On the Composition of "Akebi" Seed Oil.

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In Japan, "Akebi" seed oil is used for food locally in Iwate Prefecture, and the analytical constants of this oil have hitherto been reported by S. Uchida.[1] This oil has a peculiar characteristic, which is of extraordinarily high Reichert-Meissl value, but we have not any researches on the composition of it. The present authors have made a thorough examination on this oil, with the results that palmitic, stearic, oleic and linoleic acids were separated, and the presence of acetic acid was also confirmed.

I. The Seed Oil of "Mituba Akebi" (*Akebia lobata*, Decne.). The fruits of "Mituba Akebi", which ripen in October, are shown in Fig. 1. They contain numerous small black seeds as shown in Fig. 2, and 50 grains of the latter weigh 1.3 g. on the average.

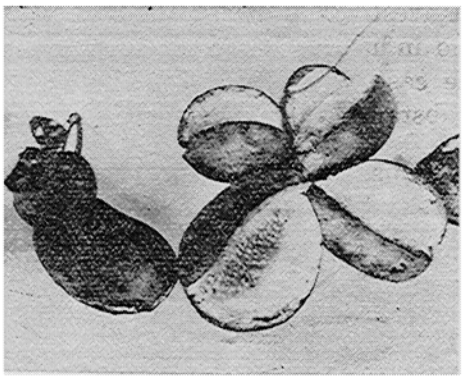

Fig. 1. Fruits of "Mituba Akebi."

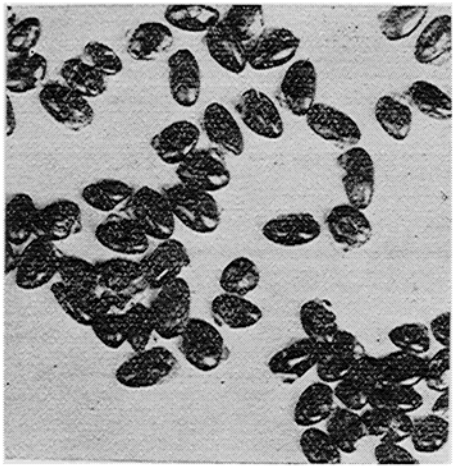

Fig. 2. Seeds of "Mituba Akebi" (life-size).

The seeds (350 g.) were ground, and by ether extraction, light yellow oil (97 g.) was obtained. The oil had the following characteristics: n_D^{20} 1.4652, d_4^{20} 0.9326, acid value 6.6, saponification value 254.9, iodine value

(1) *J. Soc. Chem. Ind.*, **35** (1916), 1091; *J. Soc. Chem. Ind., Japan*, **19** (1916), 33.

78.6, and Reichert-Meissl value 49.3. The sample oil (76 g.) was saponified and after the removal of unsaponifiable matter (0.7715 g.) by ether extraction, the soap solution was decomposed with dilute hydrochloric acid and mixed fatty acids (57 g.) were obtained.

(1) *Water soluble part.* The acidic solution, obtained by the decomposition of soap solution, was concentrated under reduced pressure after neutralisation. The concentrated solution was acidified, saturated with common salt, and extracted with large quantity of ether. The extracted substance had an irritative odour like acetic acid, and distilled at 108–114° under the ordinary pressure. The distilled substance was converted into *p*-bromophenacyl ester, two crystallisations from 75% ethyl alcohol gave an ester, m.p. 85.5–86°, which showed no depression of melting point when mixed with pure acetice acid *p*-bromophenacyl ester.

(2) *Water insoluble fatty acids.* The mixed fatty acids obtained as mentioned above formed a white semi-solid, which had n_D^{40} 1.4521, neutralisation value 203.3, iodine value 91.2. The mixed fatty acids (53 g.) were separated by the lead salt–alcohol method of Twitchell into solid and liquid portions as shown in Table 1.

Table 1.

	Yield	Neutralisation value	Iodine value
Solid acids	17.17 g. 32.4%	213.9	22.5
Liquid acids	67.6%	199.3	120.2

The solid fatty acids (15 g.) were fractionally redistilled as shown in Table 2.

Table 2.

Fraction	B.p./4 mm.	Yield (g.)	M.p.	Neutral. value	Iodine value
1	−175°	4.6	57.7–58.6°	217.4	7.6
2	175–180°	5.2	54.5–55.8°	215.2	19.4
3	180–184°	4.1	43.5–45.0°	209.0	41.3
Residue		0.8			

As the results of careful examinations of fractions 1 and 3, the authors isolated a large quantity of palmitic acid, and a small quantity of stearic acid.

The liquid acids obtained by the lead salt–alcohol method were converted into methyl esters and fractionally distilled as shown in Table 3.

Table 3.

Fraction	B.p./4 mm.	Yield (g.)	n_D^{20}	Saponif. value	Iodine value
1	176°	3.3	1.4541	190.2	112.2
2	176–177°	19.9	1.4545	189.1	116.7
3	177°	5.1	1.4550	189.4	117.5
Residue		1.1			

The saponification value of each fraction in Table 3 showed the non-existence of fatty acids having carbon numbers other than 18. In the fraction 2, oleic and linoleic acids were detected, as dihydroxystearic acid and tetrabromostearic acid respectively.

From the result of the above analysis, the mixed fatty acids of "Mituba Akebi" seed oil seemed to consist of the following composition: palmitic acid 23%, stearic acid 2%, oleic acid 53% and linoleic acid 22%.

II. The Seed Oil of "Itutuba Akebi" (*Akebia quinata*, Decne.). The seeds of "Itutuba Akebi" are comparatively larger than the seeds of "Mituba Akebi", and 50 grains of them weigh 4.03 g.

210 g. of the seeds were crashed, extracted with ether, and dark green oil (41 g.) was obtained. It had the following properties: n_D^{20} 1.4667, d_4^{20} 0.9354, acid value 2.0, saponification value 259.5, iodine value 77.3, Reichert-Meissl value 44.8, unsaponifiable matter 2.6%.

In the oil (28 g.) the existence of acetic acid was confirmed in the same way as the seed oil of "Mituba Akebi". The mixed fatty acids formed a dark green semi-solid, and their characteristics (n_D^{40} 1.4523, neutralisation value 205.1, iodine value 89.1), resembled very much those of the mixed fatty acids of "Mituba Akebi".

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