REPORT OF THE OLIVE OIL COMMITTEE FOR 1933-1934

By M. F. Lauro, Chairman

The Committee has had under advisement the drafting of specifications for OLIVE OIL and for OLIVE OIL FOOTS otherwise known as sulphur oil.

Values for these oils are today not satisfactorily defined either in the literature or by any authority. Since there is a need for their proper limitation in the case of olive oil and a growing demand by the trade in the case of sulphur oil for a closer control on quality and freedom from foreign material, it was felt that this committee could perform this meritorious and necessary function in the interest of the Society and for the benefit of the industries involved. The American Society for the Testing of Materials has accomplished such a service in the case of oils like linseed, soya bean and perilla. Our purpose is to establish an A. O. C. S. set of standards or specifications as a guide for those of the trade that care to avail themselves of a superior classification than heretofore exists.

Obviously, we must proceed with considerable thought and caution, and plenty of time must be allowed to insure fair and proper results. We must avoid any hasty conclusions which may be regretted later. A tentative schedule of values may be published in the journal and allowed to stand for some time, inviting criticism by all and their suggestions for further improvement.

It was in August, 1933, that the chairman suggested to the committee the task of setting up "standards" for these two products and the response was very favorable to an undertaking wider in scope that had originally been proposed. All thought it an excellent idea for the Society to go into this phase of activity, with the proper safeguards, of course. The majority of the membership felt it incumbent on the committee to study oils from other localities than Italy and Spain, taking in those oils that differ in some respects, such as from Algeria, Tunis and Dalmatia.

Replies were received from time to time from the various members, into which it is unnecessary to go in detail, offering valuable suggestions, modifying some of the values and adding others. It is a pleasure to note that a large part of the data subsequently submitted rests on the actual analysis over a period of years of samples of oil and foots dealt with in the trade with the larger users of these products. This gives us figures representing the fair and usual values for our basis for the normal limits.

It would appear from the various comments and figures submitted that as a whole there is substantial agreement, but one view would widen the scope to take in all pure oils regardless of how large a difference this would make in the range of value from minimum to maximum and the other view would narrow this range to cover only such values as represent the fair and usual oils appearing on the market. I have purposely drawn this distinction more sharply than the replies on their face would warrant, because when studied it will be seen that these two views are inconsistent and antagonistic to each other.

However, a good start has been made and it is hoped that with the publication of these results, the necessary interest will be aroused to bring forth the criticism required to build up a durable structure. Comment is therefore invited from all quarters, from the olive oil trade as well as from the chemists.

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U. S. Obtains Larger Share of China's Chemical Imports

The participation of both the United States and Japan in China's chemical import trade was greater in the first half of the current year than in the corresponding period of 1933, while the share of Germany in this trade declined, according to C. C. Concannon, chief of the Commerce Department's chemical division. China's imports of chemicals and allied products were valued at $16,500,-000 during the first six months of 1934, a decline of 14 per cent compared with the corresponding period last year. Germany continued the largest source of supply, accounting for 30 per cent of the total compared with 34 per cent last year, while the United States increased its share from 14 to 16 per cent and that of Japan increased from 11 to 15 per cent, it was stated. Substantial reductions in receipts of industrial chemicals, especially sulphuric acid, ammonium sulphate, bleaching powder, potassium chloride, soda ash, nitrates were largely responsible for China's reduced imports. China with its large textile interests, Concannon points out, is an important market for dyes and takes more American dyes than any other foreign country. Exports of chemicals and allied products from China are limited, the largest item being tung oil, a commodity used extensively as a raw material in the paint and varnish industry. Exports of tung oil during the first half of the year declined 6 per cent in value to $6,600,000 compared with the corresponding period last year. The United States is China's largest export market for this product.

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Elected to A.N.A.I.

The Norwich Pharmacal Company, drug manufacturers of Norwich, New York, has been elected to membership in the Association of National Advertisers, Inc. Dr. W. M. Stofer, Vice-President in Charge of Advertising, will represent his company in the A. N. A.

AUTO OXIDATION

(*Continued from page 228.*)

may also be inactive in the oxidation. The following tests were made in an attempt to verify this conclusion.

It has been known for some time that lard develops the typical odor of aldehyde rancidity at relatively low peroxide values (about 20.0 milliequivalents/Kilo), while some vegetable oils do not develop aldehyde rancidity odors until a peroxide value above 100 has been reached. It follows that a lard with a peroxide value 100 would presumably contain relatively large amounts of other decomposition products, while vegetable oil with 100 peroxide would contain at most only relatively small quantities. Similarly a lard of 30.0 peroxide would contain some other oxidation products while the vegetable oil of equal peroxide would presumably contain only extremely small amounts. It was thought that a comparison of lard and cottonseed oil at equal peroxide values would yield, by difference, some information on the effect of peroxides.

Samples of lard and cottonseed oil of the following peroxide values were prepared by aeration at 80-90° C.

1. Lard—Peroxide Value...... 104
2. C. S. Oil—Peroxide Value.. 100
3. Lard—Peroxide Value....... 31.8
4. C. S. Oil—Peroxide Value.. 30.6

It is difficult to control the aeration to get identical peroxide values, but these values were considered sufficiently close for the purpose of this study.

The oxidized products were then incorporated in fresh lard and the stability of the resulting mixtures was measured by the active oxygen method. Table V gives the results.

The results have been plotted in Figures III and IV, Figure III representing results for 100 PV fats, Figure IV for 30 PV fats.

In both cases the activity of lard exceeds that of cottonseed oil, the lard curves lying substantially below the curves for cottonseed oil, indicating that the active factor is something besides the peroxide. The interesting curve is the one shown in Figure IV where the lard of P. V. 31.8 shows definite catalysis, while the cottonseed oil of *equal* peroxide shows *no* catalytic action, in fact, seems to stablize the mixture beyond the ex-

TABLE V
EFFECT OF OXIDIZED LARD VS. OXIDIZED COTTONSEED OIL
Stability (Active Oxygen Method)

Concentration of Oxidized Fat (%)	Lard P. V. 104	C. S. Oil P. V. 100	Lard P. V. 31.8	C. S. Oil P. V. 30.6
0.0	21	21	21	21
2.5	12	14	..	..
5.0	7	11	13	21
10.0	3	7	10	18
20 0	..	..	5	14
30.0	..	..	4	13

pected stability. This, however, may be due somewhat to change in oxidation characteristics of lard when cottonseed oil is added.

The conclusion that the peroxides are inactive as catalysts would, therefore, appear to be justified.

With the peroxides and volatile end products inactive and lard which has been freed from volatile materials and peroxides by steam distillation at 200° C. still showing strong catalytic action, the inference that the active catalytic material is some substance of high molecular weight not readily volatile at 200° C. and 3-5 mm. Hg pressure seems logical. Figure VI represents a possible mechanism of oxidation, starting with a triglyceride of stearic and oleic acids, passing through the peroxide stage, and ending with glycerol alpha beta distearin, gamma azelaic semi-aldehyde and pelargonic aldehyde. The peroxide and pelargonic aldehyde would presumably be inactive on the basis of evidence presented above, leaving as the active material an aldehyde of high molecular weight. Figure VII represents the oxidation of oleic acid according to Powick[6]. Applied to the triglyceride represented in Figure VI, the end products would be heptaldehyde, epihydrin aldehyde and glycerol alpha beta distearin, gamma pimelenic semi aldehyde, the latter compound being the active material.

It was our object to synthesize a compound of similar structure and to test its action on lard. Dr. Young, of our Research Staff, has synthesized a product which apparently is alpha gamma dilaurin beta glyoxalin (Figure VI). The yields, however, were so small that both tests for catalytic activity and a derivative to determine structure could not be made. The material showed a high catalytic activity, a lard of 18 hour AOM stability being reduced to 12, 8 and 4 hours by respectively 0.087%, 0.175% and 0.35% of material. Silver oxide was used in the preparation of this substance. It is possible that the catalytic action is due to remaining traces of silver. In view of the possible effects of this metal, and the small yields which made it impossible to check the structure, this synthesis will need to be repeated.

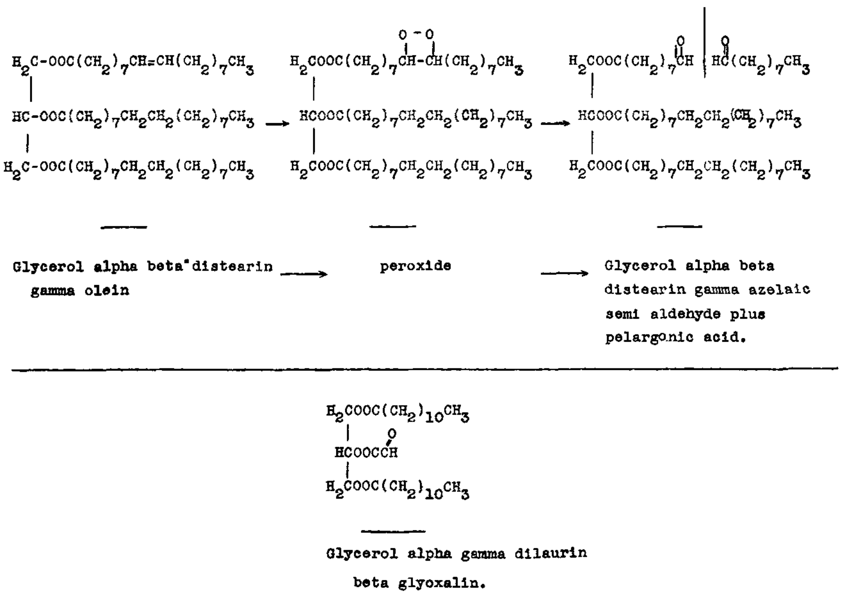

FIGURE VI
Oxidation Mechanism for a Triglyceride

Summary

Evidence has been presented:

(1) That materials volatile from ran-