ing an acid value of 180.7 and an iodine value of 77.3.

According to an almost simultaneous publication by Swedish workers (4), the acids of cameline seed or dodder oil were calculated to contain 13.8% eicosenoic and 3.2% erucic acid in addition to 33.4% linolenic, 14.5% linoleic, 23.9% oleic, 2.4% hexadecenoic, and various saturated fatty acids. Except for the absence of a hydroxy acid and the presence of a minor percentage of erucic acid their overall result agrees remarkably well with the author's since it adds up to 43.3% monounsaturated, 47.9% polyunsaturated, and 8.8% saturated acids.

Since eicosenoic acid is not a usual component of vegetable oils, a specimen of it was isolated and analyzed in the present investigation.

Isolating the Acid

Upon treating 400 g. of the fatty acids of cameline seed oil of German origin (1) in alcoholic solution with an excess of boiling lithium hydroxide and cooling to room temperature, lithium soaps were precipitated which, after one recrystallization from 50% ethyl alcohol, yielded approximately 50 g. of fatty acids, saponification value 180.2, iodine value 63.3. After removing some 20 g. of mainly saturated fatty acids (I. V. 17.5) by a lead salt precipitation, 22 g. of a concentrate of monounsaturated acids, iodine value 93.4, saponification value 166.2, $n_D^{25} = 1.4680$, containing 3% of saturated acids according to a modification of the Bertram method (5) resulted.

After the remaining saturated acids had been removed by treating with mercuric acetate according to Bertram (6), the liquid acids were esterified with methanol and fractionated by distillation *in vacuo*. About half of the ester distilled at 186 ± 1°C. at 2 mm. Hg. The fatty acid obtained from this distillate melted at 10°C. Repeated recrystallizations from acetone and petroleum ether (60-80°C.) raised the melting point to a constant value when determined on a Kofler micro hot plate (7).

Properties and Structure

The thus purified eicosenoic acid had:

melting point	21.5-22.5°C.
density 25°/4°	0.8826
refractive index n_D^{25}	1.4598
iodine value (Wijs)	80.8 (calc. 81.7)
acid value	181.2 (calc. 180.7)

From these data the specific refraction is found to be 96.3 or 0.7 units above the value calculated according to Eisenlohr.

Elaidination with nitrous oxide vapors gave a trans-acid of

melting point	42.8-43.5°C.
acid value	180.0 (calc. 180.7)

Mild oxidation with 1% aqueous $KMnO_4$ solution at 0° gave dioxy arachidic acid with

melting point	131-132°C.
acid value	162.5 (calc. 162.8)

Hydrogenation with Raney-nickel in hexane gave a saturated acid with

melting point	74.2-75°C.
acid value	178.0 (calc. 179.5)

and no melting point depression with arachidic acid.

Destructive oxidation with $KMnO_4$ in boiling acetone gave mainly undecanedioic acid, melting at 110° with an acid value of 520.5 (calc. 519.2).

From this there follows that the double bond is located between the eleventh and twelfth carbon in the chain counting from the carboxyl group. The acid therefore has the structure of normal Δ^{11}-eicosenoic acid-1 and is identical with the acid which has been found in jojoba wax by British and American authors (8, 9).

Summary

The eicosenoic acid previously discovered in cameline seed oil (1) was isolated and identified. It melts at 22.5°C. and yields an elaidinated acid melting at 43.5°C. and a dioxy derivative melting at 132°C. By its hydrogenation to arachidic acid and destructive oxidation to undecanedioic acid it was shown to be normal Δ^{11}-eicosenoic acid-1 like the acid in jojoba wax.

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Letter to the Editor

Kartha (1) has reported that fully saturated glycerides (F.S.G.) show on progressive dilutions with other glycerides (non-F.S.G.) an even series of decrements in melting point and solidifying point and that these decrements are independent of the degree of unsaturation of the non-F.S.G. portion of the mixture. These conclusions appear to us to be of such wide significance that they merit the fullest investigation, and we are therefore reporting work done in this laboratory on these lines.

TABLE I

Percentage of F. S. G.	Melting point	Solidifying point
	°F.	°F.
100	142.5	136.5
50	135	128.5
25	129	118.5
12.5	122	105.5
6.3	115	88.5
3.2	108	80.5

We have had no success in using the technique of Kartha, involving the use of a Thiele tube as a water bath, and therefore adopted the capillary tube (clear) melting point procedure (2) and a method of determining solidifying point similar to that used for determining solidifying point of fatty acids in the A.O.C.S. Titre Test method (3). The F.S.G. was a sample of hydrogenated tallow (I.V. 0.3), and for non-F.S.G. peanut oil was employed. This oil is stated by Kartha (4) to contain no F.S.G., and this was confirmed by crystallization from acetone. Results are reported in Table I.

These figures show a good series for the melting point but with a decrement of 7° as against 5.8-6° obtained by Kartha with his technique. In another series hardened tallow (I.V. 0.5) was diluted with neatsfoot oil (no F.S.G. by crystallization) and gave a constant decrement of 6.5° for 5 dilutions. It would appear that the drop in melting point is not independent of the nature of the non-F.S.G. used. With our technique the solidifying points are erratic.

In another experiment a sample of tallow was crystallized from acetone (5) and yielded three crops of crystals, amounting to 18% in all and containing F.S.G. equal to 13.0% of the original tallow. As the final crop contained only .3% F.S.G., it was assumed that all the F.S.G. had been separated in the crystals. Portions from the main crop containing 81% of their own weight of F.S.G. were mixed with peanut oil and with cacao butter (both showing no F.S.G. by crystallization from acetone) to give mixtures containing 13.0% of F.S.G. from tallow. Results are given in Table II.

TABLE II

	Original tallow	Crystals 1st crop	F.S.G. in P.N.O.	F.S.G. in C.B.
Melting point..........	117.5°	138°	119.5°	118.5°F.
Solidifying point.....	105.5°	134.5°	107°	105°F.

In theory two dilutions of the crystals should give 20.25% F.S.G. and a melting point of 124° (138—2 x 7). A further dilution would give 10.13% F.S.G. and 117°. Interpolating to 13% F.S.G. gives a melting point of 119°. Kartha (6) has advised that under certain conditions he has also obtained a small increase in melting point with peanut oil.

The same tallow was analyzed by the Bertram procedure and found to contain 55% saturated acids, and on random interesterification it should give 16.6% F.S.G., which should raise the melting point. However it has been found that the interesterified tallow (sodium methylate catalyst) has a melting point of 114°.

Further researches on these lines are proceeding.

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ABSTRACTS . . . . E. S. Lutton, Editor

• Oils and Fats

Ralph W. Planck, Abstractor
Dorothy M. Rathmann, Abstractor

Utilization of cachaza. E. A. Vazquez. *Bol. ofic. asoc. tec. azucar.* (Cuba) 9, 9-23(1950-51); *Sugar Ind. Abstr.* 12, 134 (1950). The cane-juice clarification muds (cachaza) can be extd. with acid to remove sugar, phosphate, and nitrogenous substances. The residue can be further extd. with org. solvents for wax and fats. The acid ext. can be used for the clarification of guarapo (fermented cane juice), and in the manuf. of yeast and alc. The processes are described and considered from the economic standpoint. The concn. of the muds by centrifugal sepn. is considered theoretically. (*C. A.* 47, 11769)

Sesame—research moves ahead. J. A. Martin (So. Carolina Agr. Exp. Station, Clemson, S. C.). *Crops & Soils* 6(2), 10-11 (1953). Yields as high as 1,078 lbs./acre and oil contents as high as 56% indicate that sesame may soon be an important oil seed crop in the South. More disease resistant strains are being bred.

Antioxidants in the home preservation of foods. Flora Hanning, Lyla M. Rice, Jobelle A. Shands, W. Batterman, and R. Bray (Univ. Wisconsin, Madison, Wis.). *J. Home Econ.* 45, 660-62(1953). It is recommended for home treatment of lard that 5% hydrogenated vegetable shortening and a little cream of tartar be added. It is suggested that no antioxidants be added to pork sausage, fish, or chicken prior to freezing.

Surface tension and viscosity in fats which become rancid. Leoncio Romero A. (Univ. Chile, Santiago). *Tesis quim, Univ. Chile* 2, 62-76(1950). Olive (com. edible), cod-liver (light and dark), castor, and linseed oils were observed for 4 months during which they were exposed only to artificial light for several hours. Storage temperature was 12-13.5°. The d. and viscosity (Stokes method) increased. A relation between d. and viscosity was evident only with castor and cod-liver oils. (*C. A.* 47, 7233)

Cottonseed oil by alcohol extraction. Y. K. Raghunatha Rao. *Oils and Oilseeds J.* 4(6), 10-11(1953). Whole cottonseed is crushed between rolls, lint and hulls screened out and the powdered kernel extracted with hot ethanol. Cooling the extract to room temperature causes oil of high quality to separate from the alcohol solution which retains most of the gossypol and other pigments, fatty acids, etc. After stripping, the oil had a Lovibond color of 24Y-3.5R and a fatty acid content of 0.3-0.4%. The meal was superior to hexane extracted meal because of its lower gossypol content. Advantages reported for the alcohol extraction compared with the usual hexane extraction process include need for less equipment, lower costs for solvents and refining, and higher quality of oil and meal.

Whale oil is now produced in factory ships. P. B. Cream. *Canadian Chemical Processing* 37, No. 13, 42(1953). A discussion of production of whale oil with the main emphasis on the overall historical discussion of modern whale oil production.

Ethyl oleate as a solvent for injectable solutions. F. Gialdi and R. Ponci (Univ. Pavia). *Farmaco, Ed. prat.* (Pavia), 8, 123-7(1953). A general discussion. (*C. A.* 47, 6605)

Demargarinization of cottonseed oil. P. D. Kupchinskii. *Masloboino Zhirovaya Prom.* 18(2), 8-11(1953). The removal of the solids from cottonseed oil is not affected by ordinary cooling to crystallization temperature; hence, rapid chilling is advisable. During the crystallization period it is best that a 1° temperature differential be maintained between the oil and the cooling agent. If the gradient is too great the precipitate is gelatinous and unfilterable. The initial crystallization is best done at about 6°; at 1-2° the solid is very difficult to filter. The 2nd crystallization is best done at 2.5-3.5°, the entire process taking 18-24 hrs. The solid removed amounted to 12-23% of the charge and contained some 38% saturated fatty acids. The liquid fractions contain some 20% saturated fatty acids. A flow sheet for the process is given. (*C. A.* 47, 7237)

Glycerol in hair preparations. Robert A. Stetson. *Am. Perfumer Essent. Oil Rev.* 61, 285-8(1953). The role of glycerol as a humectant, vehicle, solvent, bodying agent, emollient, lubricant, softener, and depressant in shampoos, brilliantines, and hair-treating creams is discussed. (*C. A.* 47, 6609)