higher for medicinal than for crude oils Nos. 3, 4, 6 and 8.

It is impossible to make a close comparison of the values for specific gravity and refractive index of the crude and medicinal oils with the values for the stearin since these values for the latter were determined at 40° C. instead of 25° C.

These results substantiate those included in an earlier report[3] of the effect on vitamin potency of cold-pressing cod liver oils. In the earlier study the average values obtained were for the crude cod liver oils specific gravity 0.9194, refractive index 1.4756, saponification value 190.8, iodine number 147.5, and free fatty acid 0.50% and for the medicinal oils specific gravity 0.9197, refractive index 1.4766, saponification value 193.7, iodine number 154.3, and free fatty acid 0.58%. It was also found from biological assays that cold-pressing did not produce any significant difference in the vitamin potency of the crude and pressed oils.

The average values for the eight samples show that the specific gravity, refractive index, saponification value, iodine number and free fatty acid content of the medicinal oils are higher than those of the crude oils from which they were prepared. From these results it appears that cold pressing raises slightly the chemical and physical characteristics for medicinal cod liver oil above those of the crude oil from which it is prepared.

[3]Vitamin Potency of Cod Liver Oils XVIII, Effect on Vitamin Potency of Cold-Pressing Cod Liver Oils. Arthur D. Holmes and Madeleine G. Pigott. Ind. Eng. Chem., Vol. 18, February, 1926, page 188.

# Fish Oil as a Paint Medium

By MAXIMILIAN TOCH

MORE than 30 years ago I investigated the use of Fish Oil as a paint medium and at that time the only oil available for the purpose was the Menhaden Oil gathered on the Eastern Coast of the United States.

Since that time I published various articles on the use of Fish Oil as a paint material. The last one published in "The Chemistry and Technology of Paint," page Nos. 237 to 247, describes Herring Oil, Whale Oil, Porpoise Body Oil, etc. Lately there has appeared a Fish Oil on the market made from sardines collected on the West Coast of the United States and this oil is superior to Pilchard and Herring Oil previously collected on the same Coast.* The specifications of the Sardine Oil are as follows:

| | Acid No. | Sapon. Value | Iodine Value | Spec. Gravity @ 60° F. | Cold Test |
|---|---|---|---|---|---|
| Alkali refined sardine oil..... | 0.25 | 190<br>193 | 180<br>190 | .930<br>.938 | 32° F.<br>2 hrs. |
| Spec. varnish grade sardine oil..... | 0.5 | over<br>190 | 190<br>200 | .930<br>.935 | 24°F.<br>2 hrs. |
| Crystol K light ..... | 2 | 190<br>200 | 116<br>118 | .961)<br>.965) @ 15.5° C. | |
| Crystol K medium ..... | 3.5 | 190 | 110 | .9685 @ 15.5° C. | |
| Crystol K heavy ..... | 5 | 190<br>200 | 104<br>106 | .9723 @ 15.5° C. | |

All of the foregoing oils excepting the Refined have no fishy odor whatever and the Crystol K Heavy, which is very much like a Stand Oil, has an odor analogous to Poppy Oil.

*I am indebted to the Werner G. Smith Company for five samples of oils which they sent me which I personally examined.

The drying of these oils is best achieved by the addition of a 5 per cent liquid drier containing lead manganese and cobalt and the oil when used alone and mixed with a pigment ground in linseed oil apparently dries in the open air at 70° over night. Months afterwards when the humidity arises above normal, the paint becomes tacky, even when as little as 30 per cent is used, the balance being Linseed or Perilla.

All of the Fish Oils that I have ever used, including those under discussion after, yellow much more than any of the other drying oils. Raw or Refined Fish Oils mixed with any white pigment turn a light amber color when placed in the dark for four weeks in the presence of moisture. My test for after-yellowing has always been to paint a sample, allow it to dry in normal light and then place it in a box with the painted side upward but underneath the sample a piece of blotting paper saturated with water is placed. This is the quickest after-yellowing test that I know of. The film of all fish oils never gets as hard as other drying oils and therefore in a brittle varnish a small percentage of Refined or Heavy Bodied Fish Oil increases the desired elasticity.

Sardine Oil has one quality possessed, to my knowledge, by no other oil. It is admirably suited for making Smokestack Paints where dark colors are desired.

In the usual China Wood Oil Spar Varnish which is used as a medium with aluminum for exterior purposes, the addition up to 30 per cent of a suitable Fish Oil like Sardine increases the life and the resistance to heat of the Aluminum Paint. A slight discoloration may take place, which is not always a detriment.

Smokestacks and boiler fronts which are painted black are suitable surfaces for the use of Fish Oil. This, however, does not refer to an unlined stack where the base frequently reaches a temperature of 500° C. or more.

Fish Oil is unsuited for paints under water, but for painting the steel decks of ships when mixed with Lamp Black and drier, dries sufficiently hard and elastic in 24 hours and does not track. For this purpose half of the Heavy Bodied Oil and half Benzine or Petroleum Thinner which flashes above 100, mixed with a suitable pigment, is of considerable value and when scraped by anchor chains or cargo of any kind, abrasion occurs but no splintering.