

PART X. THE OIL FROM THE SEEDS OF HOLARRHENA ANTIDYSENTERICA.

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During the extraction of the alkaloid, conessine, from the seeds of *H. antidysenterica* (*Journ. Chem. Soc.*, 1926, 2123) it was observed that the seeds contained an oil, and a considerable quantity having been obtained it appeared a desirable subject for detailed examination. The oil was present in the seeds to the extent of 19 per cent. and was a drying oil.

EXPERIMENTAL.

The oil was extracted from the finely ground seeds with light petroleum and was quite free from alkaloidal impurities. It had the following constants :—

TABLE I.

d_{15}^{15}	...	...	...	...	...	...	...	0.9354
n_D^{20}	...	...	...	...	...	...	...	1.4666
Acid value...	...	...	...	...	...	...	...	36.1
Saponification value	...	...	...	...	...	...	...	180.5
Unsaponifiable matter	...	...	...	...	...	...	...	3.5 per cent.
Acetyl value	...	...	...	...	...	...	...	22.9
Iodine value	...	...	...	...	...	...	...	149.1
Reichert-Meisel value	...	...	...	...	...	...	...	1.7
Reichert-Polenske value	...	...	...	...	...	...	...	0.4
Rehner value	...	...	...	...	...	...	...	94.3

After saponification the oil gave a mixture of fatty acids with the properties given in Table II.

TABLE II.

n_D^{60}	...	...	...	...	...	...	...	1.4597
Iodine value	...	...	...	...	...	...	...	151.3
Titre test	...	...	...	...	...	...	...	24.7°
M. W.	...	...	...	...	...	...	...	283.8

The mixed fatty acids were separated by the Twitchell process (*loc. cit.*) and the results are summarised in Table III.

TABLE III.

—			Saturated Acids (14·4 per cent.)	Unsaturated Acids (85·3 per cent.)
n_D^{60}	...	...	1·4484	1·4616
Iodine value	...	...	2·8	180·0
M. W.	...	...	290·0	280·0

The Unsaturated Acids.—The acids present in the mixture of liquid acids were identified by Jamieson and Boughman's process (*loc. cit.*) and were found to consist of a mixture of linolic acid (63·9 per cent.), linolenic acid (11·6 per cent.) and oleic acid (24·5 per cent. by difference). The bromination results from which these percentages were calculated are given in Table IV, and are in good agreement with the iodine value (180) since a mixture of acids in the proportions given above would have an iodine value of 179.

TABLE IV.

Bromo-derivatives of the Unsaturated Acids.

Quantity brominated	...	...	3·58 g	4·93 g
Yield of di- and tetrabromo-acids	...	...	6·11 g	8·45 g
Yield of hexabromo-acid	...	...	1·14 g	1·54 g
Br ₂ in crude bromo-acid	...	...	48·2 per cent.	48·3 per cent.
M. P. of tetrabromo-acid	...	...	112-113°	112-113°
M. P. of hexabromo-acid	...	...	179-180°	179-180°

The Saturated Acids.—The separation of the saturated acids was effected by distillation of the methyl esters, composition of the various fractions being determined in the usual manner.

The ester fractions 1-6 were hydrolysed and the acids examined. No evidence was found of the presence of any acids other than palmitic and stearic. Assuming the presence of these two acids the percentage composition of the mixed esters as determined from the titre of the ester, etc. and shown in columns VII, VIII, IX and X of the table are in fair agreement. Fraction 7 was nearly pure methyl stearate, but from fraction 8 an acid of m.p. 65°, M.W. 303 was separated. This acid was not homogeneous and since from fraction 9 it was found possible to separate lignoceric acid, m.p. 80°,

TABLE V.

No. of Fraction	J B.P. (8 mm.)	II Yield per cent.	III M. W. of ester	IV Titre of ester	V M. P. of acid	VI Titre of acid	VII	VIII	IX	X
							Percentage of stearic acid calculated from			
							III	IV	V	VI
1	below 180°	13.9	273.3	23.8°	57-57.5°	..	12.0	16.0	19.0	...
2	180-182°	14.0	278.2	24.8°	55-55.5°	54.8°	29.0	28.0	30.0	30.0
3	182-185°	8.4	280.5	25.9°	56-56.5°	55.4°	37.5	35.0	36.0	35.0
4	185-188°	11.4	283.3	26.8°	56.5-56.8°	56°	47.5	45.0	50.0	40.0
5	189-193°	8.8	284	27.2°	56.6-57.2°	56.4°	50.0	48.5	52.0	50.0
6	195-198°	13.8	295.0	31.6°	67.3-67.8°	65.8°	90.0	80.0	89.0	87.0
7	203-208°	7.5	301.6	32.0°	63.5-64°	...	96.0†	...	...	...
8	208-215°	2.8	305.5	33.8°	62-62.5°	...	91.0†	...	...	...
9	Residue	19.4	346.2*	..	63.5-64°	...	33.0†	...	...	...

* This is the M. W. of the acid and not of the methyl ester.

† These are assumed to be mixtures of stearic and lignoceric acids.

M.W. 366.6, we have assumed it to be a mixture of stearic and lignoceric acids.

From the above results the mixed saturated acids have the following composition:—palmitic acid (39.1 per cent.), stearic acid (47.4 per cent.) and lignoceric acid (13.5 per cent. by difference).

Unsaponifiable Matter.—The unsaponifiable matter (3.5 per cent.) yielded on treatment with digitonin a sterol (17.4 per cent.). This was identified as phytosterol by the preparation of the acetyl derivative, m.p. 119–120°.

SUMMARY.

The seeds of *H. Antidysenterica* contain 19 per cent. of a drying oil composed of the glycerides of the following acids:—linolenic acid (10 per cent.), linolic acid (54.7 per cent.), oleic acid (21 per cent.), palmitic acid (5.6 per cent.), stearic acid (6.8 per cent.) and lignoceric acid (1.9 per cent.).

The unsaponifiable matter (3.5 per cent.) contains phytosterol (17.4 per cent.).