VOLATILE OIL IN SANDALWOOD.*

BY J. F. CLEVENGER.[1]

Sandalwood is usually imported from India. Non-official species in limited amounts have also been imported from Australia, New Caledonia Islands and Africa.

During the past six years, most of the importations of sandalwood in New York have been analyzed for the yield of volatile oil. Determinations have also been made of some of the physical and chemical characteristics of these oils.

The results here reported were obtained by the method outlined in the Methods of Analysis A. O. A. C., 4th Edition (1935), 447–449. Santalol content was determined by the method outlined in U. S. P. XI, page 267, for sandalwood oils, except that the amount of oil usually available (approx. 5 cc.) was used instead of 10 cc. as indicated in the method.

It is of interest to note that Sandalwood requires a prolonged period for distillation—approximately twenty-four hours. This period is only a fraction of that used commercially (approximately 5 days). It may be pointed out that only the last fractions of volatile oil obtained are subjected to this prolonged period of heating.

The moisture was determined by xylol distillation.

A tabulation of representative results of the determinations made follows:

Authentic Sandalwood.

Yield V/W.*	Moist.	Sp. Gr. 25°/25° C.	Op. Rot. 25° C.**	Ref. Ind. 20° C.	Santalol.
8.0	7.2	0.971	−19.0	1.505	96
5.0	6.2	0.973	−17.3	1.504	92
4.0	6.3	0.964	−18.3	1.504	93
4.0	7.5	0.968	−16.9	1.503	89
4.0	6.0	0.976	−16.2	1.503	90
7.0	6.3	0.964	−22.5	1.503	96
4.3	4.0	0.973	−16.6	1.504	94
8.2	7.3	0.974	−20.4	1.504	96
6.0	7.0	0.982	−19.7	1.507	96
6.0	7.5	0.982	−20.5	1.508	96
5.2	8.4	0.984	−18.7	1.507	94
6.5	6.4	0.976	−22.1	1.506	97
4.0	6.5	0.985	−17.3	1.506	96
4.5	5.0	0.978	−21.7	1.503	95
4.7	9.1	0.970	−19.4	1.507	97
3.5	...	0.979	−22.5	1.505	90
3.0	...	0.982	−15.9	1.506	96

Sandalwood Chips.

Yield V/W.*	Moist.	Sp. Gr. 25°/25° C.	Op. Rot. 25° C.**	Ref. Ind. 20° C.	Santalol.
1.5	4.0	0.973	−19.0	1.502	92
1.4	...	0.973	−18.0	1.503	96
3.0	...	0.973	−15.2	1.503	..
3.5	7.4	0.974	−18.0	1.505	..

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[1] U. S. Food and Drug Administration, New York, N. Y.

2.0	...	0.982	−19.4	1.507	96
3.2	...	0.978	−18.0	1.506	96
2.0	...	0.978	−20.0	1.505	..
0.8	...	0.982	−20.8	1.507	..
		Non-Official Varieties of Sandalwood.			
2.4[1]	8.4	0.983	−12.4	1.504	96
5.0[1]	8.8	0.960	− 9.3	1.509	94
3.5[1]	5.0	0.983	−13.2	1.504	96
1.2[2]	...	0.954	0.0	1.505	..
2.0[2]	...	0.954	− 9.7	1.504	..
5.0[2]	...	0.978	−14.5	1.504	96
6.0[2]	...	0.975	−14.4	1.504	..
2.5[3]	...	0.954	−38.0	1.507	87
2.0[4]	...	0.943	+12.1	1.500	49

* Cc. per 100 Gm. of sandalwood.

** Reported in angular degrees on the basis of a 100-mm. tube.

[1] Australian Sandalwood.

[2] From New Caledonia Islands.

[3] African Sandalwood.

[4] Amyris Species.

CONCLUSIONS.

1. The yield of volatile oil in authentic sandalwood was found to vary considerably, being least in sandalwood chips, the amount in some instances falling below one per cent. This low yield in volatile oil in the chips is probably due, for the most part, to the inclusion of a larger proportion of sap wood.

2. The specific gravity of the volatile oil is sometimes outside the Pharmacopœial limits (0.965 to 0.980 at 25° C.), values both above and below the specifications being noted. The optical rotation in the case of some specimens falls outside the official limits (−15° to −20° in a 100-mm. tube at 25° C.), value as high as −22.50 being observed. The refractive index for the volatile oils from both the official and non-official varieties of sandalwood are essentially identical, the entire range lying between 1.500 and 1.509.

3. The specific gravity and refractive index are of little value for the detection of non-official varieties of sandalwood. The optical rotation, on the other hand, is particularly important. In the case of the volatile oils from the nine non-official samples reported not one possessed the optical rotation within the official limits, or within the limits of the volatile oils from the authentic sandalwoods.

THE HYDROLYSIS OF MENTHYL ACETATE AND ACETYLIZED PEPPERMINT OIL. II.*

BY LAWRENCE H. BALDINGER.[1]

INTRODUCTION.

In the analysis of peppermint oil the United States Pharmacopœia directs that 50 cc. of half-normal alcoholic potassium hydroxide be used to hydrolyze the weighed sample of acetylized oil. Provided an excess of base is assured, it should

* Scientific Section, A. PH. A., New York meeting, 1937.

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