

ever, the following experiments point to the possibility of peroxide formation. (1) This secondary absorption occurred most readily only in the alkaline solutions where molybdicyanide is metastable. In  $P_H$  7.0 only the normal oxygen absorption was obtained within twenty hours. (2) Preliminary experiments showed that linseed oil absorbed oxygen at a great rate in the presence of hydrogen peroxide and peroxidase.

The "complex" is greatly deactivated by heat. A sample which showed a rate of absorption at the maximum was heated in nitrogen for half an hour over the steam-bath, whereupon it absorbed only about 1/300 as fast.

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#### H. Summary

1. An empirical equation relating the rate of oxygen absorption of linseed oil to the potential of the catalysts has been obtained.

2. A series of inhibitors has been found. Acetoxime is the most powerful one. The presence of  $5 \times 10^{-8}$  mole of acetoxime will lower the rate to about one-half.

3. A "secondary" oxygen absorption has been found when molybdicyanide or tungsticyanide were used as catalysts in  $P_H$  9 or greater.

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## The Preparation of Pure Eleostearic Acids from Chinese Wood Oil

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The following prescriptions are proposed for the isolation of eleostearic acids from tung oil,<sup>1</sup> the operations being performed in a dimly lighted room using a black cloth to envelop the glass apparatus.

#### $\alpha$ -Eleostearic Acid

Saponify 25 g. of tung oil with 100 cc. of 10% solution of potassium hydroxide in alcohol by gentle boiling under a reflux condenser for one hour. Remove the condenser and insert in the flask a three-holed rubber stopper containing a tube for entry of carbon dioxide gas, a siphoning tube and a dropping funnel. Fill the flask with carbon dioxide. Decompose the soaps by addition of 200 cc. of hot molar sulfuric acid through the funnel in small portions. Allow to stand for five minutes. Siphon off aqueous layer under carbon dioxide pressure. Add 250 cc. of boiling water through funnel and agitate to wash the fatty acids. Siphon off aqueous layer as before and repeat until sulfate ion is absent (at least 6 washings are required). Remove stopper, add water at about 0°, to solidify the fatty acids. Immerse the flask in an ice bath for thirty minutes. Filter off the frozen nodules in a Buchner funnel which is in a carbon dioxide bath. Wash with very cold water and suck dry. Transfer the nodules to a beaker filled with carbon dioxide. Add about 1.5 g. 90% ethyl alcohol per gram of nodules to dissolve them by heating to about 35°. Store this solution at 10° overnight, filter crystals

(1) The authors are indebted to Mr. Sheo Loh who personally collected the specimen of tung oil near Hangchow in Chekkiang Province, China and shipped it in glass bottles, protected from air and light, to New York. They thank Prof. Chen Yung and Mr. Tang I for securing seeds of *Aleuritis Fordii*.

in a Buchner funnel in carbon dioxide atmosphere and wash four times with 5 cc. of 90% alcohol at room temperature. Using the same proportion of 90% alcohol, redissolve the crystals, store for two hours at 10° and filter. Repeat the recrystallization operation but obtain the crystals this time by immersion of the beaker for thirty minutes in a bath of cracked ice, always maintaining the atmosphere of carbon dioxide.

#### $\beta$ -Eleostearic Acid

Treat "Wood oil butter"<sup>2</sup> in a manner similar to that just described with the following exceptions. Melt the solidified tung oil or "wood oil butter" by heating at 80° for about one hour. Saponify 25 g. with 200 cc. of the alcoholic potash, boiling carefully and very gently<sup>3</sup> for one and one-half hours. Use 300 cc. of hot molar sulfuric acid for decomposition of the soaps. Use 2 g. of 90% alcohol per gram of crystals. Let stand for three instead of ten hours at 10° for the first crystallization. Use a thirty-minute period in cracked ice for the first and second recrystallizations.

The melting points of separate batches of  $\beta$ -eleostearic acid prepared at different times ranged from 70.1 to 71.0° while the preparations of  $\alpha$ -eleostearic acid melted always at 48.0°.

The spectrographic characterization of these acids will be submitted in a subsequent paper.<sup>4</sup>  
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(2) This product as used by the authors was prepared by the contact of the above mentioned tung oil sample with a trace of sulfur.

(3) The relatively insoluble potassium- $\beta$ -eleostearate induces bumping and frothing.

(4) Dingwall and Thomson, *THIS JOURNAL*, **56**, 899 (1934).