

dine is not more than slight, this was not detrimental. The colloid was now precipitated by 5 gallons of No. 1 denatured alcohol and dried at about 80° C. *in vacuo*.

The product was a fine looking yellow flaky solid which reprecipitated readily in water to give a transparent light golden-yellow solution, which was perfectly stable. The solution material usually contained about 30% AgI.

When the usual laboratory germicidal tests were made using both *B. Typhosus* and *Staph. Aureus*, variable results were obtained and in some instances the results appeared to indicate very high germicidal activity. However, a careful study of the ordinary germicidal test indicated that it is of very little value when applied to colloidal silver iodide, and an elaboration of the test showed that in those instances when the bacteria had apparently been killed, the bacteria had not been killed and that the original results were incorrect due to the limitations of the ordinary germicidal test. A careful study of the germicidal properties of all of our experimental samples of colloidal silver iodide of all purchased colloidal silver iodides proved that they are not germicidal and have little if any antiseptic activity when tested *in vitro* against *B. Typhosus* and *Staph. Aureus*.

Therefore, laboratory results fail to disclose any indications of useful antiseptic or germicidal properties in colloidal silver iodide.

The germicidal studies and tests were made by Dr. George F. Leonard in the Biological Research Laboratories of E. R. Squibb & Sons, and Dr. Leonard has discussed the limitations of the germicidal test as applied to silver preparations in a separate publication. (*Journal of Infectious Diseases*, 48 (1931), 358.)

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THE VITAMIN POTENCY OF VARIOUS GRADES OF COD LIVER OIL.*

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With the growing use of cod liver oil for animal husbandry purposes, knowledge of the vitamin activity of the various grades of cod liver oils commonly used for such purpose becomes important. These oils are from various grades of cod livers which become available in practice. Some oil is also obtained from pressing liver tissue or "chum," the residue left in steaming of fresh livers for the production of medicinal oil.

Five grades of cod liver oil seemed worthy of study in considering the above problem:

1. *No. 1 Medicinal Oil*.—Oil rendered from fresh cod livers by means of direct steam and skimmed off the settled mass within a short time after steaming (control oil to eliminate the natural variations in vitamin values existing in cod liver oil at different seasons and from different sources).

2. *Second Grade Oil*.—Oil skimmed off after the mass has stood twelve hours subsequent to the first skimming.

* Scientific Section, A. P. H. A., Miami meeting, 1931.

3. *Poultry Oil*.—Oil obtained by the pressing in bags of the liver tissue, "Chum," left after the above two skimmings. The color and free fatty acid content of this oil varies according to the speed and care used in its production.

4. *Poultry Oil*.—Oil rendered by direct steam from livers which have stood some twelve to twenty-four hours after removal from fish, and for this reason yield a grade of oil not suitable for human consumption (off color and taste).

5. *Common Cod Oil*.—Oil from livers which cannot be steamed satisfactorily and which are allowed to rot exposed to air and sun. Oil slowly comes to the top and is skimmed off over a period of weeks. This oil is sometimes used for animal feeding but is generally very high (10–15%) in free fatty acids, red in color and used mostly for industrial purposes.

In view of the fact that any one grade of cod liver oil may vary in vitamin activity from year to year and even for shorter periods, it was considered advisable for comparison purposes to prepare the several grades of oil from one lot of livers.

A day's receipt of fresh livers at one of our rendering plants was mixed, divided into five portions and treated or aged so as to make possible the production of oils as indicated above.

No. 1 medicinal cod liver oil was protected from air during the entire process of straining, settling, skimming, filtering and bottling. Second grade oil was protected to the extent that the cover was kept on the cooker during the time of settling, it was filtered and sealed in the absence of air. Poultry oil produced as described under "3" above is exposed in thin layers on the surface of the bags as it is forced out and flows into a settling tank, and hence suffers more from oxidation than the former. Common cod oil, by nature of the process used in its production, also suffers considerable exposure.

RESULTS.

The preliminary work dealt only with the first three grades of oil. Their assay appears in Table I.

TABLE I.—VITAMIN A AND D ASSAY.

Class of Oil.	Vitamin A Assay U. S. P.	Vitamin D Assay Squibb Unit.
1	Close to 500	>17 < 25
2	Close to 500	Close to 25
3	333 close to 400	Close to 33

The preliminary vitamin A assay indicated that 1 was more active than 2, but final tests indicated only a slight difference. As would be expected from the great exposure, the vitamin A activity of 3 is the lowest, but hardly as low as would be anticipated.

It will be observed from Table I that the vitamin D content of the lower grades of oil is higher than for the medicinal grade of oil. In view of the fact the work was done during the earlier stages of the development of the vitamin D test, it was thought that the results might be incorrect, hence the work was repeated; including the preparation of oils in classes four and five. The results appear in Table II.

The free fatty acid increases with exposure.

The vitamin A activity of these oils follows much the same order as that in Table I, except that the oil expressed from "chum" (class No. 3) gave higher value than anticipated. The vitamin A activity of this oil, would undoubtedly

vary depending on the care taken in its manufacture, however, not to the extent before indicated. Table I represents, it is believed, more nearly the situation.

TABLE II.—VITAMIN A AND D ASSAY OF VARIOUS GRADES OF COD LIVER OIL.

Class of Oil.	Oil Prepared September 1927.			Free Fatty Acid.
	Vitamin A Assay U. S. P.	Vitamin D Assay Squibb.		
1. No. 1 Medicinal	Close to 700	>20	<33	0.3%
2. 2nd Medicinal	Close to 667	>20	<33	0.4
3. Poultry Oil	More than 667	About 16		5.8
4. Poultry Oil	>500 <667	Close to 20		1.95
5. Common Cod Oil	>400 <500	Close to 16.7		7.7

The vitamin D activity of the oils in Table II also indicates its destruction by exposure.

Classes 3 and 5 show the lowest activity and are the oils, which as observed in their preparation, are exposed longest to air and water.

SUMMARY.

1. The short exposure of oil to water and air before skimming, has a slight deleterious effect upon the vitamin A activity.

2. The long exposure of oil to water, and air as in the case of pressing chum has a marked deleterious effect on the vitamin A activity.

3. The standing of livers for twelve hours or longer before steaming has a marked deleterious effect on the vitamin A activity of the oil obtained.

4. Rotting livers produces an oil of low vitamin A and D activity.

5. Under best conditions for vitamin D test, the indications are that vitamin D is destroyed in cod liver when cod liver oil is exposed to water and air.

The vitamin A and D tests were carried out by the Biological Research Laboratory, E. R. Squibb & Sons, New Brunswick, New Jersey.

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QUALITY OF SPEARMINT OIL PRODUCED IN FLORIDA.*¹

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The cultivation of spearmint (*Mentha spicata* L.) has not until recently been developed into an industry of much importance. The reason for this is probably due to the fact that in nearly every country of the earth it has been possible to find spearmint being grown in the home garden for home use. This situation prevailed for many years in the United States where it has been used for culinary purposes and for flavoring drinks and to some extent in pharmaceutical preparations. This situation resulted in a very poor market for the herb or its oil so that it has never become of much importance until the past few years, when American industries created a good demand for the oil. As a result some of the growers

* Produced in Medicinal Plant Garden, University of Florida.

¹ Scientific Section, A. P. H. A., Miami meeting, 1931.