Arachidic-Behenic Mixture

C_{20} *mol. pct.*	C_{22} *mol. pct.*	Sol. Pt. °C. *(corr.)*
0.00	100.00	79.35
3.79	96.21	78.55
6.97	93.03	77.90
11.65	88.35	76.90
16.17	83.83	76.00
19.03	80.97	75.40
25.36	74.64	74.05
29.87	70.13	72.95
32.56	67.44	72.35
34.76	65.24	71.75
35.04	64.96	71.70
37.51	62.49	71.05
39.74	60.26	70.50
42.51	57.49	70.05
44.69	55.31	69.80
47.45	52.55	69.50
50.15	49.85	69.30
52.42	47.58	69.24
55.64	44.36	69.20
59.27	40.73	69.05
62.63	37.37	68.85
64.55	35.45	68.65
67.29	32.71	68.44
70.18	29.82	68.25
71.96	28.04	68.20
73.70	26.30	68.20
75.04	24.96	68.20
77.10	22.90	68.23
78.85	21.15	68.30
80.57	19.43	68.40
81.96	18.04	68.65
84.47	15.53	69.40
87.30	12.70	70.20
89.01	10.99	70.65
91.79	8.21	71.65
93.74	6.26	72.25
96.01	3.99	73.00
96.94	3.06	73.25
100.00	0.00	74.35

Behenic-Lignoceric Mixture

C_{22} *mol. pct.*	C_{24} *mol. pct.*	Sol. Pt. °C. *(corr.)*
0.00	100.00	83.40
4.97	95.03	82.55
10.01	89.99	81.55
15.17	84.83	80.50
20.05	79.95	79.47
22.62	77.38	78.95
25.07	74.93	78.45
27.30	72.70	78.00
29.71	70.29	77.45
32.35	67.65	76.82
34.94	65.06	76.20
37.46	62.54	75.75
39.94	60.06	75.45
42.52	57.48	75.20
45.05	54.95	74.95
47.41	52.59	74.78
49.94	50.06	74.60
52.47	47.53	74.55
54.72	45.28	74.50
57.33	42.67	74.48
59.89	40.11	74.45
62.33	37.67	74.35
64.97	35.03	74.10
67.28	32.72	73.93
69.70	30.30	73.75
72.55	27.45	73.75
74.69	25.31	73.75
76.97	23.03	73.75
79.94	20.06	73.87
82.48	17.52	74.25
84.91	15.09	74.70
87.56	12.44	75.35
91.73	8.27	76.42
95.93	4.07	77.80
100.00	0.00	79.35

Summary

Earlier studies on solidification point curves for binary systems of the saturated fatty acids of even-number carbon atom content have been extended to include the C_{16} to C_{24} group. The effect of homology is here beginning to become more obvious than it is in the lower brackets of this series of compounds in that the three-segment curve which is there a characteristic feature is gradually approaching in form that of the smooth, continuous type. This phenomenon has been interpreted in the light of a decreasing tendency toward compound-formation. It has been postulated that one equi-molecular compound is formed between adjacent pairs of fatty acids of even-number carbon atom content.

This study is being continued in the hope of bringing into the picture acids of higher carbon content than those already studied. Systems containing the odd-number carbon atom members of this homologous series will also be investigated.

Acknowledgments

This investigation was supported by a grant from the Wisconsin Alumni Research Foundation Fund. Armour and Company supplied the "Neo-Fats," from which the palmitic and stearic acids were recovered, and the hydrogenated sample of their "Neo-Fat 19" which served as our source of arachidic acid. To Prof. C. H. Sorum of the University of Wisconsin we are indebted for his assistance in the interpretation of the curves.

Literature Cited

(1) Schuette, H. A., and Vogel, H. A. This Journal, **16**, 17; 223 (1939).

(2) Schuette, H. A., and Vogel, H. A., ibid., 209.

(3) Francis, F., and Piper, S. H., J. Am. Chem. Soc., **61**, 577 (1939).

(4) Roozeboom, H. W. B., Z. physik. Chem., **30**, 396 (1899).

Abstracts

Oils and Fats

Edited by
M. M. PISKUR

DRY GERM REMOVING OF FEED CORN, A PROCESS TO IMPROVE OUR FAT SUPPLY. Felix Grandel. *Fette u. Seifen 47,* 185-8 (1940).

PRESENT STATE OF PHOSPHATIDE RESEARCH. W. Halden. *Fette u. Seifen 47,* 52-4 (1940). Review of recent work.

DEVELOPMENT AND PRESENT STATE OF THE I. G. HYDROGENATION PROCESSES. W. Boesler. *Chem. Ztg. 64,* 81-5 (1940).

LABORATORY-TYPE MOLECULAR OR SHORT-PATH STILL FOR VEGETABLE AND ANIMAL FATS AND OILS. S. B. Detwiler and K. S. Markley. *Ind. & Eng. Chem. Anal. ed. 12,* 348-50 (1940).

THE MELTING POINT OF FAT MIXTURES. Thor Lexow. *Fette u. Seifen 47,* 204-13 (1940). The flow pt. of Pohl, the Ger. standard, the Pohl and Finkener drop pts., the raised m.p., the flow-m.p., clear m.p., m. interval were investigated and discussed from the pt. of view of their value for margarine manuf.

WHAT THE USER WANTS IN EDIBLE OILS. G. W. McBride. *Food Ind. 12,* 56-8 (1940). It tells briefly how to select an oil of desired flavor or blandness, and how to retain that flavor in the finished product.

DETERMINING THE REFINING GRADE OF A FAT. I. SURFACE TENSION AND THE "RING TEST." H. P. Kaufmann and P. Kirsch. *Fette u. Seifen 47,* 191-6 (1940). The difference between the surface tension of refined and crude oils is not great enough to serve as test to detect refining. II. THE FOAMING CAPACITY OF FATS. *Ibid.* 198-201. Crude vegetable oils foam when finely divided air bubbles are passed through them. Highly refined oils and triglycerides do not form under these conditions. The foaming qualities plus the stability of the foam is with most fat a measure of the refining grade of the fat. The results from coconut and palm kernel fats were not consistent. Lecithins, slimes, and saponins are the cause of foaming; which is also favored by free fat acids and unsaponifiables. Heat increases the foam volume but decreases foam stability.

STALING VS. RANCIDITY IN ROASTED COFFEE. ANTIOXYGENS PRODUCED BY ROASTING. Lucius W. Elder, Jr. *Ind. & Engr. Chem. 32,* 798-801 (1940). Comparison of the oxidation induction period of oil extracted from coffee before and after roasting shows that the roasting process increases the stability of the oil fraction toward the development of rancidity by a factor of approx. 3. The oil from green coffee when subjected to the roasting treatment by itself does not acquire increased stability. A practical test involving the storage of ground roasted coffee which had been treated with a small amount of pyrrole shows that the oil fraction is definitely stabilized, but resistance to staling is unaffected by such treatment.

MECHANISM OF THE PYROLYSIS OF CASTOR OIL. S. Isikawa, et al. *Science Repts. Tokyo Bunrika Daigaku A3,* 273-85 (1939). Castor oil was conducted through a combustion tube filled with clean sand or silica and heated to about 500°. The product obtained was a free-flowing mass which was sepd. by fractional distn. into 24% crude enanthaldehye, b_{18} 40-87°, 27.5% un-

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decylenic acid, b$_{15}$ 130-190°; and residue. Other catalysts (MnO$_2$, pumice, alumina, Na silicate, borax and K carbonate) in place of silica caused considerably smaller percentage yields (Chem. Abs.).

Studies on the chemistry of the fatty acids. VI. The application of crystallization methods to the isolation of arachidonic acid, with a comparison of the properties of this acid prepared by crystallization and by debromination. Observations on the structure of arachidonic acid. G. Y. Shinowara and J. B. Brown. *J Biol. Chem. 134,* 331-40 (1940).

Comparative curative values of unsaturated fatty acids in fat deficiency. G. O. Burr et al. *Proc. Soc. Exptl. Biol. and Med. 44,* 242-4 (1940). Unsaturated fatty acids (linoleic, linolenic, arachidonic and cod liver oil acids) show differences in growth and skin effects. They should no longer be treated as an interchangeable group but should be used individually in nutrition studies.

Fat requirements of the growing chick. W. C. Russell et al. *J. Nutr. 19,* 555-62 (1940). The extensive removal of substances soluble in diethyl ether from an ordinary poultry growing mash did not retard growth of chicks significantly up to 14 wks. of age, when care was taken to provide the vitamins removed by the extn. process. Although dietary fat was reduced to a very low level (0.1% or less) crystalline carotent was utilized. However, the quantity of carotene fed was several times the min. requirement. The depot fat formed on the low fat ration was more saturated than that of chicks on the normal ration. On the other hand the liver fat of both groups showed essentially the same degree of saturation. The liver fat was less saturated than the depot fat.

Glycerine in modern baking practice. G. Leffingwell and M. A. Lesser. *Bakers Digest 14,* 228 (1940).

Mixed unsaturated glycerides of liquid seed fats. I. Nondrying oils. B. G. Gunde and T. P. Hilditch. *J. Soc. Chem. Ind. 59,* 47-53 (1940). Groundnut, almond and olive oil were elaidinized by heating at 220°. It was proved that their minor component linoleic acid is largely present in the form of dioleins and that the following general principles can be put forward: (1) In nondrying oils such as groundnut, in which oleic acid forms less than 60% of the total acids, while satd. and linoleic acids are each present to about 20%, a considerable proportion of the oil may consist of mono-oleo-monolinoleo-monsatd. glycerides and monosatd. dioleins, linoleodioleins and triolein. (2) In other nondrying oils in which oleic acid forms more than 60% of the total acids, and satd. and linoleic acids are minor components each amounting to less than 15%, monoöleins are present, if at all, in every small proportions. (3) With oils of the fat acid compn. defined in (2) a fairly close approximation to the proportions of the component glycerides can be obtained directly from the (molar) percentage proportions of the component acids by combining each minor component acid in the form of, e. g., monopalmitodiolein or monolinoleodiolein, the surplus of oleic acid being present as triolein (allowance being made for any fully satd. glycerides which may also be present). (*Chem. Abs.*)

PATENTS

Extraction with solvents. C. F. Dinley (Solvent Machine Co.). *U. S. 2,200,983.* App is described.

Apparatus for rendering and extraction. T. K. Lowry (Darling & Co.). *U. S. 2,199,670.* App. is described.

Processes of extracting and refining glycerides and products resulting therefrom. S. E. Freeman (Pittsburgh Plate Glass Co.) *U. S. 2,200,390.* Oils are extd. from seeds with fural or furfuryl alc. by a process in which solvents and seeds are heated, the solvent separated and cooled to release the oil.

Distillation of organic material. A. P. Lee. *U. S. 2,177,664.* A distn. procedure suitable for fat acids comprises atomizing the charge with an inert gas into a distg. zone of sub-atmospheric pressure.

Treatment of hydrogenated oils. S. Musher (Musher Foundation, Inc.). *U. S. 2,210,112.* Macerated sesame seeds are used as antioxidants for shortenings.

Process for making fatty acids. H. Kaufman. *U. S. 2,200,279.* Splitting and hydrogenation are carried on simultaneously in the same app.

Process of treating tall oil. E. Segessemann (Nat'l Oil Products Co.). *U. S. 2,199,653.* The fat acids are first esterified with a low boiling alc. and subsequently the resin acids are esterified with a higher boiling alc. to yield a mixt. that may be easily separated.

Treatment of cacao butter. W. Clayton et al (Crosse & Blackwell, Ltd.). *U. S. 2,200,858.* Method of oxidizing cacao butter to mol. wt. 1050 to 1500 is described.

Highly viscous polymerization products and a process of preparing them. A Voss and W. Heuer (I. G. Farb. A.-G.). *U. S. 2,200,437.* Vinyl esters of org. acids are polymerized in the presence of peroxides of fat acids contg. at least 10 C atoms.

Mineral oil compositions and the processes of preparing the same. A. W. Ralston and E. J. Hoffman (Armour & Co.). *U. S. 2,197,712-3.* Stearylated or other acylated coumarone or indene compds. are used as a pour pt. depressor for mineral oil lubricants.

Method for manufacturing grease. M. T. Buford (Continental Oil Co.). *U. S. 2,189,661.* App. is described.

Grease composition. E. S. Carmichael and G. M. Hain (Socony-Vacuum Oil Co.). *U. S. 2,197,263.* Lime soaps and Ca salts of mono-basic fatty acids having not more than 6 C atoms are used as improvers for grease.

Method for making pure hydrogen. A. R. Stryker. *U. S. 2,200,607.* A catalytic method of prepg. H$_2$ from hydrocarbons is described.