

## SOME ASPECTS OF SHARK LIVER OIL INDUSTRY IN INDIA

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IT is now more than three years since the manufacture of Shark Liver Oil was started on a commercial scale in India and within this short period, it has gained considerable popularity as a substitute for Cod Liver Oil. The industry was first started under the initiative of the Fisheries Departments of Travancore and Madras, but soon other maritime provinces followed the example and in due course, private enterprises also started manufacture. At present, though all these concerns are exploring every possible avenue for increasing production and though the output to-day is much greater than what it was two years ago, it can be safely asserted that, at present, the demand is much in excess of available supplies.

It is a generally accepted fact that dislocation of International trade due to conditions of war, provides opportunities for developing indigenous industries. This is well exemplified by the growth of Shark Liver Oil industry in India. Though Shark Liver Oil was known to possess high vitamin potency it was never able to find a market in competition with Norwegian Cod Liver Oil during pre-war days. But, when the supply of Cod Liver Oil was completely cut off and when the medical profession began searching for a suitable substitute, the valuable researches and propaganda conducted by the Nutrition Research Laboratory at Coonoor, assured confidence regarding the suitability of Shark Liver Oil and very soon this new product found a place on every chemist's counter in many parts of India. But this meteoric development had its disadvantages. In the midst of heavy rush of orders and efforts to increase production there was hardly any breathing space to realise the necessity for improving methods of manufacture, based on correct principles of fish oil technology. If, however, this tendency to ignore the necessity

of improving quality is allowed to prevail unchecked, it may ultimately prove disastrous to the future of the industry and once more yield to the influx of foreign products when conditions return to normal. Stabilisation of the industry will be possible only if side by side with every effort to increase production, equal, if not greater, attention is concentrated on improving and standardising quality through scientific investigations.

Researches on fish oils so far undertaken in India relate to the determination of vitamin A potency and the specific chemical properties of the oils of some of the common varieties of sharks found in Indian seas. On the manufacturing side, however, no work of any importance seems to have been carried out nor any endeavour made to adopt the technical principles followed elsewhere. The disadvantages resulting from the neglect of this aspect may be summarised as follows:—

Fish oils tend to become rancid when stored for more than a limited period of time. Peroxides formed during the process, cause rapid destruction of vitamin A. If, therefore, the vitamin is to be preserved, oxidative rancidity should be prevented. The method of extraction, storage, influence of light and the degree of unsaturation, are all important factors which control the development of peroxides. In foreign countries antioxidants derived from certain seeds are used for the stabilization of fish oils but this is mostly kept as a closely guarded trade secret. It is necessary to prepare extracts of the indigenous seeds and test them so as to discover a suitable antioxidant.

The removal of sterine from Shark Liver Oil is an important process which determines the quality of oil for human consumption. At present raw oil is cooled at random. But



since a suitable method has not been developed the precipitated sterine is not always in a form in which it can be easily filtered. It has been found that the crystallisation of sterine is very sensitive to changes in the rate of cooling and so the most economical and efficient method of sterine separation will depend on the determination of the rate of cooling for oils extracted from the livers of various types of sharks. The prevention of sterine formation in cleared oils by means of protective colloids is also an important problem.

Vitamin A potency of Shark Liver Oil is the chief factor which determines the value of the oil. It is, therefore, worthwhile to enquire how far this property is safeguarded under the prevailing systems of uncontrolled and empirical methods of manufacture. There are a number of brands of Shark Liver Oil now in the market and in the majority of cases the vitamin values are not specified. Almost all of them maintain that their vitamin potency is more than double that of ordinary Norwegian Cod Liver Oil. However, it may be pointed out that the latter is not known to contain more than 500 International Units of vitamin A per gramme whereas the average vitamin content of Shark Liver Oil is 10,000-12,000 International Units per gramme. Therefore, the statement that Shark Liver Oil contains double the vitamin content of ordinary Cod Liver Oil would imply that four or five volumes of some vegetable oil has been mixed with each volume of pure Shark Liver Oil. This process is called blending and though the ostensible aim is to standardise the finished product, the method followed is not quite satisfactory. If blending is designed to bring the vitamin content to a constant proportion, the vitamin value of each sample of Shark Liver Oil should be determined and on that basis the quantity of groundnut oil to be added must be calculated. In other words, specific and seasonal variations in the vitamin content of Shark Liver Oil should form the basis for calculating the proportion of blending. But is blending after all, indispensable? The vitamin content of halibut liver oil, for example, is many times higher than that of Shark Liver Oil and, if the principle of blending is accepted as a general rule, it would imply that halibut liver oil should also be blended in a similar manner. In actual practice, however, this is not done. The properties of the oil are conserved in tact, while the dosage is reduced in an inverse ratio, so that in cases where a few ounces of ordinary Cod Liver Oil is necessary, a few drops of halibut liver oil will suffice. If, therefore, it is feared that the vitamin concentration of Shark Liver Oil is high, all that is necessary is to specify the actual values so that physicians may regulate dosage according to requirements of individual patients. This will eliminate the necessity of blending and conserve the original properties of the oil unaltered.

In the methods of manufacture also there are certain inherent handicaps which contrast Indian conditions with those of other countries. For example, in America, during the halibut fishing seasons, fleets of fishing vessels go out into the Atlantic and the livers collected are at first frozen or steamed before being shipped to the coast, where entire lots are sold to one or other of the big manufacturing companies

such as Parke Davis & Co., Abbot Laboratories, Mead Johnson & Co., or E. R. Squible & Sons, at competitive rates. This system not only ensures large supplies but also facilitates the development of self-contained factories. In India on the other hand, there are no specified shark fishing seasons and there are no boats specially equipped for the purpose. The uncertainty and scattered nature of the catches do not favour the development of centralised factories for the extraction of oil but compel the necessity of encouraging production on a cottage industry basis. This system would have been satisfactory if the fishermen readily adopted improved methods of extraction advocated by the Fisheries Departments. But they still persist in following crude indigenous methods which, they believe, ensures higher yields of oil; the product is often adulterated with other oils such as turtle oil and oil of leather jackets.

Shark Liver Oil having now been generally accepted as an efficient substitute for Cod Liver Oil, the responsibility of manufacturers to maintain a high quality is indeed very great but in many cases, they seem to ignore this necessity. In Western countries, where fish oils are manufactured on a large scale, an analytical section forms an essential component of the organisation and every sample of oil, as soon as it is prepared, is tested and certified before it is placed on the market but in India though analysis has been voluntarily taken up by a few important scientific laboratories,—to whose labours much of the popularity of the oil is due—since there is no co-ordination between these laboratories and manufacturing concerns, reports of analysis have no bearing on the quality of the product offered in the market. Samples analysed are those specially prepared in the laboratories, whereas the commodity sold in the market is largely what is purchased from fishermen. The two have no comparison and in most cases, are widely different. If, therefore, the Shark Liver Oil industry in India is to be stabilised on a pharmaceutical basis, it is very essential to control production and to exercise a more vigilant supervision of the methods of manufacture.

Owing to the uncertainty of catches, the production of oil on a cottage industry basis has been regarded as the surest and the only practicable scheme, but the unreliability of the methods of extraction, complete disregard of the principles of cleanliness and the susceptibility to adulteration, are factors which argue very strongly against the continuance of this practice. If the quality and purity of the oil are to be ensured, extraction must be carried out under expert supervision during every stage in the process of manufacture and there must be an intimate co-ordination between scientific and manufacturing sections. But so long as collection and manufacture are thrown open to the public such a supervision and co-ordination will be ineffective. The only alternative, therefore, is to centralize manufacture under the supervision of Government Departments and completely exclude private agencies from direct dealings with fishermen. Such a step will ensure maximum utilization of the raw product to the best advantage without being wasted or rendered valueless by irresponsible handling or indifferent methods of extraction, and also promote the development of centralised factories.