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MARKET REQUIREMENTS FOR SHARK PRODUCTS

by

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Introduction

Several Pacific Island countries are actively promoting local small-scale fisheries for the deep-water snappers, jobfish and groupers of the outer reef slope. Fishing is usually by hook and line, and often produces a by-catch of deep-water sharks which may comprise a large proportion of the total cach weight. In addition, traditional inshore and offshore fishing methods using nets, hooks, or other means, also produce quantities of sharks. In many cases, these fish are not consumed locally for a variety of reasons, which include local customs and taboos concerning sharks, unfamiliarity with the species concerned, and fear of toxicity. Nevertheless, no fisherman likes to see the results of his time and labour wasted, and many of the regions fisheries departments are keen to see some benefit accrue from this presently unutilised resource. The South Pacific Commission has been requested by a number of its member countries on several separate occasions to seek advice and information on possible uses for this part of the catch. Some of the results of our enquiries are summarised in this brief report, which is intended to supplement the preceding article with details pertaining specifically to the SPC region.

The meat

As noted in the TDRI article, with few exceptions most sharks will yield an acceptable meat provided that processing is rapid and proper handling techniques are used. Ciguatera poisoning has sometimes been attributed to the consumption of large individuals, and some deep-water species are thought to be mildly toxic in their own rights. However, in many areas where shark is not consumed, the reasons are more closely related to traditional customs and superstitions, and the ready availability of preferred types of fish or other protein, rather than to the quantities of shark meat itself.

Given this situation, some countries have considered exporting shark meat to areas where it is an acceptable product. For many Pacific Island countries, Australia is the first which springs to mind, as shark meat is widely-consumed as "fish and chips". Markets also exist in other developed and developing countries: the 'Infofish' Trade News # 17/84 of September 1984 quotes the following indicative market prices (wholesale):

Location	Product form	Indicative Price (US$/kg)
Singapore	Whole fresh shark	1.38
Singapore	Whole fresh sting ray	0.92
France	Frozen dogfish backs	0.42

These figures are indicative of the low prices generally paid for shark meat, and, given the collection, storage and shipping costs likely to apply in most Pacific Island situations, would be inadequate to allow for shark meat to be exported at a profit. The difficulty, in an intermittent small-boat fishery of ensuring quality control adequate to enable consistent standards to be maintained nn the final product presents a further obstacle, as does the imposition by most

industrialised countries of stringent limits to allowable mercury levels in marine produce. These regulations present particular problems in the case of shark flesh, as mercury levels can frequently be unacceptablity high, particularly in old or large individuals. Permitted levels, noted in the 'Infofish' Fact Sheet #2/84 are as follows:

Location	Permitted Mercury Level (parts per million)
Australia: Queensland, Victoria, New South Wales and Western Australia	0.5
: Tasmania & South Australia	1.0
Federal Republic of Germany	1.0
Italy	0.7
Japan	0.4
Spain	0.5
USA	1.0
UK	No limit

Techniques for the analysis of mercury content require fairly specialised laboratory equipment and would be beyond the capabilities of existing facilities in some Pacific Island countries, although possible at others having reasonably well-equipped medical or university laboratories. Consignments of seafoods imported into countries having legislation on mercury levels are liable to be spot-checked and, if over the limit, rejected or condemned.

It would therefore appear that except in special circumstances, Pacific Island countries cannot realistically consider the export of shark meat, and, will have to look to the development of home markets if this resource is not to be wasted.

The Skin

The use of shagreen, which is shark skin with the dermal denticles, or scales, still attached, dates back to early eastern civilisations. When the denticles are ground or polished down to remove the sharp points, this material forms a leather of lasting beauty but of limited use, mainly as a covering for hard objects such as books, etc. However the removal of the denticles without damaging the natural grain of the skin remained a problem for many years. It was finally solved by the Ocean Leather Company of Newark, New Jersey, USA, shortly after World War I, but for several decades the company were able to keep the process a secret, and remained the only large-scale sharkskin tannery in the world able to produce good quality shark leather. In recent years the technology has spread and been improved upon, and a small number of tanneries in Europe, South America and Japan now produce shark leather of high value which is used for shoes and small personal items such as bags and wallets.

The main considerations in the initial preparation of shark skins, which involves cleaning off of the meat and salting down the hides, have already been detailed in the TDRI paper, which also notes the difficulty in obtaining information on the requirements of buyers of this product. However, the Australian Department of Primary Industry advises that the Mermaid Leather Company of Canada, is currently seeking new sources of shark hides in this and other regions. For development purposes, the Canadian company wants to acquire samples of skins from commercially fished species, and these should be cured in 100 percent salt brine for a minimum of 48 hours, drained prior to shipping, and packed with additional salt in barrels or cardboard boxes with plastic liners. The larger hides (16 inches and over) from each species are of greater interest, but smaller hides can also be utilised. The company would also require information on the quantities of skins likely to be available, by species.

Given adequate raw material supplies and the identification of suitable Pacific regional fish processing interests, Mermaid sees the potential for a regional joint venture or similar agreement, ideally involving a fish processor who would provide raw skins and supervise the training operation. Mermaid would provide tanning technology, training, additional research, and marketing. The initial capitalisation required would be US$2 million to produce 2 million square feet of leather. There is an opportunity, according to the company, "for profit margins beyond those normally provided by the fishing industry". For those seeking further information, the company address is: The Mermaid Leather Company Ltd., 708-112 West Pender Street, Vancouver, B.C. V6E 2S1, Canada.

Liver oil

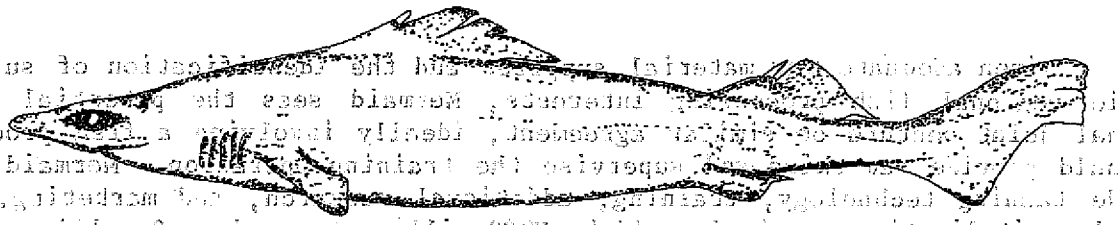
The shark liver oil industry boomed in the USA in the 1940's following the discovery of its high vitamin A content, and the wartime disruption of supplies of cod liver oil, the previous supply source, from Europe. However, subsequent development of vitamin A synthesis techniques ended the boom and there is now little demand for oil for this purpose.

There is, however, a demand at present for the compound squalene, which is presently available only from natural sources, of which oil from the livers of some species of shark is the richest. Technically, squalene is a polyunsaturated hydrocarbon having the formula $C_{30}H_{50}$, and six unsaturated bonds per molecule. In practice, however, the term is used to include most of the hydrocarbons in shark liver oil, down to decane ($C_{10}H_{22}$), hence the amount of industrially usable 'squalene' is greater than the amount of pure squalene. The compound is used in the pharmaceutical, medical and cosmetic industries, contributing to such diverse compounds as cardiac medicinces and skin rejuvenators.

Livers of the deep-water sharks normally taken while deep-bottom fishing are the richest source of squalene, and the Kishimoto Special Liver Oil Manufacturing Co. of Japan are actively seeking supplies of oil from these species called "Aizame" in Japanese. The company provides the following list of species known to produce good oil with a squalene content of over 50 percent:

Centrophorus atromarginatus
Centrophorus granulosus
Centrophorus squamosus
Centrophorus scalpratus
Centrophorus uyato
Centrophorus lusitanicus
Centroscymnus crepidater
Centroscymnus owstoni
Deania calcea (= Deania eglantina)
Deania profundorus
Deania quadrispinosus
Dalatias licha

All except the last in this list can be recognised due to the presence of hard spines in front of both dorsal fins, as per the figure below. All live in depths of 200m or more, average 0.5-1.5m in length, and have large livers which can comprise up to 25 percent of the total body weight. Other species living at similar depths and so far untried as a squalene source may also prove suitable.



Centrophorus squamosus showing dorsal spines characteristic of squalene sharks.

Extracting the oil is simple and requires no special equipment. The livers are removed from the shark and chopped into chunks a centimetre or two across and then heated, a process which causes the oil to come out of the meat. The most simple and widely used method in hot regions is to place the livers on a sloping sheet of roofing iron in the sun, with a collecting vessel at the base into which the oil will run. In locations where constant hot sunshine is not dependable, this system can be too slow and the livers may begin to putrefy before all the oil has been released. In this case, the slivers can be gently heated in an oven and the oil dripping out collected, or gently boiled, and the oil skimmed off the surface of the vessel.

Whichever method is used, care must be taken in ensuring that oil extraction begins promptly after capture and that the oil is kept free of meat particles or sediment which could start to decay. These can be simply removed by straining through a fine cloth. Provided that these procedures are followed, the oil is non-perishable and can be stored for long periods without degradation, even at tropical ambient temperatures. This is a considerable advantage to small producers who can accumulate a reasonable quantity of oil before arranging for its transportation. Storage should be in clean containers, preferably steel drums which have been washed inside and well-dried before use. 5-gallon kerosene or similar drums are suitable provided that they are properly cleaned.

The value of the oil varies depending on its squalene content, which can only be accurately analysed by the buyers, but as a rough guide, good quality produce would be expected to fetch US$4.00-4.30/kg or about $70-80 per 5-gallon drum.

Producers can check their oil to ensure that it is of adequate squalene content using a hydrometer with a specific gravity range of 0.820-0.880 (the Kishimoto Company will supply suitable hydrometers on request). The specific gravity of squalene-bearing oil is 0.850-0.860 and hydrometer readings within this range are a fairly conclusive indication that the oil is of adequate commercial value.

For further information, the company address is: The Kishimoto Special Liver Oil Manufacturing Co., Room 1003 Artere Akihabara, No. 8-4 1-Chome, Sakumacho, Kanda, Chiyoda-ku, Tokyo, Japan.