1116. THE BODY FATS OF THE PIG

5. COMPONENT GLYCERIDES OF PERINEPHRIC AND OUTER BACK FATS FROM THE SAME ANIMAL

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SINCE the glyceride structure of the inner back fat of a pig was investigated by observations on the composition of the fatty acids present after it had been hydrogenated to a number of stages culminating in complete saturation [Hilditch & Stainsby, 1935], a method of more precise determination of the component glycerides present in a solid natural fat has been developed. This procedure, which depends on preliminary resolution of the original fat into several mixtures of less complexity by systematic crystallization from acetone, has already been applied by Hilditch & Paul [1938] to the study of an ox depot (perinephric) fat. We have now taken the opportunity afforded by the possession of sufficient quantities of perinephric and outer back fats from a pig reared on a known diet at the Animal Nutrition Institute, Cambridge, to undertake similar studies of the glycerides present therein.

EXPERIMENTAL

The procedure employed was described in full in the previous communication on an ox depot fat [Hilditch & Paul, 1938], to which reference may be made. The essential data from which the probable component glycerides are deduced will therefore be tabulated in as condensed a form as possible, and description of the methods followed may be confined to the following general statement:

(a) The pig fats (*ca.* 1200 g.) were each systematically crystallized from acetone (similarly to the ox depot fat for which a full description was given) and finally grouped into three or four fractions by uniting sub-fractions of similar iodine value.

(b) The component acids in each fraction were determined by ester-fractionation.

(c) The amounts of fully saturated glycerides present in the two fractions from each fat most sparingly soluble in acetone were determined by oxidation of a portion of each fraction with KMnO_4 in acetone solution. When sufficient fully saturated glycerides (10 g. or more) were available, their component acids were determined by ester-fractionation; otherwise, the latter were calculated as mixtures of palmitic and stearic acids from the observed equivalent of the fully saturated glycerides.

(d) In the fractions most soluble in acetone (in which the di- and tri-unsaturated glycerides are concentrated), the amount of tri- C_{18} glycerides was determined, in the form of tristearin, by a method which differed slightly from that previously employed. A portion (*ca.* 200–250 g.) of the fraction was completely hydrogenated and the whole of the product separated by crystallization

from anhydrous ether into several sub-fractions, in each of which the component acids were determined by ester-fractionation. The component glycerides in each sub-fraction were then calculated as binary mixtures of tristearin and palmitodistearin, or of palmitodistearin and dipalmitostearin, according to the proportions of palmitic and stearic acid found, whence the tristearin content of the hydrogenated product, and therefrom the proportionate amount of tri- C_{18} glycerides in the whole fat present in the most soluble fractions, were obtained. This procedure, although much more lengthy than the sole determination of the saponification equivalents of the fractions of hydrogenated product separated by crystallization from ether, is believed to give more reliable results.

The whole of the data thus accumulated permit the component glycerides present in each fraction of the original fat to be grouped, according to the proportions of palmitic, stearic and unsaturated C_{18} acids present, into (a) dipalmitomono- C_{18} glycerides, palmitodi- C_{18} glycerides, and tri- C_{18} glycerides, and (b), fully saturated, mono-unsaturated-disaturated, di-unsaturated-mono-saturated, and tri-unsaturated glycerides. From the proportions of these classes of glycerides, the individual components in each fraction of the original fat can be deduced, usually within close limits.

As in the case of the ox depot fats, pig fats contain small quantities of several acids which, for the present purpose, have to be included with one or other of the major component acids. The minor amounts of lauric, myristic, tetradecenoic and hexadecenoic acids are included with palmitic, arachidic (when present) with stearic, and octadecadienoic and unsaturated C_{20-22} acids are similarly included in the "oleic" group. The minor component acids of pig fats, other than octadecadienoic (*ca.* 5%), together form about 5% of the total fatty acids, as compared with somewhat more (*ca.* 7%) in ox fats. As pointed out by Hilditch & Paul [1938], the consequent probable presence of about 15% of triglycerides containing one of these minor component acyl groups in their molecules does not seriously affect the conclusions reached as regards the distribution of saturated non- C_{18} and stearic acids in the mixed glycerides of the fats, whilst the great preponderance of palmitic acid over the other saturated non- C_{18} acids entails that components defined as "palmito"-glycerides are in fact for the most part compounds of palmitic acid.

The fats studied in the present work were mainly from a single pig (no. 73) which had been reared for 16 weeks from weaning on a low plane of nutrition, and subsequently to 200 lb. live weight on a high plane of nutrition [cf. Hilditch *et al.* 1939]. The perinephric fat used was entirely from this animal, but in order

Table 1. *Component acids of the perinephric and outer back pig fats studied*

	Outer back fats							
	Perinephric		(no. 73)				Mixture used	
	(no. 73)		(no. 73)		(no. 74)		(calc.)	
	% (wt.)	% (mol.)	% (wt.)	% (mol.)	% (wt.)	% (mol.)	% (wt.)	% (mol.)
Lauric	0.3	0.3	Trace	—	—	—	—	—
Myristic	0.8	1.0	1.1	1.4	1.3	1.6	1.2	1.5
Palmitic	30.4	32.4	28.2	30.2	28.3	30.2	28.3	30.2
Stearic	17.9	17.2	13.5	13.0	11.9	11.5	12.9	12.5
Tetradecenoic	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Hexadecenoic	1.5	1.7	2.4	2.6	2.7	2.9	2.5	2.7
Oleic	41.2	39.9	47.0	45.4	47.5	46.0	47.2	45.6
Octadecadienoic	5.7	5.6	5.2	5.1	6.0	5.8	5.4	5.3
Unsaturated C_{20-22}	2.1	1.8	2.4	2.1	2.1	1.8	2.3	2.0

to obtain 1200 g. of outer back fat it was necessary to mix 800 g. of fat from pig no. 73 with 400 g. of the outer back fat of pig no. 74, which had been fed throughout on the high plane of nutrition, but which contained almost exactly the same component acids as the outer back fat of pig no. 73. The component acids of the fats studied are given in Table 1.

Glyceride structure of the perinephric fat

Systematic crystallization from acetone yielded finally four groups of fractions, the proportions, characteristics and component acids of which are given in Table 2.

Table 2. *Fractions (A, B, C, D) separated by crystallization of the perinephric fat from acetone*

	A		B		C		D	
Wt. of fraction (g.)	252.8		335.1		65.2		568.8	
I.v.	21.5		36.8		62.1		73.8	
Sap. equiv.	285.4		283.3		285.1		287.2	
Glycerides % (wt.)	20.7		27.4		5.3		46.6	
Glycerides % (mol.)	20.7		27.6		5.3		46.4	
	% (wt.)	% (mol.)	% (wt.)	% (mol.)	% (wt.)	% (mol.)	% (wt.)	% (mol.)
Component acids:								
Lauric	—	—	0.7	1.0	—	—	0.4	0.5
Myristic	—	—	1.2	1.4	2.1	2.5	1.4	1.7
Palmitic	35.6	37.9	34.6	36.6	28.0	29.8	23.5	25.1
Stearic	41.0	39.4	29.1	27.7	5.7	5.5	3.3	3.2
Tetradecenoic	—	—	0.8	0.9	0.5	0.6	0.3	0.4
Hexadecenoic	1.3	1.4	1.0	1.1	3.3	3.5	2.4	2.6
Oleic	20.7	20.0	30.1	28.9	53.4	51.5	57.1	55.5
Octadecadienoic	1.4	1.3	2.5	2.4	5.1	4.9	8.9	8.7
Unsaturated C ₂₀₋₂₂	—	—	—	—	1.9	1.7	2.7	2.3

The fully saturated glycerides present in the less soluble fractions A and B were determined, together with their component acids, with the results shown in Table 3.

Table 3. *Fully saturated glycerides present in fractions A and B of the perinephric fat*

	A		B	
Wt. of fraction oxidized (g.)	100.8		104.1	
Wt. of crude F.S.G. (g.)	35.3		5.0	
I.v. of crude F.S.G.	0.5		2.6	
Sap. equiv. of crude F.S.G.	283.5		279.1	
Acid value of crude F.S.G.	1.7		1.8	
% (wt.)	33.6		4.3	
% (mol.)	33.8		4.3	
	% (wt.)	% (mol.)	% (wt.)	% (mol.)
Component acids:				
Myristic	3.5	4.2	—	—
Palmitic	37.8	39.9	67.8	70.2
Stearic	58.7	55.9	32.2	29.8

In the most soluble fraction D the tri-C₁₈ glycerides were determined by the procedure outlined on p. 971. The portion (124.7 g.) of the hydrogenated fraction D (198.9 g.) least soluble in ether (62.7 % wt. or 62.3 % mol.) contained the following proportions of component acids: myristic 0.3, palmitic 24.4, stearic 72.1, C₂₀₋₂₂ 3.1 and oleic 0.1 % (mol.), from which it was estimated to contain

25.9% (mol.) of tri- C_{18} glycerides (including the C_{20-22} group), corresponding to 16.1% (mol.) of tri- C_{18} glycerides in fraction D, or to 7.5% (mol.) in the whole fat. (The more soluble fractions contained respectively 62.0, 42.5 and 46.1% (mol.) of stearic acid, indicating that tri- C_{18} glycerides were not present therein.)

The probable component glycerides in fractions A, B and D have been deduced (by the reasoning described in previous papers) from the foregoing data, whilst those in the small fraction C (insufficient in quantity for more than component acid determination) have been calculated arbitrarily from the proportions of its component acids. The final results are assembled in Table 4. In the case of fraction D alternative possibilities lead to the limiting values indicated for "oleo"-palmitostearin, palmitodi-"olein", steardi-"olein" and tri-"olein".

Table 4. *Probable component glycerides (% mol.) present in the constituent fractions and in the whole pig perinephric fat*

	A		B		C	D	Whole fat
Glycerides	20.7		27.6		5.3	46.4	100.0
Component acids (increments):							
Lauric	—		0.3		—	0.2	0.5
Myristic	—		0.4		0.1	0.8	1.3
Palmitic	7.8		10.1		1.6	11.6	31.1
Stearic	8.2		7.6		0.3	1.5	17.6
Tetradecenoic	—		0.2		Trace	0.2	0.4
Hexadecenoic	0.3		0.3			0.2	1.2
Oleic	4.1		8.0		2.7	25.8	40.6
Octadecadienoic	0.3		0.7		0.3	4.0	5.3
Unsaturated C ₂₀₋₂₂	—		—		0.1	1.1	1.2
	F.S.G. Mixed		F.S.G. Mixed				
Groups of component acids (increments):							
C ₁₆ (+ C ₁₄ , C ₁₂)	3.1	5.0	1.1	10.2	1.9	14.0	35.3
Stearic	3.9	4.3	0.5	7.1	0.3	1.5	17.6
"Oleic" (+ C ₂₀₋₂₂)	—	4.4	—	8.7	3.1	30.9	47.1
Groups of component glycerides (increments):							
Tripalmitin	—	—	0.1	—	—	—	0.1
Dipalmitomono-C ₁₈	2.3	1.4	1.5	4.6	0.4	3.1	13.3
Palmitodi-C ₁₈	4.7	12.3	—	21.4	4.9	35.8	79.1
Tri-C ₁₈	—	—	—	—	—	7.5	7.5
Fully saturated	7.0	0.5	1.6	—	—	—	9.1
Mono-"oleo"-disaturated	—	13.2	—	26.0	1.4	7.6-3.1	48.2-43.7
Di-"oleo"-monosaturated	—	—	—	—	3.9	31.3-40.3	35.2-44.2
Tri-"olein"	—	—	—	—	—	7.5-3.0	7.5-3.0
Probable component glycerides							
Fully saturated (9.1 %):							
Tripalmitin	—	—	0.1	—	—	—	0.1
Dipalmitostearin	2.3	0.5	1.5	—	—	—	4.3
Palmitodistearin	4.7	—	—	—	—	—	4.7
Mono-"oleo"-disaturated (48.2-43.7 %):							
"Oleo"-dipalmitin	—	0.9	—	4.6	0.4	3.1	9.0
"Oleo"-palmitostearin	—	12.3	—	21.4	1.0	4.5-Nil	39.2-34.7
"Oleo"-distearin	—	—	—	—	—	—	—
Di-"oleo"-monosaturated (35.2-44.2 %):							
Palmitodi-"olein"	—	—	—	—	3.9	31.3-35.8	35.2-39.7
Stearodi-"olein"	—	—	—	—	—	Nil-4.5	Nil-4.5
Tri-"olein" (7.5-3.0 %)	—	—	—	—	—	7.5-3.0	7.5-3.0

Glyceride structure of the outer back fat

Three groups of fractions were finally obtained by systematic crystallization of the outer back fat (67 % from pig no. 73, and 33 % from pig no. 74) from acetone; these had the characteristics shown in Table 5.

Table 5. *Fractions (A, B, C) separated by crystallization of the outer back fat from acetone*

	A		B		C	
Wt. of fraction (g.)	177.3		243.0		780.7	
I.V.	25.0		36.2		74.1	
Sap. equiv.	285.9		285.9		286.9	
Glycerides % (wt.)	14.8		20.2		65.0	
Glycerides % (mol.)	14.8		20.3		64.9	
	% (wt.) % (mol.)		% (wt.) % (mol.)		% (wt.) % (mol.)	
Component acids:						
Myristic	—	—	0.1	0.1	1.7	2.0
Palmitic	34.8	37.1	34.2	36.4	23.2	24.8
Stearic	38.6	37.2	30.4	29.2	3.7	3.6
Tetradecenoic	—	—	—	—	0.3	0.4
Hexadecenoic	0.7	0.8	1.7	1.9	2.8	3.1
Oleic	22.5	21.8	28.2	27.3	55.7	54.1
Octadecadienoic	2.2	2.1	4.0	3.9	9.5	9.3
Unsaturated C ₂₀₋₂₂	1.2	1.0	1.4	1.2	3.1	2.7

The fully saturated glycerides (and their component acids) present in the less soluble fractions A and B were found to be as indicated in Table 6.

Table 6. *Fully saturated glycerides present in fractions A and B of the outer back fat*

	A		B	
Wt. of fraction oxidized (g.)	101.6		133.4	
Wt. of crude F.S.G. (g.)	31.4		5.7	
I.V. of crude F.S.G.	0.5		1.1	
Sap. equiv. of crude F.S.G.	281.1		271.3	
Acid value of crude F.S.G.	1.9		4.7	
% (wt.)	29.7		4.0	
% (mol.)	30.2		4.2	
	% (wt.) % (mol.)		% (wt.) % (mol.)	
Component acids:				
Myristic	6.5	7.6	—	—
Palmitic	39.0	41.0	91.4	92.2
Stearic	54.5	51.4	8.6	7.8

A portion of the most soluble fraction C (251.4 g.), after complete hydrogenation, yielded three fractions by crystallization from ether, the component acids in the least soluble of which (177.4 g.; i.e. 70.6 % wt. or 70.4 % mol.) were myristic 1.1, palmitic 25.1, stearic 71.3, C₂₀₋₂₂ 2.4, and oleic 0.1 % (mol.). (The more soluble fractions contained 60.5 and 56.2 % (mol.) of stearic acid, indicating that tri-C₁₈ glycerides were not present therein.) The data correspond with 21.4 % (mol.) of tri-C₁₈ glycerides (including the C₂₀₋₂₂ group) in the least soluble fraction of the hydrogenated portion C, and, accordingly, with 15.0 % (mol.) of tri-C₁₈ glycerides in the whole fraction C, and with 9.8 % (mol.) in the whole outer back fat.

Consideration of all the data then lead to the final estimates of component glycerides in each of the fractions A, B and C given in Table 7; as in the previous

case, alternative possibilities for some of the components in the most soluble fraction lead to possible values varying within the limits of a few units per cent. for "oleo"-palmitostearin, palmitodi-"olein", stearodi-"olein" and tri-"olein".

Table 7. *Probable component glycerides (% mol.) present in the constituent fractions and in the whole pig outer back fat*

	A	B	C	Whole fat
Glycerides	14.8	20.3	64.9	100.0
Component acids (increments):				
Myristic	—	Trace	1.3	1.3
Palmitic	5.5	7.4	16.1	29.0
Stearic	5.5	5.9	2.4	13.8
Tetradecenoic	—	—	0.2	0.2
Hexadecenoic	0.1	0.4	2.0	2.5
Oleic	3.2	5.6	35.1	43.9
Octadecadienoic	0.3	0.8	6.1	7.2
Unsaturated C ₂₀₋₂₂	0.2	0.2	1.7	2.1
	F.S.G. Mixed		F.S.G. Mixed	
Groups of component acids (increments):				
C ₁₆ (+ C ₁₄)	2.2	3.4	0.8	7.0
Stearic	2.3	3.2	0.1	5.8
"Oleic" (+ C ₂₀₋₂₂)	—	3.7	—	6.6
Groups of component glycerides (increments):				
Tripalmitin	—	—	0.6	—
Dipalmitomono-C ₁₈	2.1	—	0.3	1.6
Palmitodi-C ₁₈	2.4	10.3	—	17.8
Tri-C ₁₈	—	—	—	9.8
Fully saturated	4.5	—	0.9	—
Mono-"oleo"-disaturated	—	9.6	—	19.0
Di-"oleo"-monosaturated	—	0.7	—	0.4
Tri-"olein"	—	—	—	9.8-2.8
Probable component glycerides				
Fully saturated (5.4%):				
Tripalmitin	—	—	0.6	—
Dipalmitostearin	2.1	—	0.3	—
Palmitodistearin	2.4	—	—	—
Mono-"oleo"-disaturated (39.4-32.4%):				
"Oleo"-dipalmitin	—	—	—	1.6
"Oleo"-palmitostearin	—	9.6	—	17.4
"Oleo"-distearin	—	—	—	—
Di-"oleo"-monosaturated (45.4-59.4%):				
Palmitodi-"olein"	—	0.7	—	0.4
Stearodi-"olein"	—	—	—	—
Tri-"olein" (9.8-2.8%)	—	—	—	—

DISCUSSION

The present data offer for the first time an opportunity to compare the component glycerides of fats of different mean unsaturation present in different fat depots of one and the same animal. They thus form a useful basis for further consideration of the suggestion [Hilditch & Sleightholme, 1931; Banks & Hilditch, 1932; Hilditch, 1937, 1, 2; Hilditch & Paul, 1938] that stearo-glycerides in stearic-rich animal depot fats have resulted from saturation of preformed oleo-glycerides. At the same time, the procedure used in the present work has defined the glyceride components of the pig fats within much closer limits than was possible by earlier methods, such as that of progressive hydrogenation employed by Hilditch & Stainsby [1935]. Both these points are illustrated in

Table 8, in which are given (to the nearest unit) the component glycerides observed in the present work on pig perinephric and outer back fats, by Hilditch & Paul in ox depot fat, and in the earlier work of Hilditch & Stainsby on a pig inner back fat; the stearic acid content of the total fatty acids from each fat is also given.

Table 8. *Component glycerides of pig and ox depot fats (% mol.)*

Fat	(Hilditch & Stainsby [1935]) Pig, inner back	Present investigation		(Hilditch & Paul [1938]) Ox, perinephric
		Pig, outer back	Pig, perinephric	
% Stearic acid in total acids	14.4	13.8	17.6	22.6
Component glycerides				
Fully saturated:				
Tripalmitin	—	1	—	3
Dipalmitostearin	3	2	4	8
Palmitodistearin	2	2	5	6
Mono-"oleo"-disaturated:				
"Oleo"-dipalmitin	2	5	9	15
"Oleo"-palmitostearin	36-21	34-27	39-34	35-32
"Oleo"-distearin	—	—	—	2
Di-"oleo"-monosaturated:				
Palmitodi-"olein"	42-57	46-53	35-40	20-23
Stearodi-"olein"	0-15	0-7	0-5	8-11
Tri-"oleins"	15-0	10-3	8-3	3-0

Comparison of the first column in Table 8 with the remaining three columns (the data in which are based on our current procedure of preliminary crystallization of the fats from acetone) shows that the possible limits for the proportions of "oleo"-palmitostearin, palmitodi-"olein", "stearodi-"olein" and tri-"oleins" have been considerably narrowed. The remaining uncertainty, amounting to 3-7 units %, is due entirely to the difficulty, still inherent in the experimental method, of distinguishing between stearodi-"olein" and tri-"oleins" in the more liquid and soluble fractions of the fat. The possible limits are nevertheless sufficiently near in each case to justify the claim that a practically complete statement of the component glycerides in animal depot fats can now be given.

In the perinephric and outer back fats of the pig studied in the present work "oleo"-palmitostearins and palmitodi-"oleins" are the chief components, and in each case amount together to about 75-80 % of the whole fats. In the more unsaturated outer back fat, palmitodi-"oleins" form about half of the fat and considerably exceed in amount the "oleo"-palmitostearins; but in the perinephric fat the proportion of each group is of the same order (whilst in the more saturated ox depot fat there is more "oleo"-palmitostearin than palmitodi-"olein"). Small amounts (3 %) of tri-unsaturated C₁₈ glycerides are definitely present in both pig fats, and the proportion may be greater according to whether stearodi-"oleins" are also present; the total amount of these tri-C₁₈ glycerides is of the order of 8-10 % in each fat. The remaining glyceride components, although significant, are individually of a minor order.

The present data, in conjunction with those for the ox depot fat, give some further insight into the possible hydrogenation mechanism of the production of animal depot glycerides which are relatively rich in combined stearic acid. The suggestion that hydrogenation of preformed oleo-glycerides in the animal

may be involved was originally based [Banks & Hilditch, 1932] on the facts that abnormal increase in the content of fully saturated glycerides accompanies increasing proportions of stearic acid in the total fatty acids of these animal depot fats, whilst the content of the other major component saturated acid, palmitic acid, remains approximately constant at about $30 \pm 3\%$ (mol.) [Hilditch & Longenecker, 1937]. These phenomena are well illustrated by the figures for the present pig outer back and perinephric fats, and the ox perinephric fat, in which (whilst the palmitic acid contents are respectively 29.0, 31.1 and 32.2 % mol.) the stearic acid contents steadily increase (respectively 13.8, 17.6 and 22.6 % mol.) and correspondingly the fully saturated glycerides were found to amount to 5, 9 and 17 % (mol.) of the whole fat.

The present study enables us to show in addition, however, that there is a corresponding relationship between the palmitodiolein, oleopalmitostearin and palmitodistearin groups in each fat; and, to a less marked extent, between the proportions of oleodipalmitin and dipalmitostearin in each fat. In the most unsaturated of the three fats (pig outer back fat), palmitodioleins exceed oleopalmitostearins in amount; in the pig perinephric fat the amount of each is approximately the same, and in the ox perinephric fat (which contains nearly 23 % of stearic acid), palmitodioleins are present in much less proportion than the oleopalmitostearins. The major component glycerides (75–80 %) of the fats, therefore, consist of palmitodi- C_{18} glycerides, the relative proportions of oleopalmitostearin and palmitodiolein in which (like the fully saturated glyceride contents of the fats) run parallel with the stearic acid contents of the whole fats. This of course is fully consistent with, and additional evidence in favour of, the hypothesis of saturation of preformed oleo-glycerides which we have previously put forward.

At the same time, whilst this is the most prominent feature of these comparative studies of ox and pig depot glyceride structure, the detailed data available for the two pig fats now studied and for the ox depot fat disclose a subordinate phenomenon. With increasing general saturation (i.e. as already shown, increase in stearic at the expense of oleic acid in the fats as a whole) there is a minor, but definite increase in the amount of dipalmitomono- C_{18} glycerides (in the three fats, respectively, these amount to 7, 13 and 23 % mol.), although the content of tri- C_{18} glycerides does not alter significantly. This may in part be correlated with the slight increase (with decreasing mean unsaturation of the whole fats) in palmitic acid content within the range of $30 \pm 3\%$ (mol.), but, in the ox fat, is also due to the higher proportions of the minor component, myristic acid (which is grouped with palmitic acid in the present experimental studies of glyceride structure). The present data, however, point definitely to the presence of subordinate changes in glyceride structure, following decrease in general unsaturation of the depot fats, which stand outside the conception of hydrogenation of preformed oleo-glycerides; the latter hypothesis, however, satisfactorily accounts for the main features which are characteristic of the glyceride structure of stearic-rich animal depot fats.

Finally, it may be recalled that, in the ox depot fat, the proportions of "oleo"-dipalmitin, "oleo"-palmitostearin, palmitodi-"olein" and steardi-"olein" obtained by an arithmetical calculation, based (after allowance for the fully saturated glycerides present) upon proportionate division of the "oleic" acid between the palmitic and stearic acids present in the form of mixed "oleo"-saturated glycerides, were extremely close to those actually observed. In the two pig fats now under consideration, a similar calculation leads in each case to values which differ somewhat widely from the observed figures for "oleo"-

dipalmitin, "oleo"-palmitostearin and stearodi-"olein", although they are closer to the latter in the case of palmitodi-"olein" (calculated, outer back fat 43 %, perinephric fat 32 % mol.). The accordance in these "calculated" and observed figures in the case of the ox depot fat glycerides may therefore have been merely a coincidence.

SUMMARY

Specimens of outer back and perinephric fats from the same pig have been studied after resolution into several fractions of varying degrees of solubility in acetone, with results leading to an approximate statement of the proportions of each of the major component mixed glycerides present in each fat. The approximate molar percentages of the main components were:

	Outer back fat % (mol.)	Perinephric fat % (mol.)
Palmitodi-"olein"	46-53	35-40
"Oleo"-palmitostearin	34-27	39-34
"Oleo"-dipalmitin	5	9
Stearodi-"olein"	0-7	0-5
Tri-"oleins"	10-3	8-3
Fully saturated glycerides	5	9

The proportions of the respective groups of tri-"olein", palmitodi-"olein", "oleo"-palmitostearin, and of the fully saturated glycerides in each pig fat, together with those in an ox perinephric fat previously studied [Hilditch & Paul, 1938], form a series which strongly supports the hypothesis that stearo-glycerides in these animal depot fats have resulted from saturation of preformed oleo-glycerides. Concurrently, the three groups of observations disclose a subordinate effect not connected with a hydrogenation mechanism, namely, a gradual increase in the proportions of dipalmito-glycerides as the general degree of saturation of the depot fats becomes more pronounced.

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