ABSTRACTS

Oils and Fats

Edited by
W. F. BOLLENS and R. E. KISTLER

Hydrogenation of fats. I. The influence of catalyst concentration on the selective hydrogenation of cottonseed oil. D. R. DHINGRA, J. P. HILDITCH and A. J. RHEAD. *J. Soc. Chem. Ind.* 51, 195-8T (1932).—The hydrogenation of the linoleic glycerides is selective in character under all the conditions examd. The earlier conclusions that selective hydrogenation is most pronounced at higher temps. have been confirmed. Over the range of concns. studied, the amt. of catalyst present influences the selectivity the most when the greatest amt. of catalyst was used. This relation holds at each of the temps. at which observations were made but is most marked at 130°, the action of 2 g. of catalyst per 400 g. of oil at 130° being the least selective. The proportion of isoöleic acids produced depends mainly on the temp. of hydrogenation and in smaller degree on the catalyst concn.; it increases with rise of temp. and also with increasing concn. of catalyst at any given temp. At 200° the proportion of isoöleic acids is much the same for corresponding stages of satn., whatever the proportion of catalyst, while at 170° with 2 g. of catalyst it is distinctly less; at 130° isoöleic acid formation reaches its lowest limit in the series. **II. Course of hydrogenation of cottonseed oil by the Bolton-Lush continuous hydrogenation process. (Drip method.)** T. P. HILDITCH and A. J. RHEAD. *Ibid* 198-202T.—In the drip process the amt. of satd. acids increases from the outset, and the linoleic acid does not disappear so rapidly as in the powder-catalyst method; the proportion of isoöleic acids is notably smaller. The amt. of oleic acid varies little in the earlier stages of hydrogenation. By continuous hydrogenation those unsatd. glyceride mols. which are attacked are frequently taken much further in the direction of complete satn. than when the conditions of the hydrogenation tend toward complete mixing of the reacting system. The rate of increase in fully satd. components is not only in harmony with the considerations of gravitational flow of the unsatd. fat over the stationary catalyst, but the extent of contact between any partly hydrogenated mol. and the catalyst in the later stages of passage over the Ni persists until complete satn. is reached. Products not fully satd. obtained by the drip process consist, so long as hydrogenation has not gone too far, of glycerides in which the normal procedure of selective hydrogenation has taken place: transformation of linoleic into oleic derivs. with relatively subordinate production of stearic compds. Palmitic and other acids are still present in amts. approaching those of untreated cottonseed oil. **III. Relative amounts of solid and liquid oleic acids present at different stages of the hydrogenation of olive and cottonseed oils.** T. P. HILDITCH and E. C. JONES. *Ibid* 202-3T.—Three tables are given which show that there is an apparent const. proportion of solid and liquid oleic acids over a wide range of I nos. In the case of cottonseed oil of I nos. between 70.0 and 61.6, oleic glycerides have not been previously attacked, but oleic as well as isoöleic glycerides have been produced from the linoleic glycerides. Hydrogenation of the linoleic glycerides leads to a mixt. of oleic derivs. of which isoöleic acids are the major components. From the point at which the hydrogenation becomes almost wholly that of oleic and isoöleic derivs., the ratio of the latter to the former further augments until soon it reaches a value which is of the same order as the max. observed in the olive oil series, 18:10, and which subsequently declines. Consideration of both series of hydrogenated fats leads to the conclusion that there is no true equil. between isoöleic and oleic acids. The phenomenon of the relative proportions of these solid and liquid acids is regarded as the resultant of a no. of factors of which the actual resolution of *cis* into *trans* isomerides or vice versa is only one; the others will be the relative rates of hydrogenation of the *cis* and *trans* forms into satd. derivs., and the initial accumulation of isoöleic and oleic derivs. resulting from the reduction of more unsatd. components. Selective hydrogenation of polyunsatd. glycerides generally leads to the production of more isoöleic than ordinary oleic derivs. Hydrogenation of monoethylenic derivs. is usually accompanied by changes, usually augmentation, in the ratio of solid to liquid oleic acids, secondly by a period in which the ratio reaches an upper limit but during which its rate of variation is relatively slow, and finally the ratio may again decline to a certain extent.
E. SCHERUBEL.

Conditions of formation of iso-acids in the hydrogenation of fats. R. GUTMANN. *Masloboino Zhirovoe Delo* **1931**, No. 8-9, 32-6: *Chimie & industrie* **27**, 1391 (1932).—At the present time there are 3 theories to explain the formation of iso-acids: (1) During hydrogenation, not only is H fixed at the double bonds of the unsatd. fatty acids, but at high temps. in heterogeneous medium dehydrogenation also occurs. (2) Oils contg. unsatd. fatty acids with several double bonds are hydrogenated progressively, the H being first fixed at only 1 double bond of each acid. (3) The formation of iso-acids is due to migration of the double bonds. To det. the mechanism of the formation of iso-acids, G. carried out a series of hydrogenation tests of sunflower-seed oil and of oleomargarine in presence of Ni catalyst. The amt. of unsatd. solid iso-acids increases with the temp. and time of hydrogenation. It is concluded that dehydrogenation does take place at high temp. (about 300° in the present instances); while other expts. with ethyl oleic ester had shown that it does not occur at lower temps. On the other hand, it was observed that at lower temps. hydrogenation takes place progressively; in this case, the presence of linoleic and linolenic acids favors the formation of iso-acids. A. PAPINEAU-COUTURE.

Titer points of mixed fatty acids. II. Mixtures of pure fatty acids. GEORGE W. JENNINGS. *Ind. Eng. Chem., Anal. Ed.* **4**, 262-3 (1932); cf. *C. A.* **25**, 2315.—The titer points of mixts. of lauric and myristic, lauric and palmitic, oleic and palmitic, oleic and lauric, and oleic and myristic acids were detd. In view of the results obtained it is not possible to generalize about the behavior of the titer of mixts. of other acids until further data are secured. E. S.

Determination of hydroxyl number of oils, fats and waxes. WILLARD L. ROBERTS and H. A. SCHUETTE. *Ind. Eng. Chem., Anal. Ed.* **4**, 257-9 (1932).—The hydroxyl no., defined as the no. of mg. KOH equiv. to the hydroxyl content of 1 g. of fat, can be detd., with economies of time, sample and reagents, if the reaction is carried out in a sealed tube in the presence of Ac_2O. Upon completion of acetylation the excess Ac_2O is hydrolyzed and detd. as AcOH by titration with 0.5 *N* KOH. The entire process is carried out in the presence of the acetylated product except with samples contg. free sol. acids, when filtration prior to titration is necessary. E. SCHERUBEL.

The hydrogenation of soy-bean oil. A. LAPTEV. *Masloboino Zhirovoe Delo* **1932**, No. 1, 31-3.—The phosphatides (lecithin (**I**)) which are present in the crude soy-bean oil are poisonous to the Ni catalyst. In Germany **I** is removed by centrifuging and washing the oil with alc. L. completely removed **I** (as evidenced by the m. p. (52°) of the hydrogenated oil) in the following way: The oil was treated with 1% H_2SO_4 (d. 1.84) at room temp., then *after removal* of the H_2SO_4 ppt., with NaOH (20° Bé.) at 60-70°. After washing several times with hot H_2O to neutral reaction, the oil was dried by blowing air through it at 100°. E. BIELOUSS.

Chemical study of fish oils. M. BĚLOPOLSKII and I. MAKSIMOV. *Masloboino Zhirovoe Delo* **1931**, No. 10, 43-6; *Chimie & industrie* **27**, 1391-2 (1932).—B. and M. applied direct bromination of the fatty acids in Et_2O or in petrolic ether to the study of certain fish liver oils (cod, herring, etc.). *Conclusions.*—(1) The bromides which ppt. in petrolic ether are those of the unsatd. aliphatic acids. (2) The yield of bromides insol. in petrolic ether is as accurate and characteristic a const. as the hexabromide value. (3) The fats analyzed contained at least 2 classes of unsatd. acids; on the other hand, no evidence was found in support of the presence of linoleic and linolenic acids. (4) Combined bromination of the fatty acids in Et_2O and in petrolic ether, together with examn. of all the fractions of bromides, furnishes sufficiently accurate qual. and quant. identification of fats. A. PAPINEAU-COUTURE.

The quality and composition of peanut oil from nuts of different degrees of maturity. N. DUBLYANSKAYA. *Masloboino Zhirovoe Delo* **1931**, No. 11, 55-7.—The acid, I, sapon. and ester nos. changed very little with the degree of ripeness of the nuts. The thiocyanate nos. (Kaufmann), however, were lower for the oils from the green nuts, an indication that the content of the satd. acids increases and the oleic acid decreases with the lowering of the degree of ripeness. The color of the oil of the unripe nuts is considerably darker. E. BIELOUSS.

A rapid determination of the acetyl number in fats. RAYMOND DELABY and YVONNE BREUGNOT. *Bull. sci. pharmacol.* **39**, 354-61 (1932).—Mix 1-3 g. fat and 10 cc. of a mixt. of 1 part Ac_2O and 2 parts pyridine and heat for 30 min. to 1 hr. After cooling titrate with 0.5 *N* NaOH and phenolphthalein. A blank is run in the same way. A. E. MEYER.

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