

appearance of the deep violet color. Each cc. of tenth normal potassium dichromate V. S. corresponds to 0.011584 gram of ferrous carbonate.

CONCLUSION.

The use of diphenylamine as an indicator in ferrous titrations has been successfully applied to the official assay of mass of ferrous carbonate, which method eliminates the troublesome spotting with potassium ferricyanide.

SCHOOL OF PHARMACY,
UNIVERSITY OF MARYLAND,
BALTIMORE, MD.

THE EFFECT OF VARIOUS CONDITIONS ON THE STABILITY OF SOME ESSENTIAL OILS.*

BY R. A. KONNERTH.

It has frequently been observed that Essential Oils are subject to deterioration. Such deterioration usually has been attributed to temperature variation, exposure to light, exposure to air or oxidation, contact with container, etc. In an effort to determine to what extent these factors might be responsible for deterioration, a series of experiments were conducted as follows:

A group of essential oils were placed in different containers and exposed to a variety of storage conditions, carefully observed and compared at intervals over a period of fourteen months. In all, six sets of oils were packaged representing partially filled (1) colorless bottles, (2) amber bottles, (3) tin cans. These were filled under air, and a duplicate set packaged in the same kind of containers with the air replaced by nitrogen.

The six sets consisted of two containers each of the following oils: Anise, Lemon, Lemon (Terpeneless), Orange, Peppermint and Eugenol.

One of each of the containers was kept in a refrigerator, while the other was kept at room temperature, thereby permitting observation of the keeping qualities of the oils in the presence of air, and in the absence of air; at ice box temperature, at room temperature; in glass containers, in tin containers; in the presence of diffused daylight and in the absence of diffused daylight.

In observing the changes which occurred in the oils so stored, great care was taken to note all detectable changes in odor, color and general appearance. The colors were checked against Sheet C of the Milton Bradley Color Standards. ("Mulliken's Identification of Pure Organic Compounds." Vol. III.)

From the observations made, it appears that:

Oxidation is the most active factor in deterioration, hence, it is advisable to avoid contact with air under all storage conditions. This is readily accomplished by the use of nitrogen.

Glass bottles are to be preferred to metallic containers. Tin materially affects the odor and color of the oils.

Light is detrimental to the odor and color of some oils; others are not seriously affected by it if stored under nitrogen.

* Scientific Section, A. Ph. A., Des Moines meeting, 1925.

Refrigerator temperature during storage is to be preferred in some cases, in others it seems to be of little value.

SUMMARY OF OBSERVATIONS.

Oil of Anise undergoes least deterioration if stored in bottles under nitrogen. Keeping the oil in tins at room temperature causes rapid deterioration of odor and darkening in color. At low temperature the development of a darker color and impairment of odor is somewhat retarded.

Oil of Lemon keeps best if stored in bottles under nitrogen. It also keeps fairly well in tin cans when under nitrogen.

Oil of Lemon (Terpeneless) retains its fragrance, although the color darkens to a deep yellow, if stored in amber glass bottles under nitrogen. Oxidation and exposure to diffused daylight cause a dark orange-yellow color and a very disagreeable odor. No complete data are available on the tin can storage conditions, since these were lost after six months' observation. Indications were to the effect that this oil does keep fairly well in tin cans.

Oil of Orange undergoes least deterioration if stored in bottles under nitrogen. This oil keeps better at room temperature than in the refrigerator. It also keeps fairly well in tin cans under nitrogen. Light hastens the darkening of color.

Oil of Peppermint keeps best if stored in amber bottles under nitrogen. This oil is more stable than the other oils, but is subject to a decided color change when in contact with tin. Protection from light retards the development of color and impairment of odor.

Eugenol keeps best if stored in bottles under nitrogen at low temperature. Oxidation rapidly affects the odor of Eugenol, also changes color, from colorless to dark reddish orange. Storage in tin cans causes rapid deterioration of odor and development of color. Reduced temperature retards the development of color.

LABORATORIES,
E. R. SQUIBB & SONS.

AROMATIC COD LIVER OIL.*

BY CLYDE M. SNOW AND BERNARD FANTUS.

The disguising of cod liver oil having assumed new importance with the recent recognition of the richness of the oil in vitamins, it is a lamentable fact that the prescribing of the oil by no means insures that it will be taken by the patient. Indeed, with the very youngsters ill-nourished because of dietetic idiosyncrasies who are often in need of cod liver oil, and with the tubercular of delicate palate and stomach, the nasty taste of the cod liver oil often furnishes an insurmountable obstacle to its administration. It is therefore to be regretted that our formularies do not furnish the physician with the opportunity of prescribing an acceptably disguised oil excepting in the form of emulsions, which after all are only fifty per cent or less in strength.

The "Extra Pharmacopœia" of Martindale and Westcott contains the following formula which furnishes quite an acceptable product:

* Section on Practical Pharmacy and Dispensing, A. Ph. A., Des Moines meeting, 1925.