ides, after oxidation by Proc. I or Proc. II, through basic alumina columns, their main data being isolation of 15% N.D. (of which 3% was original tristearin) from distearo-olein oxidized by Proc. II. If the non-tristearin material in N.D. were ketoacetoxy derivatives then the N.D. should show sap. val. 317 against 227 recorded and the oxidized concentrate should give, on Mg. salt separation (4a, 5), 93% insoluble azelaoglycerides (I.A.G.) of sap. val. 290 against 89.3% I.A.G. of sap. val. 279 recorded and 89.9% I.A.G. of sap. val. 281 required in the absence of production of I.O.P. Further, the acidic material removed by Bertram separation from the hydrolysis products of the N.D. showed sap. val. (calc.) 381 against 355 for nonoic acid 487 for an equimolecular mixture of nonoic and azelaic acids producible from I.O.P. by saponification with alcoholic KOH. The non-tristearin part of the N.D. from oxidized di- and mono-saturated glycerides show sap. vals. (calc.) of 230 and 234 against 221 and 264 required for distearo-nonoin and stearo-di-nonoin resly. and the N.D. is thus mainly composed of the above two triglycerides obviously formed by ester interchange on the basic alumina column.

It has further been suggested (2) that errors due to hydrolysis of azelaoglycerides occur during oxidation by Proc. II and also during Mg salt separation of the azelaoglycerides (4a, 5). Since theoretical yield of I.A.G. of theoretical sap. val. was obtained from disaturated glycerides (4a, 2) it is illogical to suggest any hydrolysis during oxidation by Proc. II. Proof that no hydrolysis of azelaoglycerides (and also formation of I.O.P.) need take place during normal analysis is provided by the example of the apricot kernel oil (4b) which showed only 0.2% monoazelains and fraction of peanut oil (most soluble fraction, low temp crystallization) which showed no I.A.G. at all (9) in spite of their containing 24 and 33% monosaturated glycerides resly. The Mg. salts of di-azelains are, however, much less stable towards alkali than those of the monoazelains and tend to undergo hydrolysis if during the Mg. salt separation there is too much excess of alkali, or rise in temp above 30C or again if the precipitated salts are not filtered off within a maximum of 20–30 min, and any actual hydrolysis produced will be due only to non-observance of the conditions specified for the separation.

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Analysis of Lipids and Oxidation Products by Partition Chromatography: Dimeric and Polymeric Products

UNDER the above title a chromatographic method was published (1) recently and was said to be useful for determining the extent to which an oil is oxidized before deodorization, and for following the various phases of oxidation, polymerization, and processing. Column chromatographic separation of the fatty acids obtained by saponification of deodorized oils, yielded three fractions, termed, respectively, unoxidized acids, "dimeric" or polymeric fatty acids, and highly polar compounds. The "dimeric" fatty acids fraction amounted to approximately 1 to 2% of the total fatty acids of the oils investigated.

We have applied the above method to soybean oil in its various stages of processing. According to graph No. 4 of FRANKEL et al. (1) deodorized soybean oil contains as much as 1.5% "dimers" at a peroxide value of zero. Therefore, we extracted soybean oil from selected whole beans in the laboratory. This crude oil was investigated by the chromatographic method in question and found to contain 1.7 to 2.2% of the "dimers." The same oil refined and deodorized had 1.3 to 2.1%. The values found during refining of a factory sample were: degummed oil 1.3 to 2.1%, neutralized oil 1.0 to 1.2%, bleached oil 0.7%, deodorized oil 0.8 to 1.8%.

From the above we may infer that the "dimers" are either already present in the non-extracted seed or are formed during saponification of the oil in the course of the analysis, although precautions were taken to avoid oxidation. Refining and deodorization of oils cannot explain the total amount of "dimers" as found by FRANKEL et al. Our data even suggest a decrease of "dimers" during refining.

This raises the question of the real nature of the "dimeric" acid fraction. It is generally known that there can exist two different kinds of polymers in fatty oils: thermal polymers, formed during thermal treatment in the absence of oxygen, and oxidative polymers, formed in oxidized oils. Determination of thermal polymers in normally refined, deodorized oils using a paper chromatographic method (2) showed that they do not normally contain more than 0.1% thermal polymers (3). The amount of oxidative polymers in normally refined, deodorized oils is not yet known with certainty. We intend to investigate this and to ascertain the structure of the constituents of the "dimeric" fraction.

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