A Sterol from Apple Seeds and Cherry Seeds

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In addition to reporting some physical constants of apple seed oil, Pritzker and Jungkunz (1) mention a phytosterol acetate, melting point 122° C., which they obtained from this oil. A search of the literature, however, disclosed no report of the identification of a sterol from either apple seeds or cherry seeds (2, 3). This paper not only reports some constants of the oil extracted from these seeds, but also describes the isolation of a sterol from this oil and its characterization as sitosterol.

EXPERIMENTAL

Isolation of Sitosterol from Apple Seeds.—The apple seeds used were obtained from dried apple pomace.[1] The seeds were separated by screening, washed with water, dried and then ground in a Wiley mill. Extraction for 20 hours with Skellysolve *B* was carried out in a continuous extractor charged with 1150 Gm. of the ground material. The solvent was removed by distillation under reduced pressure and the acid number, saponification number and refractive index of the oily residue were determined (Table I).

Saponification of 200 Gm. of this oil was carried out by refluxing for 6 hours with 400 ml. of 5% alcoholic potassium hydroxide. After dilution with 400 ml. of water, the solution was extracted with Skellysolve *B*. Washing with water freed the extract of soaps. Removal of the solvent by distillation under diminished pressure yielded the unsaponifiable fraction as 3.5 Gm. of a noncrystalline residue.

This unsaponifiable fraction was taken up in ethyl alcohol and treated with a 200 cc. of a 1% digitonin solution (4). The sterol digitonide was collected upon a Büchner funnel and washed thoroughly, first with hot chloroform, then with ether. The dried residue was acetylated (5) by refluxing for one hour with acetic anhydride. Upon cooling, the sterol acetate separated as crystals. This crystalline material was collected upon a Büchner funnel, then recrystallized from acetic anhydride. A portion of the acetate was saponified by refluxing for 5 hours with 40 ml. of 5% alcoholic potassium hydroxide. The sterol, which separated as crystals upon cooling the saponification mix, was repeatedly recrystallized from absolute methanol until a constant melting point was obtained. Both the sterol and the sterol acetate were finally dried for one hour in an Abderhalden drier at 110° C. and 4 mm. pressure.

Isolation of Sitosterol from Cherry Seeds.—Red cherries, collected locally during the month of July, were used. The seeds were expressed from the fruit, sorted from injured seeds and dried. The procedure for isolation and characterization of the sterol was the same as that used in the case of apple seeds. Collected data are given in Tables I and II. It is evident that the same sterol exists in the seeds of both the apple and the red cherry.

Table I

	Apple		
	Literature (1)	Determined	Cherry
Per cent of oil in seeds	18.0	19.1	8.2
Acid number of oil	2.3	0.9	0.8
Saponification number of oil	187.7	186	189
n_D^{21}	...	1.4735	1.4744
Per cent unsaponifiables obtained	1.10	1.75	4.15

Table II

	Apple		
	Literature (1)	Determined	Cherry
Melting point of sterol acetate, ° C.	122	123	121
α_D^{31} of sterol acetate	...	−35.4	−34.8
Melting point of sterol, ° C.	...	137–138	137–138
Liebermann - Burchard Test	...	+	+
Whitby's Salkowski Test	...	+	+
Whitby's Test B	...	+	+

SUMMARY

1. Sitosterol has been isolated from both apple and red cherry seeds.

2. The refractive index, acid number and saponification number of both apple and cherry seed oil are reported.

REFERENCES

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