malaysia in four main forms: agar strips, bacteriological agar (powder), agar desserts (jellies) and flavoured powder mixes. Five categories of intermediaries involved with the trade and marketing of the agar were identified: namely importer, wholesaler, distributor/packer, manufacturer and retailer. At least three from each category were interviewed. The surveys were carried out in Kuala Lumpur, Penang and Johore Bahru, which have been identified as the main centres for the trade and import of agar in the country.

2. Current status of the Malaysian seaweed industry

2.1 Seaweed resources of Malaysia

Traditionally, seaweeds have been utilised in Malaysia as food, animal feed and fertiliser and even in traditional medicine (Zaneveld, 1959; Burkill, 1966; Johnson, 1967; McHugh and Lanier, 1983). The documented use of local seaweeds was compiled by Phang (1984). Fourteen species of ***Agardhiella, Corallopsis, Gelidiopsis, Gelidium, Gracilaria, Grateloupia, Laurencia*** and ***Padina*** were recorded as agar-producers, four species of ***Eucheuma*** as carrageenan-producers, and seven species of ***Colpomenia, Hormophysa, Hydroclathrus, Padina*** and ***Sargassum*** as alginic acid-producers. Recent studies at the University of Malaya have added two more species of agarophytes, namely ***Gracilaria blodgettii*** and ***G. salicornia.***

2.2 Research on agarophytes and their culture in Malaysia

The first study on agar content and quality of seaweeds in Malaysia was on ***Gracilaria*** by Burkill ***et al*** (1968). There was no further contribution to agar research until Doty & Fisher (1987) showed the potential for seaweed farming in Malaysia. The agar content of local species analysed ranged from 44-67% (Doty, ***et al*** 1983, Santos and Doty 1983). As a result of Doty's studies, a one-year pilot project on seaweed culture in Penang was undertaken (1983-84) by the Fisheries Research Institute at Glugor together with Agronomic Research Development and Production Inc., Honolulu, Hawaii. Further trials were reported by Faaaz Abdul Latiff (1986).

2.3 Production of agarophytes and agar in Malaysia

There is no known industrial production of agar in the country. Local fishermen collect species of ***Gracilaria*** and prepare the dessert "agar-agar" for home consumption or for sale. The first seaweed production company in Malaysia was set up in early 1989 based on the ***Gracilaria*** species known as G16. Due to unforeseen circumstances the crop was destroyed and plans for the continuation of the project are unknown. ***Gracilaria*** G16 had an agar yield of 17-19%, with gel strength greater than 610 g/cm^2.

3. The agar trade

In 1980, estimated world production of seaweeds for use in agar manufacture was 36,094 tonnes, of which about 18,088 tonnes was produced by Asian countries (McHugh and Lanier, 1983). Of the total amount produced in Asia, Korea accounted for 11,308 tonnes or 62.5% while Japan produced 4,000 tonnes or 22.1%. The remainder came from the Philippines, Taiwan, India and Sri Lanka. It is estimated that the agar produced by Asian countries, mainly Japan, Korea, and to a lesser extent, Taiwan and India, was 3,574 tonnes. The primary consuming countries for agar are Japan, Korea and China.

3.1 Forms of agar in Malaysia

Agar Strips

These are imported in bulk, mainly from Korea and Japan. The strips are repacked by packers or wholesalers into convenient sizes of 20 g or 35 g and then distributed directly or via retail outlets such as supermarkets and provision shops. The agar strips are bought by consumers for the preparation of jelly desserts, and the business enjoys peak sales during the many festivals in the country. Agar strips and agar powder are also imported,directly for utilisation by the manufacturers of jelly desserts.

Agar desserts/jellies and flavoured powder mixes

There are very few manufacturers of jelly desserts in the country, Socma being the main manufacturer. Some are imported in processed form from Japan, Indonesia and the Philippines. Instant agar powder mixes of various flavours are also sold. These come mainly from Thailand,

and at least one brand is from Taiwan. They are sold in vacuum packs ranging from 10-85 g, or in paper boxes of 90 g.

Bacteriological agar

Most of the bacteriological agar is sold in Kuala Lumpur to universities, research institutes and hospitals. The various brands available include "Difco", "Merck". "Oxoid", "Bitek", "Eiiken" and "High Media". They come mainly from the United States of America and United Kingdom. "Eiiken" comes from Japan, while "High Media" is the newest brand from India. The Indian agar is price competitive. One salesman estimates that the total market for bacteriological agar in the country is valued at M$ 2 million per annum.

3.2 Imports

The only official source for import figures is the external trade statistics published by the Malaysian Department of Statistics. One major disadvantage, however. is that statistics on agar imports do not appear separately but are lumped together under "seaweed products" (SITC code 292-981-O) or under "vegetable saps and extracts; pectic substitutes; pectinates and pectates; agar-agar and other mucilages" (SITC code 292-910-00). Hence, imports of agar can only be estimated by examining the statistics available for the two commodity groups.

The value of imported seaweed products increased from 1980 to 1987 as indicated in Table 1. Between 1984 and 1987, however, there was a decline in the value of imports due, perhaps, to the severe recession in the country. The main countries exporting agar to Malaysia are the People's Republic of China (which accounted for almost 37.0% of the total import value in 1987). Japan (18.1%). Korea (14.6%), Singapore (14.3%) and Taiwan (10.7%).

Table 1: Imports (Volume and c i f value) of seaweed products by country of origin, 1980-1987

Country	1981		1982		1984		1985		1986		1987	
	tonnes	M $	tonnes	M$	tonnes	M $	tonnes	M $	tonnes	M$	tonnes	M$
Australia	0.49	1,464	1.02	6,095	-0.07	252	-----	0.00	0	0.07	173	
China	139.45	202,887	26.34	110.995	37.69	238,804	21.00	184,600	32.17	159,011	31.56	193,163
Hong Kong	2.32	19,047	5.36	10,440	14.43	22,274	18.05	20.250	11.98	16.927	1.21	3.382
Indonesia	5.59	6,740	0.06	188	3.01	9,402	0.20	300	0.18	427	0.03	352
Japan	110.13	65,368	32.72	131,129	25.57	305,628	32.91	219,101	41.66	187,778	12.16	94,454
Korea Rep. of	30.43	93,362	59.16	155.952	21.48	104,919	24.38	117,945	26.78	126.802	20.30	76.246
Norway												
Philippines		·	0.21	2.343	23.79	12.494	53.25	13.462	48.61	21,107	25.01	6,031
Singapore	7.00	100	0.59	2,178	1.57	6.456	0.52	1,735	0.03	197	3.11	74,491
Taiwan	19.67	67.487	14.55	87,757	5.95	34.126	9.20	46,540	18.17	70,674	16.81	56,148
Thailand		·	0.15	245	0.02	113	0.14	413	1.43	1,297	· 1.30	1,811
U.K.				14	0.01	406	0.03	288	0.12	1,707	0.70	14,707
Others #	0.97	4,474	0.59	1,969	0.23	966	0.34	2,534	0.59	576	0.75	533
TOTAL	315.95	460,929	140.75	509,396	133.82	735,840	160.02	607,168	181.72	586,503	112.71	552,501

Includes Austria, France, Germany, North Korea, Laos, Macau, Norway, New Zealand, Switzerland, U.S.A. and Vietnam.

Imports of vegetable extracts and saps, pectic substances, pectinates and pectates. agar-agar and other mucilages also increased from M$5.58 million (cif value) in 1982 to M$ 13.6 million in 1987 (Table 2). Unfortunately, it is not known what percentage of this total constitutes agar imports. By country of origin, Korea emerges as the most important source, accounting for some M$7.72 million or nearly 57.0% of the total import value in 1987. This is followed by USA (18.9%), Denmark (5.2%) and Japan (4.0%).

A significant proportion (perhaps as high as 90%) of the agar imported for food is in the form of agar strips, while the remaining 10% is in powdered and jelly dessert forms. Imports of agar strips from Korea increased from 73.95 tonnes valued at M$1.83 million in 1982 to 168.74 tonnes valued at M$6.40 million in 1988, thereby registering average annual growth rates in physical and value terms of 21.4% and 41 .0% respectively (Table 3). However, a slight decline in the import of agar strips from Korea was recorded between 1987 and 1988.

Table 2: Imports (Volume and c i f value) of vegetable saps and extracts; pectic substitutes; pectinates and pectates; Agar-agar and other mucilages by country of origiri, 1980-87.

Country	1982		1983		I984		1985		1986		1987	
	tonnes	M $	tonnes	M $	tonnes	M $	tonnes	M $	tohnes	M$	tonnes	M$
Australia	9.6	0.26	1.1	0.10	1.5	0.07	8.3	0.51	10.1	0.07	1.6	0.03
China	14.1	0.09	20.3	0.15	19.7	0.24	44.5	0.12	56.4	0.32	11.4	0.19
Denmark	11.7	0.20	10.4	0.10	14.2	0.25	14.6	0.21	17.2	0.25	37.8	0.71
France	12.6	0.26	1.1.4	0.25	22.9	0.56	12.3	0.27	6.1	0.13	10.4	0.22
Germany, Fed. Rep.	22.6	0.41	37.1	0.43	15.8	0.25	22.0	0.16	7.7	0.08	12.4	0.14
Hong Kong	84.5	0.14	64.4	0.13	6.4	0.04	1.7	0.15	1.5	0.13	3.3	0.16
Indonesia	53.9	0.06	49.6	0.08	50.1	0.05	41.5	0.03	5.1	0.01		
Japan	51.4	0.31	32.3	0.64	160.2	0.36	24.9	0.47	20.1	0.50	23.8	0.54
Korea,Rep.of	458.8	4.532,819.5		6.54	988.4	5.741,614.0		6.40	213.7	5.53	242.2	7.12
Singapore	106.7	0.24	251.2	0.45	38.3	0.27	35.3	0.16	8.2	0.21	42.8	0.48
Taiwan	7.2	0.01	35.7	0.06	15.6	0.10	40.2	0.11	34.7	0.06	9.8	0.10
United Kingdom	38.0	0.24	33.9	0.29	17.9	0.25	25.8	0.26	17.3	0.24	15.3	0.22
U.S.A.	53.7	1.09	71.4	1.38	76.8	2.15	100.2	1.95	72.3	1.47	82.6	2.57
Others #	47.3	0.74	52.6	0.26	106.2	0.38	164.9	1.47	181.6	1.45	63.8	0.52
TOTAL	971.5	5.583,490.9		10.941,534.0		10.712,150.2		12.27	652.0	10.45	557.2	13.60

Includes Austria, Belgium, Brazil, Canada, India, Iran, Ireland, Italy, Netherlands, New Zealand, Pakistan, Philippines, Spain, Switzerland, Turkey and Vietnam.

Table 3: Imports (Vdume and c i f value) of agar strips from Republic of Korea and Japan, 1980-1988

Year	Republic of Korea		Japan	
	Tonnes	M$	Tonnes	M$
1980	n.a.	n.a.	3.50	125,530
1981	n.a.	n.a.	4.37	128,180
1982	73.95	1,826,305	4.10	127,500
1983	107.24	2,530,003	1.25	319,630
1984	n.a.	na.	9.86	287,040
1985	142.84	3,648,045	14.40	367,670
1986	162.11	4,570.683	11:20	282,630
1987	211.32	7,378,233	6.10	252,180
1988	168.74	6,404.368	3.30	144,740

Sources: 1) Korea Trade Centre, Kuala Lumpur.
2) Japan External Trade Organisation, Kuala Lumpur.

By comparison, imports of agar strips from Japan are relatively small and have declined recently from 1985 onwards to reach 3.30 tonnes valued at M$ 144,740 in 1988. The decline in imports from Japan can be explained by the rising value of the Japanese yen, which has forced Malaysia to cut its imports from Japan. This was further aggravated by falling demand for agar resulting from the 1984-86 economic recession.

By virtue of its geographical proximity, a fairly substantial proportion of Malaysia's imports of agar is handled through Singapore. It is understood that the bulk is handled by a few large importers based mainly in Kuala Lumpur, Penang and Johore Bahru. Over the last five years, however, the trade from Singapore experienced a downward trend owing to the soft domestic demand for agar.

Besides agar strips, Malaysia also imports processed agar-based products such as confectionery jellies and jelly desserts from and through Singapore. In 1986,'Malaysia imported about 160.4 tonnes of processed agar products (including jam, fruit jelly, marmalade and nut puree and paste) worth S$ 546,000 (Singapore Trade Statistics, 1986). These products were either imported (mainly from Japan) and then re-exported to Malaysia, or were produced locally by Japanese companies registered in Singapore.

3.3 Marketing and distribution patterns

This section analyses the marketing of agar strips, agar powder and jelly agar in Malaysia. The marketing of agar is undertaken by a host of intermediaries such as importers, wholesalers, packers, agent distributors, processors/manufacturers and retailers. All of these normally perform the three major functions of marketing, merchandising and financing simultaneously. In general, the marketing of agar follows the pattern of a few large importers selling direct to many wholesalers and/or agent distributors, who then service numerous small retailers such as provision shops, supermarkets, hotels and restaurants.

Agar strip and powder

Since practically all of the country's need for agar is imported, the role of importers in the marketing of agar strips is crucial. There are fewer than 20 companies, with various scales of operation, which have a monopoly over the trade. In a sense, therefore, the market structure of agar strips could be characterised as oligopolistic, with a small number of importers controlling a sizeable share of the agar market. More than half of the importers are found in Kuala Lumpur, while the remainder are in the other large cities such as Penang, Johore Bahru and Kuantan. Virtually all the importers also deal in other dried food provisions, and agar strip constitutes only a small proportion (less than 10%) of their total business volume. Three major types of agar importers could be identified, namely importer, importer-repacker and importer-repacker-wholesaler. These three groups could be differentiated by the marketing activities they perform. The distribution channels and functions performed by the intermediaries in the marketing of agar strip is shown in Figure 1. It should be noted that the marketing and distribution of agar powder, another form of raw agar, is essentially similar to that of agar strip. Again, most if not all of the importers/repackers/wholesalers of agar powder are found in large cities and major consumption centres such as Kuala Lumpur, Penang, Johore Bahru, Ipoh and Kuantan.

Like the importers, the wholesalers of agar strip are located mainly in large urban centres, and are involved in wholesaling other food provisions besides agar. They provide a crucial link between importers and retailers. They also perform important facilitating functions such as selling, pricing, financing, grading and merchandising. A gross estimate suggests that more than 95% of the agar handled by wholesalers is sold to distributors/suppliers, manufacturers and large retailers, while only 2-5% went to small retailers and ultimate consumers.

Another marketing intermediary which is becoming increasingly important is the distributor/supplier (Figure 1), otherwise known as the stockist. These provide a link between wholesalers and certain retailers, especially the small retailers scattered throughout the country.

At the retail level, the agar trade seems highly competitive as there are a large number of retailers involved. Agar retailing is generally widespread and agar is sold in most retail outlets; ranging from small village provision shops to large city supermarkets. The retailers provide the final link between sellers and consumers. Agar, however, accounted for a mere 1-2% of the total volume handled by most retailers.

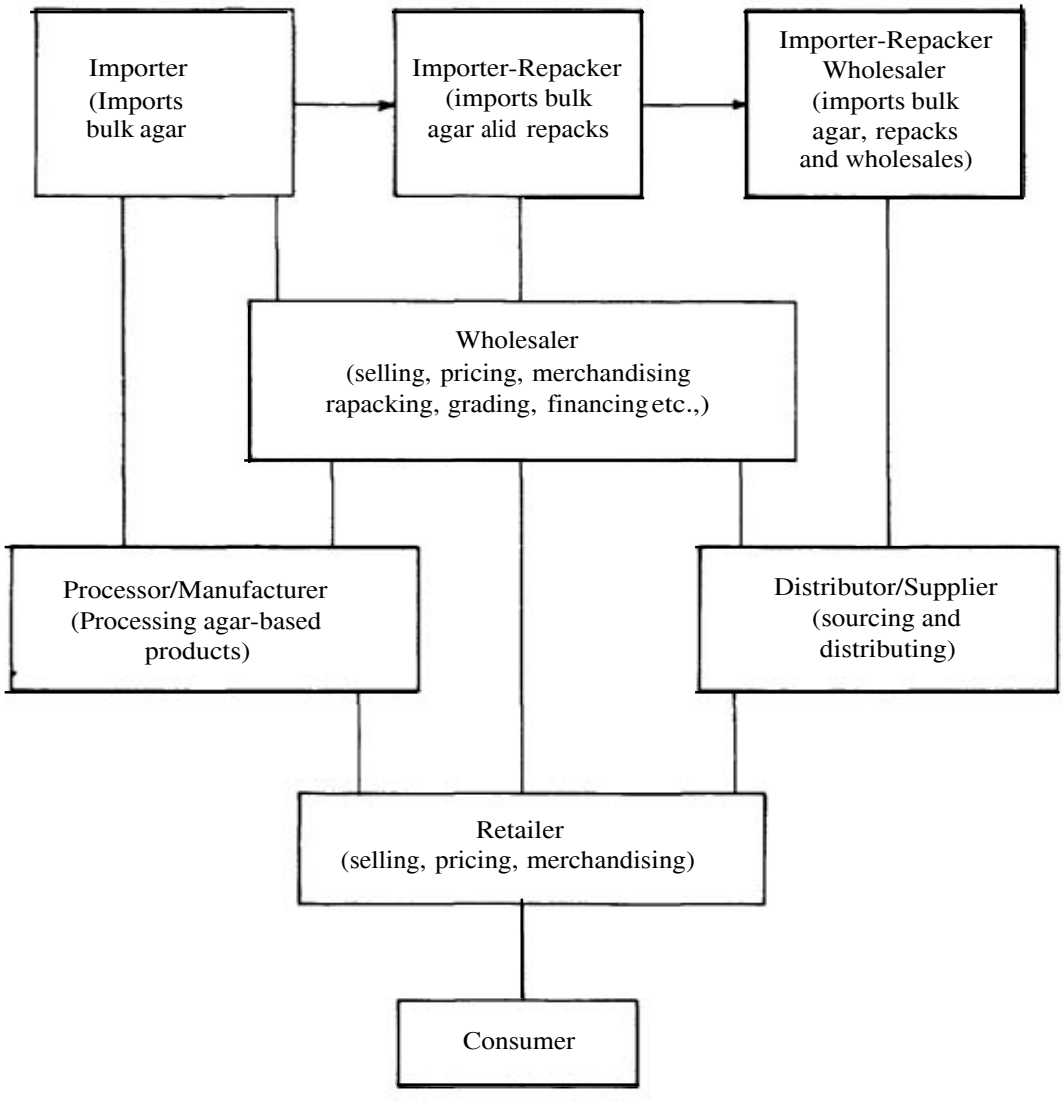
For the majority of agar traders (importers, wholesalers and retailers), agar constitutes only 5-10% of their total business. The actual volume of agar traded varies considerably from one dealer to another, depending on their scale of operation. A gross estimation indicates that the volume traded by each importer/wholesaler in a year, ranged from 3.0-10.0 tonnes valued at M$135,000-$450,000.

As for the retailers, it was found that their trade volume in agar is generally low, hardly exceeding 100 packets (20 g per packet) per month valued at M$ 160-$180. One large supermarket, however, reported that its sale of agar strip averages 600 packets a month, valued at M$ 960-$1000. Sales of agar powder are reported to be much lower, and retailers complained that it is not as saleable as agar strip. As expected, sales of both strip and powder increased by as much as 30-40% during festive seasons such as Hari Raya, Chinese New Year and Christmas.

Processed agar (jelly desserts)

The manufacturing or processing of agar into jelly desserts is a relatively small business in Malaysia. Fewer than 10 companies are involved. Among the big names are Nutritional Products

Figure 1: Marketing Channels for Agar Strip and Agar Powder, Peninsular Malaysia



Sdn. Bhd. (Petaling Jaya) which is a subsidiary of Nestle, Foodpro Sdn. Bhd. (Kuala Lumpur), CPC (Malaysia) Sdn. Bhd. (Kuala Lumpur), Kinos Food Industries Sdn. Bhd. (Johore Bahru), and Fourseason Foodstuff Industries (M) Sdn. Bhd. (Penang). Except for Foodpro Sdn. Bhd., which is a subsidiary of an oil-refining company, the others are primarily food-based companies involved in the manufacturing of other food items.

Detailed business information could not easily be extracted from the manufacturers interviewed because of the high degree of secrecy maintained by most companies. However, some basic information on the manufacturing business of one particular company was obtained.

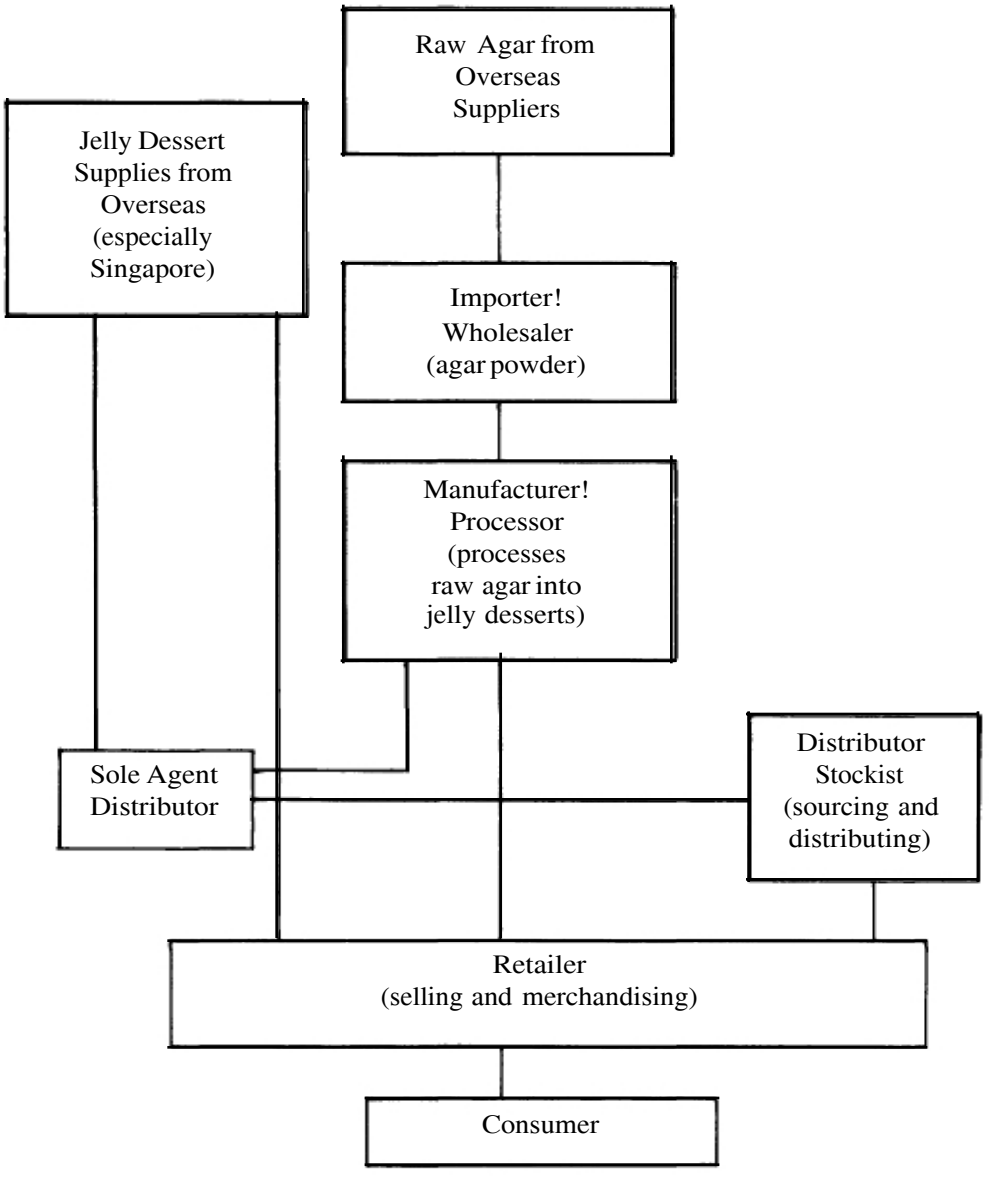
The company started to manufacture jelly around 1986 as part of its diversification programme. It is understood that the dessert accounts for about 20.0% of the company's overall business. The raw material required, agar powder, is imported mainly from Korea. In 1988, the company

imported approximately 6.0 tonnes of agar powder worth some M$ 150.000. The company sold about 2.7 million cups of jellies worth about M$ 1.0 million in 1988, an increase of about 10% over the previous year's sale of 2.4 million cups worth M$ 0.9 million.

The marketing pattern for the jelly desserts is somewhat different to that of agar strip or agar powder. A characteristic of the marketing of jelly desserts is the absence of wholesaling (Figure 2). Instead, marketing is usually dominated by sole agent distributors and stockists/suppliers who provide the important link between the manufacturers and retailers. Most manufacturers undertake their own packaging and branding, while some like Foodpro Sdn. Bhd. also do contract packaging for retailers such as the Seven Eleven Company. The retailing of jelly desserts is done mostly by supermarkets, mini-markets and provision shops selling food items. These outlets are dispersed throughout the country.

As with agar strip retailing, jelly desserts constitute only one of the many items sold, and usually account for less than 10% of the total volume.

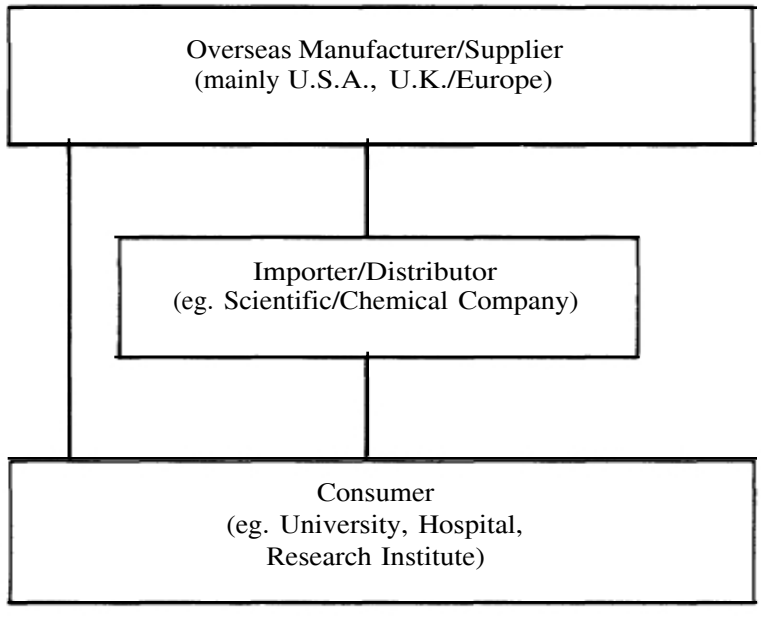
Figure 2: Marketing Channels for Processed Agar (Jelly Desserts), Peninsular Malaysia



Bacteriological agar

Marketing of bacteriological agar is more simple than that of agar strip or processed agar jellies. Essentially, it revolves around the importer-cum-distributor who imports directly from overseas manufacturers, in particular from the U.S.A., United Kingdom/Europe (Figure 3). Field surveys identified companies selling scientific equipment and supplies as the main businesses involved in the bacteriological agar trade. Importing small quantities at a time, most of them reported that bacteriological agar constitutes only a fraction (1—2%) of their total business.

Figure 3: Marketing Channels for Bacteriological Agar, Peninsular Malaysia



A unique feature of the bacteriological agar trade is that neither wholesaling nor retailing is involved in its marketing and distribution. The product is sold directly by the importer/distributor to the consumers (Figure 3). The main consumers are hospitals, universities and research institutes. In some instances, these institutions import bacteriological agar direct.

3.4 *Demand and prices*

International demand for agar remains strong as evidenced by the continuing high priëes and the ease with which major exporting countries like .China and Korea (McHugh and Lanier, 1983) dispose of the product. The market price of agar seaweed is higher than those for other colloid-bearing seaweeds.

In Malaysia, demand for agar has been dictated primarily by its major utilisation, as food for human consumption. Unlike more essential food items such as rice, fish, meat and vegetables, agar is considered non-essential and is eaten only as a desert. Hence, demand for agar is very income and price elastic, meaning that a slight change in the price of agar and consumers' income would bring about a remarkable change in the demand. Besides price and income, demand for agar is also determined by consumer preference, availability and price of other colloid substitutes (e.g. carrageenans), eating habits and nutritional considerations. One major advantage is agar's acceptability to all religious and cultural groups among multi-racial Malaysian communities. Statistics on the domestic demand for agar and its per capita consumption are not, how-ever, available.

The market price of agar is reflected, to some extent, in its import value (cif). From the statistics available on imports from Korea, it was found that the ex-vessel prices of agar strip have been on

the increase over the last five to six years, averaging M$37.95 per kilogram in 1988. This represents a remarkable increase from the 1982 price estimated at M$24.70 per kilogram. On average, the import value of agar strip increased at an annual rate of about 10.0%. The rising prices of imported agar can be construed as reflecting the continuing strong domestic demand.

At wholesale and retail levels, there can be wide fluctuations in the price of agar strips depending on the individual trader's profit margin and the quality of the agar as measured by its gel-strength. Laboratory analyses were undertaken to determine the relationship between gel strength and retail prices (Table 4). As expected, it was found that the higher the gel-strength of the agar strip. the higher its retail price. On average, the high-quality agar strip, originating mainly from Korea, is retailed at M$ 1.80- M$ 1.90 per 20 g packet. In comparison, the retail price for low- quality agar strip, supplied mainly from China, averages M$ 1.20- M$ 1.30 per 20 g packet. The retail price of agar strip of the same quality may differ by as much as 10% from one outlet to another, depending on the individual retailer's profit margin.

Table 4: Gel strength and retail prices of agar strip, Peninsular Malaysia, 1989

Brand	Country Of Origin	Gel Strength (g/cm^2)	Retail Price (20g)
A	Korea	> 500	M$ 1.90
B	Korea	408	M$ 1.60
C	Korea	185	M$1.55
D	Unknown	86	M$l.35

From the few brands of agar powder available in the market, it was estimated that the retail price averaged about M$1.20-M$1 .30 per 10 g packet. Agar powder imported from Japan commands a better price than that packed and distributed locally.

The prices of jelly desserts were more difficult to estimate, as they are sold in different types of containers with different units of measurement. The most common packaging is in packets containing 20 cups of jellies, each individually packed with 19 g content. A packet of agar jellies is usually retailed at M$l.00-M$1.30, with slight variations from one retailer to another. A well-known brand, Square Cut Jelly, is sold at M$0.60 per cup, and the content per cup is 130 g.

In the case of bacteriological agar, it was found that the consumer price varies in the region of M$250-M$450 per kilogram depending on the grade. For example, Bacto-Agar, a supposedly high-grade bacteriological agar is sold at M$ 418 per kilogram, while a lower grade called Bitek-Agar fetches about M$352 per kilogram. The purchase price of bacteriological agar was in the region of M$ 200- M$ 350 per kilogram, depending on the grade. In general, the purchase price had increased by as much as 10-20% since 1986.

3.5 Marketing margins

The marketing margin or price spread for agar in this study is analysed in terms of dollars per kilogram and as percentage of retail price. In an efficient marketing system. the marketing margins can be equated with processing/manufacturing costs, transportation costs, handling charges and the normal profits of market intermediaries.

The data in Table 5 indicate that the marketing margin of a 20 g packet of agar strip is 66.7% of the retail price or M$ 1.20 per 20 g packet. of this, about M$0.80 or 66.7% is accounted for by marketing costs, while the remaining M$0.40 or 33.3% is the profit made by the various marketing intermediaries (wholesalers and retailers). Transportation, handling charges, storage, and packaging constitute the major items of marketing costs.

At the wholesale level, the marketing margin and wholesale price account for 33.3% and 55.5% respectively of the retail price. At the retail level, the marketing margin is 11.1% of the retail price, all of which constitutes gross profit margin to the retailers.

Analysis of the marketing margin indicates that the importer's share of the retail price is M$0.60 per 20 g packet or 33.3%. Based on this information, the importer's share of the retail price appears relatively low. This does not necessarily mean that the marketing system is inefficient.

Table 5: Marketing margins of agar strip per 20g packet, Kuala Lumpur

Trade Level	cost		Price (M$)
Importer			
Net price received by importer			0.60
Transportation	0.25		
Handling charges	0.15		
		0.40(22.2%)	
Wholesaler	1.00		
Inter-market transportation	0.10		
Storage	0.20		
Packaging	0.10		
Profit margin	0.20		
		0.60(33.3%)	
Retailer			1.60
Profit margin	0.20		
		0.20(11.1%)	
Price paid by consumer			1.80
Total marketing margin		1.20(66.7%)	

Note: *Figures in parentheses indicate percentages of retail price*

For agar powder, the marketing margin was estimated to be M$0.90 per 10 g packet or 69.3% of the retail price of M$ 1.30 (Table 6). Of this, 38.5% was accounted for by the wholesaler, 15.4% by the importer and another 15.4% by the retailer. The importer's share of the retail price was 30.8%.

Table 6: Marketing margin of agar powder per 10 g packet, Kuala Lumpur, 1989

Trade Level	cost		Price (M$)
Importer			
Net price received by importer			0.40
Transportation	0.10		
Handling charges	0.10		
	0.20		(15.4%)
Wholesaler			0.60
Inter-market transportation	0.10		
Storage	0.10		
Packaging	0.10		
Profit margin	0.20		
		0.50(38.5%)	
Retailing			1.10
Profit margin	0.20		
		0.20(15.4%)	
Price paid by consumer			1.30
Total marketing margin		0.90(69.3%)	

Note: *Figures in parentheses indicate percentages of retail price.*

The marketing margin of one brand of agar jelly is analysed (Table 7). The net price received by the manufacturer is M$0.35 per cup, hence the manufacturer's share of the retail price is 58.3%. This is much higher than the importer's share of retail price for agar strip (33.3%) or agar powder (30.8%). The marketing margin at the manufacturer's level is M$ 0.10 per cup or 16.6% of the retail price, comprising mainly manufacturing costs such as raw material, labour and packaging.

At the sole agent distributor level the marketing margin is M$ 0.10 per cup or 16.6% of the retail price, This percentage seems low compared with the marketing margin at wholesale level for

agar strip (33.3%) and for agar powder (38.5%). Such a difference is not surprising, considering that the distributor for agar jellies does not perform activities like storage, and packaging which wholesalers have to undertake for agar strip or agar powder.

Table 7: Marketing margins of processed agar (jelly desserts) per cup, Kuala Lampur, 1989.

Trade Level	cost		Price (M$)
Manufacturer			
Net price received by manufacturer			0.35
Raw materials	0.05		
Labour	0.02		
Handling and packaging	0.03		
		0.10(16.6%)	
Distributor			0.45
Transportation	0.05		
Profit margin	0.05		
		0. 10(16.6%)	
Retailer			0.55
Profit margin	0.05		
		0.05(8.3%)	
Price paid by consumer			0.60
Total marketing margin		0.25(41.6%)	

Note: Figures in parentheses indicate percentages of retail price

The overall marketing margin for agar jellies amounted to M$0.25 per cup or 41.6% of the retail price. Of this, 16.6% was accounted for by manufacturer's margin, 16.6% by distributor's margin and 8.3% by retailer's margin. It is noted that the marketing margin for agar jellies (41.6%) is lower than that of agar strip (66.3%) or agar powder (69.3%).

4. Potential for development and constraints

Malaysia imported nearly 172 tonnes of agar strip worth some M$6.55 million in 1988. This means that a sufficiently large domestic market exists to support the production and processing of seaweed, especially *Gracilaria,* in the country. Moreover, if this species could be successfully cultivated in Malaysia, substantial savings in foreign exchange would be attained through import-substitution.

Malaysia is blessed with several natural factors such as an abundance of sunshine and the absence of destructive typhoons. Most of the coastal areas are relatively unpolluted from sources such as silting, agricultural, agro-industrial and human wastes. Aquaculture in general has not been intensively developed, and at present offers no strong competition to seaweed culture. The political stability of the country, together with its well developed infrastructure and good shipping and communication network, pose few problems for the marketing of the product. A substantial domestic market for the processed agar, as well as good regional (ASEAN, Japan and Korea) and possibly international markets (U.S.A.. E.E.C., etc.), is also envisaged. Malaysia has good international links with the Muslim world and agar is the accepted substitute for gelatine in the food, cosmetic and pharmaceutical industries.

Notwithstanding the bright prospects there exist a number of constraints and problems that need to be overcome if a seaweed industry is to be developed. Heading this list is the inadequacy of technical capability and expertise. The technology available for seaweed culture in Malaysia is far from satisfactory and it may take several years of concentrated and well-designed effort to make it successful enough to compete with other seaweed producing countries in the region. A constant supply of consistent quality is important if seaweed produced in Malaysia is to be competitive with that of other producers. Moreover, while Gracilaria cylindrica was shown to produce a good food agar, it cannot be used for more demanding and higher valued uses such as bacteriological agar. The search for high-quality agar producing species must therefore continue. Stock improvement studies should also be conducted.

In addition to technological considerations, the potential development of the seaweed industry in Malaysia may be affected by market and economic constraints. While the domestic market may be able to support a small number of agar-producing enterprises, the full-scale development of the agar industry will very much depend on a reliable regional and international market. Unfortunately, potential producers (particularly those in developing countries like Malaysia) wishing to enter the international seaweed trade would be faced with stiff competition from the more established producers.

5. Conclusion

Almost all of the country's agar is currently imported, mainly from Korea. The bulk is utilised in Malaysia in the form of agar strips used mainly for jelly desserts. The other forms include agar powder and bacteriological agar for scientific purposes.

The domestic marketing of agar entails a host of different intermediaries, each performing varied functions such as importing, wholesaling, processing, distributing, merchandising, financing and retailing. In essence, the marketing of agar follows the general pattern of a few large importers selling to a relatively large number of wholesalers and/or agent distributors and stockists, who then service numerous small retailers and other retail outlets such as supermarkets, restaurants and hotels. Domestic demand remains strong as suggested by the continuing high imports and cif prices of agar. However, demand was adversely affected by the 1984-86 economic recession which had the effect of reducing imports, particularly from Japan. Furthermore, the fall in imports from Japan since 1986 can be attributed to the rising value of the yen. Demand and market potential for agar could not be analysed in detail, owing to the absence of detailed information. However, it is unlikely that demand for agar would increase substantially in the future since agar is a non-essential food item. Demand for food agar, however, is very price and income elastic.

It is timely, perhaps, for Malaysia to develop seaweed production and processing. However, before venturing into seaweed culture and processing on a large scale, there is a need to undertake in-depth market evaluation for different species of seaweeds, both at the domestic and international levels. New markets should be explored so that new seaweed-producing countries like Malaysia would not be too vulnerable to wide price fluctuation and uncertainties. The domestic market should be expanded to reduce over-dependence on the foreign market. There is also a need for more research on new uses for the various species of seaweeds. To ensure a constant supply of raw seaweeds for any processing plant that might be set up, Malaysia could act as a collecting centre for neighbouring countries in the ASEAN region. Once processed, the product could then be sold back to these countries.

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SEMINAR PAPERS: SESSION III
MARKETING AND MARKET POTENTIAL FOR AGAROPI-IYTES AND EXTRACTS IN BOBP REGION

INTERNATIONAL TRADE IN AGAR FOR COUNTRIES IN THE BAY OF BENGAL REGION

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ABSTRACT

Trade statistics from 1980-87 of imported/exported agar from the BOBP countries are presented in this paper. Thailand, Malaysia and Indonesia account for most of the imports in the region. Export of agar is recorded from four BOBP countries. However, re-export and misclassification of items may interfere with sound interpretaion of the statistics.

* * *

It is the intention, here, to look at the international trade in agar, making use of available statistics. Before examining the data it is prudent to sound a cautionary note. Trade statistics are ultimately only as good as the person who completes the customs form or the one who interprets it. Items may be misclassified. So-called 'Danish agar', for example, which appears in European trade statistics, is not agar at all but furcellaran, a carrageenan-type gum obtained from the seaweed *Furcellaria.* Figures available for imports of agar into the European Community indicate that 301 tonnes from the Philippines entered the UK in 1986 (Nimeke, 1986), a figure cited recently elsewhere (Anon, 1988), although incorrectly attributed to 1987. This, too, according to sources in the United Kingdom and Philippines (personal communication), is spurious and presumably refers either to carrageenan or the seaweed from which it is obtained.

For some countries, agar is not separated from other commodities. This is the case for Malaysia, for example, where it is included under the heading, 'Vegetable saps and extracts, pectic substances, pectinates, agar and other mucilages'. In such a situation, imports of agar can only be estimated by examining other countries' exports. Even this, however, may not be accurate or reliable. Thus, figures for imports of agar into Indonesia from Japan, when extracted from Indonesian import and Japanese export statistics, respectively, are in poor agreement although both list agar separately (Table 1).

Table 1: Indonesian imports of agar from Japan (tonnes)

	1980	1981	1982	1983	1984	1985	1986	1987
Indonesian imports from Japan (1)	22	2	67	233	75	18	12	47
Japanese exports to Indonesia (2)	136	122	126	88	32	61	6	1

Source: (1) Indonesia Foreign Trade Statistics
(2) Japan Exports and Imports

Notwithstanding these comments, it is hoped that the trade statistics presented go some way towards representing the true picture with regard to international trade in agar within the BOBP region.

Thailand, Malaysia and Indonesia account for most of the imports of agar within the region (Table 2). Imports into Thailand, valued at Bht 112.9 million in 1987, come mainly from Japan, although there have been increasing amounts from Chile in recent years (Table 3).

Figures for Malaysian imports have been fairly consistent during the present decade, at around 250 tonnes per annum, except for 1983 when a sharp increase to over 500 tonnes was

recorded (Table 4). Singapore, it should be noted, is not a producer of agar, but rather, re-exports imported material.

Table 2: Agar imports, BOBP countries (tonnes)

	1980	1981	1982	1983	1984	1985	1986	1987
TOTAL	681	489	739	1236	689	661	684	699
Of which by:								
Thailand	209	184	230	307	260	234	252	277
Malaysia(1)	303	253	233	574	256	253	259	279
Indonesia	159	43	262	350	163	170	165	140
India(2)	6	6	4	3	6	3	5	NA
Sri Lanka	2	~(3)	7	~	NA	~	~	1
Bangladesh(1)	2	3	3	2	4	1	3	2

Notes : (I) Derived from exports by Japan. S. Korea and Singapore
(2) Year begins 1 April
(3) ~ Indicates < 0.5

Table 3:.Agar imports, Thailand (tonnes)

	1980	1981	1982	1983	1984	1985	1986	1987
TOTAL	209	184	230	307	260	234	252	277
Of which from:								
Japan	117	90	143	195	150	143	134	126
S. Korea	22	25	19	22	16	20	20	10
Chile	59	60	64	60	58	70	94	134
Taiwan			3	21	2		2	6
China	8	9		8	20			
USA					11			
Others	3		1	1	3	1	2	1

Source: Foreign Trade Statistics of Thailand

Table 4: Agar imports, Malaysia (tonnes)

	1980	1981	1982	1983	1984	1985	1986	1987
TOTAL	303	253	233	574	256	253	259	279
Of which from :								
Japan	4	4	4	11	10	11	11	6
S. Korea	15	57	74	107	82	146	162	214
Singapore	284	192	155	456	164	96	86	56
Hong Kong								3

Source: Derived from exports by Japan, S.Korea, Singapore, Hong Kong.

Indonesia imports agar from a variety of sources, with Asian and South American countries contributing significant amounts (Table 5). Figures for Hong Kong and Malaysia, like those of Singapore, refer to re-exports. Total imports for 1987 were valued at US $526,000. Imports in 1983, again, appear to have been higher than normal.

Indian demand for agar is met primarily by domestic production (Coppen, 1989) but small amounts of higher grade bacteriological/pharmaceutical agar are imported (Table 6).

Imports of agar into Sri Lanka and Bangladesh are also low, of the order of a few tonnes per annum or less (Tables 7 and 8). There is not much local production either.

Exports of agar are recorded for four BOBP countries, although for Thailand and Malaysia, at least, these probably represent re-exports (Table 9).

The main destination for Thai agar has been the USA (Table 10). For Indonesia, most of the 9 tonnes exported in 1988 went to Singapore (Table 11).

Table 5: Agar imports, Indonesia (tonnes)

	1980	1981	1982	1983	1984	1985	1986	1987
TOTAL	159	43	262	350	163	170	165	140
Of which from:								
Japan	22	2	67	233	75	18	12	47
Taiwan		12	170	102	74	106	30	24
Singapore	43	21	19	1			3	
Hong Kong	36	6	1			25	21	
Malaysia			2	12	10	9	12	7
Chile				2		9	43	8
China	58						12	45
W. Germany			1		1	3		1
Spain							31	5
France								2
USA		1	1		3			
Others		1	1				1	1

Source: Indonesia Foreign Trade Statistics

Table 6: Agar imports, India (tonnes)

	1980	1981	1982	1983	1984	1985	1986
TOTAL	5.7	5.8	3.8	2.6	6.0	2.6	4.7
Of which from:							
Japan	0.9	1.9	0.5	1.0	1.5	1.2	2.1
China					2.0	0.4	0.5
France	0.8		1.0	0.9	1.0	1.0	1.6
USA	4.0	0.3		0.7			
Singapore		2.3	1.8				
UK					0.5		0.5
W.Germany		1.0			1.0		
Argentina		1.0					
Thailand			0.4				
Others		0.3	0.1				

Source: Monthly statistics of the Foreign Trade of India
Note: Year begins 1 April

Table 7: Agar imports, Sri Lanka (tonnes)

	1980	1981	1982	1983	1984	1985	1986	1987
TOTAL	2.5	0.2	6.8	0.1	NA		0.1	1.4
Of which from:								
India	0.3	0.1						
Singapore	2.1		0.1					
UK			6.7					0.4
Switzerland								0.9
USA								0.1
Others	0.1	0.1		0.1				0.1

Source: External Trade Statistics, Sri Lanka
Note: (-) indicates < 0.05

Table 8: Agar imports, Bangladesh (tonnes)

	1980	1981	1982	1983	1984	1985	1986	1987
TOTAL	1.8	2.5	2.5	2.2	4.4	1.3	3.0	1.9
Of which from:								
Japan		0.7	1.4	0.2	1.0	0.5	0.6	1.4
S. Korea					1.4	0.8	1.4	0.5
Singapore	1.8	1.8	1.1	2.0	2.0		1.0	

Source: Derived from exports by Japan, S.Korea and Singapore

Table 9: Agar Exports, BOBP countries (tonnes)

	1980	1981	1982	1983	1984	1985	1986	1987
TOTAL	2	15	6	15	33	40	24	19
Of which by:								
Thailand			~(3)		1	12	12	11
Malaysia (1)			2	12	10	9	12	7
Indonesia				2		1		1
India (2)	2	15	4	1	22	18		NA
Sri Lanka								
Bangladesh								

Notes: (I) Derived from imports by Indonesia
(2) Year begins 1 April
(3) ~Indicates < 0.5

Table 10: Agar Exports, Thailand (tonnes)

	1983	1984	1985	1986	1987
TOTAL		1.2	11.8	11.7	10.8
Of which to:					
USA			4.8	7.0	3.5
Canada			1.6	0.6	1.1
Australia		0.1	1.6	1.8	2.3
Netherlands			1.1	0.5	
France			1.5		
UK				1.0	
W. Germany					0.7
Burma		1.1			
Japan					1.0
Singapore					0.7
Others			1.2	0.8	1.5

Source: Foreign Trade Statistics of Thailand
Note: (-) indicates < 0.05

Table 11: Agar exports, Indonesia (tonnes)

	1983	1984	1985	1986	1987	1988
TOTAL	2.0		0.5		0.6	9.0
Of which to:						
Japan	2.0					0.5
Hong Kong					0.5	0.4
Singapore						7.8
Saudi Arabia					0.5	0.3
Netherlands					0.1	

Source: Indonesia Foreign Trade Statistics

Indian exports, which occasionally rise to quite significant amounts, are known to originate from indigenous production (Table 12). A number of different countries have purchased Indian agar at one time or another, but none appear to have sustained such imports.

Table 12: Agar exports, India (tonnes)

	1980	1981	1982	1983	1984	1985
TOTAL	**1.5**	15.1	4.0	1.4	21.8	18.0
Of which to:						
Saudi Arabia					21.8	
Yemen Arab Rep.		5.1	1.9			
United Arab Em.				1.0		
Kuwait	0.2					
Japan						**18.0**
UK			.I.3	0.4		
Australia		10.0				
Kenya	1.0					
Mauritius			0.8			
Sri Lanka	0.3					

Source: Monthly Statistics of the Foreign Trade of India
Notes: Year begins 1 April; (~) indicates < 0.05

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