and capric acids. These diagrams have been presented together with pertinent data and a description of a tested procedure for preparing these acids from readily available raw material.

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2. Grün. Ad., and J. Janko, Deut. Oel. Fett-Ind., *41*, 553 (1921).
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Referee Board Report

The Referee Board has only routine activity to report for the year 1944-5. Twenty-seven Referee Certificates were issued, as already published in Oil & Soap. The usual 10 check samples of cottonseed were distributed. The number of check oil samples was reduced to a single series consisting of three samples each of crude cottonseed and of crude soybean oil.

G. W. AGEE — K. S. MARKLEY
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Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

THE FUTURE OF SOYBEAN OIL. O. H. Alderks. *Chem. Eng. News. 23,* 1168-70 (1945). During 2 world wars the use of soybean oil has jumped tremendously. After World War I it declined just as rapidly, but after reaching a low point in 1928, consumption began to expand again, gradually at first, then rapidly to where it now challenges cottonseed oil for leadership in production and use. Agronomic improvement and better technology in refining and processing have improved the competitive outlook for soybean oil in postwar years.

DETECTION OF OLIVE OIL IN EDIBLE OIL MIXTURES. J. Fitelson. *J. Assoc. Off. Agr. Chem. 28,* 283-4 (1945). The method depends on the determination of squalene. Olive oil contains considerably more squalene than the other common edible oils. The squalene content of edible vegetable oils were: olive 136-708 mg. % (average 383), cottonseed 3-15 (8), peanut 8-49 (27), corn 16-42 (28), soybean 5-22 (12), sunflower 8-19 (12), teaseed 8-16 (12), sesame 3-9 (5) and rape 24-28 (26).

INVESTIGATION OF THE SEED OILS OF SOME SUDAN MIMOSACEAE. D. N. Grindley. *J. Soc. Chem. Ind. 64,* 152 (1945). The seeds of this family have a very low content of fixed oils, which are rather dark in color and contain a high proportion of unsaponifiable matter. The fatty acids consist in most cases of 20-30% of saturated acids, including about 3% of higher acids (arachidic, behenic and lignoceric), the balance being a mixture of oleic and linoleic acids in proportions varying from about 2:1 to 3:4 according to the species.

OBSERVATIONS ON TESTS FOR SUPPOSED α-DICARBONYL COMPOUNDS IN AUTOXIDIZED FATTY SYSTEMS. H. Jasperson, R. Jones and J. W. Lord. *J. Soc. Chem. Ind. 64,* 143-5 (1945). The colorimetric tests for α-dicarbonyl compounds proposed by Prill and by O'Daniel and Parsons have been applied to the specific dicarbonyls, diacetyl and diketostearic acid, and to autoxidized ground-nut oil and Me linoleate. Spectroscopic examination of the colors has shown that in autoxidizing fatty systems the substances responsible for the colors are not necessarily dicarbonyls.

THE EFFECT OF THERMAL TREATMENT AND HYDROGENATION ON THE ABSORPTION OF A FEW VEGETABLE OILS. A. Roy. *Ann. Biochem. Exptl. Med. 4,* 17-22 (1944). The oils examined were fed to normal adult rats previously maintained on a fat free diet, a portion of this diet being replaced by an equivalent amount of the oil. The fats were fed in the normal state or after heating at 200, 250 or 275° for one hour or 300° for 45 minutes. Groundnut and cocoanut oils were also fed after hydrogenation to different degrees. Except in the case of groundnut oil all the oils showed a decrease in absorption after submission to thermal treatment but no effect after hydrogenation. Determination of the I value of the fats showed that this decrease in absorption was not related to the degree of unsaturation but appeared to be related to the rate of hydrolysis of the fats by lipase. *(Nutr. Abs. & Revs. 14,* 690).

SOUTH AFRICAN FISH PRODUCTS. XVI. THE COMPONENT ACIDS OF THE HEAD, BODY, LIVER AND INTESTINAL OILS OF THE JACOPEVER (SEBASTICHTHYS CAPENSIS, GMEL.). N. J. Van Rensburg, W. S. Rapson and H. M. Schwartz. *J. Soc. Chem. Ind. 64,* 139-40 (1945). The jacopever has already been characterized as a fish with a diffuse system of fat storage. The liver oil is distinguished by its tendency to a lower degree of unsaturation than the corresponding head, body and intestinal oils, and by an inverse relationship between the content of oil in the liver and its I value. As a first step in the precise location of these effects, the component acids have been determined in the head, body, liver and "intestinal" oils from the jacopever in moderately fat condition. It has been found that these jacopever oils conformed in type to those from other fish with diffuse systems of fat storage. In relation to the head, body and intestinal oils, the liver oil was distinguished by an enhanced content of C_{16} and C_{18} unsaturated acids and a decreased content of the more highly unsaturated C_{20} and C_{22} acids.

SOUTH AFRICAN FISH PRODUCTS. XVII. THE COMPONENT ACIDS OF THE LIVER OIL OF THE STOCKFISH (MERLUCCIUS CAPENSIS, CAST.). N. J. Van Rensburg, W. S. Rapson and H. M. Schwartz. *J. Soc. Chem.*

Ind. 64, 140-3 (1945). The stockfish or hake, has already been characterized as a fish with fat storage localized in the liver. The component acids of a commercial sample of liver oil have now been determined. These include C_{14} (satd.) 1.4, C_{16} (satd.) 17.9, C_{18} (satd.) 1.9, C_{20} (satd.) 0.3, C_{14} (—2H) 0.4, C_{16} (—2H) 11.8, C_{18} (—3.3H) 32.6, C_{20} (—7.1H) 19.3, C_{22} (—9H) 12.0, C_{24} (—?H) 2.3% by weight. In its relatively high content of C_{20} and C_{22} unsaturated acids, stockfish liver oil conforms in type to other liver oils from fish in which the liver is the main fat depot. It differs markedly from the liver oil of the jacopever and is very similar to the liver oil of M. gayi of New Zealand waters and to that of the European *M. vulgaris,* both of which are very closely related to, if not identical with *M. capensis.* It is suggested that differences found among the liver oils of these 3 species may be due to differences in condition of the fish studied, rather than to species or environmental effects. As a check on the interpretation of the results of this, the first component acid analysis to be carried out in this laboratory, the component acids were also determined on the stockfish oil after hydrogenation and the results are placed on record as an independent confirmation of the accuracy of the Hilditch fractionation technic. Other points relating to the interpretation of results and in particular to the determination of the average unsaturation of ester fractions are discussed.

A SURVEY OF THE VITAMINS A AND D POTENCIES OF THE LIVER OIL OF ATLANTIC COD (GADUS MORRHUA L.) L. I. Pugsley, C. A. Morrell and J. T. Kelly. *Can J. Res. 23 F.,* 243-52 (1945). A survey has been made of the variations and of some of the factors influencing the variations of the vitamins A and D potencies of the liver oil of cod landed at ports in Nova Scotia, New Brunswick and the Gaspe peninsula of Quebec. An increase in the vitamin A potency was paralleled by an increase in the vitamin D potency and the oil content of the liver increased with the percentage liver in the fish. An increase in the oil content of the liver and of the liver content of the fish was accompanied by a decrease in the concentration of vitamins A and D in the oil. The vitamin potency of the oil tended to decrease as the fishing season advanced from June to October and the oil content of the liver increased during this period. When the yield of vitamins was expressed per 100 g. of fish there was no apparent seasonal change in potency indicating that the seasonal changes observed were due to dilution. A relationship was observed between the stages in the spawning cycle and the oil content of the liver. Fish classed as "steaks" (6-8 years) yielded a liver oil higher in vitamins A and D potencies than "market cod" (4-6 years) and the liver oil of "scrod" (3-4 years) had the lowest vitamins A and D potencies.

RELATIVE VALUES OF CAROTENES IN FOODS AS MEASURED BY STORAGE OF VITAMIN A IN LIVERS OF RATS. G. S. Fraps and W. W. Meinke. *Food Res. 10,* 187-96 (1945). Appreciable differences were found in the quantities of vitamin A stored in livers of young rats from purified commercial carotene fed at different times. In 17 experiments the average total storage from 60 γ of carotene per rat per day ranged from 63.4-124.1 γ per liver, with an average of 85.9 and a standard deviation of 15.2. In 19 tests on 6 foods the storage from carotene on the basis of the β carotene equivalent ranged from 16-64% of that of carotene dissolved in oil, with an average of 32. In 4 tests with raw beef liver and butterfat the storage from the β carotene equivalent of the carotene and the vitamin A averaged 179 and 145%, respectively, of that of carotene in oil. In 26 tests cottonseed oil increased the utilization of carotene when added to the basal ration or added directly to the carotene supplement. The maximum utilization in 4 tests was 44% with oil compared with 21% without oil for the corresponding foods and compared with 100% for the β carotene equivalent of the carotene in oil. The digestibility of the constituents of the carotene in foods having vitamin A activity including the β carotene, β carotene B, α carotene, and combined β carotene and neo-β-carotene B, varied with the different experiments but the averages of 9 tests were nearly the same, being from 50-53% compared with about 70% for carotene dissolved in oil. The digested carotene in foods utilized for storage in the livers of rats, in 6 tests ranged from 9-44% of that of carotene in oil. The average was 26% compared with an average of 28% for carotene eaten in corresponding foods in previous tests when the digestibility was not determined. The lower utilization of carotene in foods as compared with carotene in oil may be due to the protection of the carotene by the oil from the action of destructive enzymes.

FATE OF INTRAVENOUSLY INJECTED FAT: ITS ROLE IN THE PRODUCTION OF ULCER. I. Baronofsky, K. A. Merendino, T. E. Bratrud, O. H. Wangensteen. *Proc. Soc. Exptl.Biol. Med. 59,* 231-4 (1945). Fat emboli may cause gastric and/or duodenal erosions or ulcers. The presence of fat emboli after intravenous injection of fat may be demonstrated in the lung, brain, kidney and stomach. Its rate of disappearance in experimental animals is such that after 4 days it is found in sections of lung tissue in 41%, brain 11.1%, kidney 34.4% and the stomach of 3.7% of the sections examined. On the contrary, in sections of those animals sacrificed within 1-4 days after the intravenous injection of fat, the incidence of demonstrable fat emboli in the same tissues was: lung 91%, brain 61%, kidney 73.9% and stomach 47.8%.

ESTIMATING THE BIOLOGICAL VALUE OF FATS BY BIOLOGICAL AND CHEMICAL TESTS. 1. THE BIOLOGICAL VALUE OF SOME FOOD FATS JUDGED FROM THEIR DEPOSITION AND BY CHEMICAL TESTS. K. E. Schulte, *et al. Ernährung 7,* 305-26 (1942). Refeeding experiments on adult mice which had lost 25% of their weight through underfeeding, were used to investigate the biological value of food fats. Preliminary experiments made on over 200 mice to determine the most suitable fat content of the standard diet showed that 10% olive oil gave the best results as regards weight increase and general condition of the animals. All groups of mice received the standard diet containing olive oil during the period of underfeeding, after which they were given adequate amounts of a similar diet in which the olive oil was replaced by 10% of the fat under investigation. The only fats tested which enabled the animals to regain their original weight within the experimental period of 21 days were olive oil, cocoa fat, refined soya oil and refined cocoa fat. With these fats the original weights were reached in 7, 9, 5 and 13 days respectively. Smaller weight increases were obtained with whale oil hardened at 40°, crude soya oil, crude and refined sun-

flower oil and whale oil hardened at 32°. With unhardened whale oil, both crude and refined, the animals lost still more weight. To eliminate seasonal variations each experiment was repeated in the 4 seasons of the year, but in winter no group regained its original weight. Very low fat contents were found for the groups on unhardened whale oil, which lost further weight in the refeeding test, but other groups did not show correspondence between fat content and weight gain. Thus, fat contents of 21.3, 21.3 and 21.0 g. were found with weight gains of 12.8, 6.0 and 3.7 g. respectively. A fat content of 27.2 g. in the crude sunflower oil group was associated with a weight gain of 6.0 g., while fat contents of 26.4 and 23.5 g. in the olive oil and refined soya oil groups were associated with weight gains of 26.8 and 24.5 g. Estimations of the I and Reichert Meissl numbers of the fats indicated no relationship between these numbers and fat deposition. (*Nutr. Abs. & Revs. 14,* 710.).

PATENTS

METHOD OF SOLVENT EXTRACTION OF OIL FROM SEEDS. P. A. Singer and H. J. Deobald (Allied Mills, Inc.). *U. S. 2,377,975.* The method of extracting oil from seeds comprises contacting the seeds at elevated temperature with a solvent comprising approximately 75% ethanol and 25% isopropanol. On cooling the oil separates out and the lecithin can be separated from the solvent layer by a salting out agent.

ANTIOXIDANTS. L. H. Howland and P. T. Paul (United States Rubber Co.). *U. S. 2,377,423.* A method of preserving organic substances which tend to deteriorate by absorption of O_2 from the air comprises incorporating therein a product of reaction at an elevated temperature in the presence of an acidic catalyst of one molecular proportion of a monomeric 1,3-butadiene hydrocarbon and at least one molecular proportion of a diamino diphenyl methane, said amino groups being primary amino groups.

STABILIZATION OF FATTY MATERIAL. L. C. Brown (Industrial Patents Corp.). *U. S. 2,377,610.* The process of stabilizing fats and oils against rancidity comprises embodying therein a solution of gum guaiac in a higher fatty acid partial glyceride, the latter solvent being added to the stabilized fat in an amount not sufficient to substantially alter the shortening properties of the stabilized fat.

MANUFACTURE OF ANTIOXYGENIC PAPER. S. Musher (Musher Foundation Inc.). *U. S. 2,377,359.* In the method of making antioxygenic paper are the steps of providing paper pulp with a pH of between 4 and 6.9, adding to the paper pulp a small amount, less than 1%, of hydroquinone while maintaining a pH between 4 and 6.9, and then compacting the paper pulp at a temperature of at least 210° F. to form the paper.

FATTY ACIDS FROM TALL OIL. A. G. Houpt (American Cyanamid Co.). *U. S. 2,378,359.* The separation is made by dissolving the anhydrous tall oil, in which the fat acid was neutralized, in a solvent (AmOH) which dissolves both components when hot and only the rosin acids when cold; on cooling this solution the soaps of the fat acids precipitate out.

PROCESS FOR TREATING FATS AND FATTY OILS. E. W. Eckey (The Proctor & Gamble Co.). *U. S. 2,378,005-7.* The fat acid composition of oils is modified by ester interchanges. For example, the lower weight fat acid may be removed from coconut oil by heating it with Me esters of high molecular weight acids in the presence of a catalyst, thereafter removing the low boiling esters by distillation.

MINERAL OIL LUBRICANT. H. G. Smith, T. L. Cantrell and J. G. Peters (Gulf Oil Corp.). *U. S. 2,378,442-3.* Mono-fat acid amides of phthalic acid are added to lubricant mineral oils to serve as rust preventatives.

Abstracts

Drying Oils

Edited by
HOWARD M. TEETER

MISCELLANEOUS STUDIES AT THE GAINESVILLE TUNG-OIL LABORATORY. R. S. McKinney. *Proc. 10th Ann. Convention Am. Tung Oil Assoc. and United Tung Growers Assoc., 1944,* 59-63. Tests indicate the possibility of preparing a moldable plastic from solvent-extracted tung meal. Solvent-extracted tung meal and press cake with and without autoclaving for 2 hours with steam at 25-pound pressure were used in feeding tests with chickens. The materials not autoclaved were definitely toxic. With autoclaved tung-oil press cake in the diet up to 30% the chickens did not lose weight but they looked unhealthy. A new clarification process for crude tung oil is suggested in which sodium bisulfite is used to precipitate the non-oil constituents. Tests showed the new process to be better in certain respects than the diatomaceous earth filter-aid now used in the tung-oil mills. (*Chem. Abs. 39,* 2890.)

SOME PROBLEMS OF INTEREST TO TUNG PRODUCERS. R. S. McKinney, W. G. Rose and A. B. Kennedy. *Proc. Am. Tung Oil Assoc. 9,* 62-77 (1943). The regression coefficient to determine the relationship between kernel content and oil content of tung fruit was estimated. Studies were reported on the use of a modified portable English walnut huller for hulling tung fruit. Experiments are described on the recovery of oil from tung press cake and tung fruit by means of solvent. The dehulled tung fruit was ground preparatory to extraction with a heavy-duty attrition mill. A Kennedy continuous countercurrent extractor was used for the tests with a normal hexane petroleum fraction as the extracting solvent. Varnish made from the solvent-extracted oil appeared to be as durable as a standard spar varnish (*Chem. Abs. 39,* 2890).

HULLING AND EXPRESSION OF OIL FROM TUNG FRUIT. R. S. McKinney and R. E. Oglesbee. *Proc. 10th Ann. Convention Am. Tung Oil Assoc. and United Tung Growers Assoc., 1944,* 68-9. Tests with a modified walnut huller indicated that it will do a good hulling job on moist tung fruit, but its capacity is limited. An experimental tung huller operating on a principle similar to a peanut sheller was fairly satisfactory and had a good capacity. Hulling moist tung fruit in the or-