

SUMMARY.

Hydrolytic studies on a sample of cherry gum purchased on the open market were carried out. In common with all plant gums studied to date this gum was found to contain uronic acids. The aldobionic acid fraction was shown to contain galactose and unidentified methylated uronic acids.

Apparently authentic American cherry gum does not contain methoxyl.

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PITTSBURGH, PA.

PRELIMINARY INVESTIGATION OF CERTAIN PHYSICAL AND CHEMICAL PROPERTIES OF THE VOLATILE OILS FROM AUTHENTIC PLANT PRODUCTS.

BY JOSEPH F. CLEVINGER.*

This investigation was undertaken to obtain information regarding the volatile oils of plant products official in the U. S. P. and N. F. as well as of other plant products which may be used as drugs. The work has been limited chiefly to plant products regularly imported that contain appreciable quantities of volatile oil. The volatile oils present in these plant products are usually the important constituents. It is believed the following information will be valuable in suggesting volatile oil standards.

Where the amount of moisture present is reported, the determination was made by the xylool method. The distillation of the volatile oils was carried to complete exhaustion by the use of the Clevenger apparatus,¹ which may now be obtained by Emil Greiner Co., New York, N. Y.

The physical constants were determined at 20° C. The chemical characteristics were determined by methods outlined in U. S. P. X. Unless otherwise stated the products examined represented imports.

* Pharmacognosist at the New York Station Food and Drug Administration.

¹ *Jour. A. Ph. A.*, 17 (1928), 345.

Oleum Anisi.—Oils distilled from samples taken from 25 shipments of anise seed and 24 shipments of star anise fruits gave the following data:

	<i>Anise Seed.</i>		U. S. P. X.
	Limits.	Usual.	
Yield	1.6% to 3.0%	2.2%	
Specific gravity	0.982 to 1.000	Under 0.996	0.978 to 0.988
Optical rotation	-0.4° to +1.0°	0.0°	+1° to -2°
Refractive index	1.550 to 1.557	Approx. 1.554	1.554 to 1.560
Congealing temperature	+12° to +17.5° C.	+15.0 to +16.0° C.	Not below +15° C.

	<i>Star Anise Fruits.</i>	
	Limits.	Usual.
Yield	7.8% to 13.0%	9% to 10%
Specific gravity	0.977 to 1.000	Approx. 0.991
Optical rotation	-1.0° to +0.6°	0.0°
Refractive index	1.550 to 1.557	Over 1.552
Congealing temperature	+7.5° to +17.5° C.	+14° to +16° C.

Oleum Cari.—Oils distilled from samples taken from 17 shipments of caraway seed gave the following data:

	Limits.	Usual.	U. S. P. X.
Moisture (in seed)	6.0% to 12.5%	6.0%	
Yield	3.3% to 5.0%	Approx. 4.0%	
Specific gravity	0.927 to 0.942	Approx. 0.930	0.900 to 0.910
Optical rotation	+66° to +72°	Below +68°	+70° to +80°
Refractive index	1.487 to 1.493	Approx. 1.490	1.484 to 1.488
Carvone	62% to 78%	Approx. 75%	50%

Oleum Caryophylli.—Oils distilled from samples taken from four lots of cloves gave the following data:

Moisture (in buds)	5.0% to 7.5%		
Yield	15.0% to 16.6%		
Specific gravity	1.036 to 1.059		1.038 to 1.060
Optical rotation	0.0° to -0.3°		Not exceed -1°10'
Refractive index	1.530 to 1.534		1.530 to 1.535
Eugenol	96% to 98%		82%

Further work is contemplated.

Oleum Cinnamoni.—Oils distilled from samples taken from 21 shipments of Saigon Cassia, 18 shipments of China Cassia, 30 shipments East India and 8 shipments of Ceylon Cinnamon gave the following data:

	<i>Saigon Cassia.</i>		
	Limits.	Usual.	
Moisture (in bark)	8.5% to 20%	13.0%	
Yield	2.0% to 3.6%	2.5%	
Specific gravity	1.035 to 1.056	1.040 to 1.046	1.045 to 1.063
Optical rotation	-0.7° to 0.0°	0.0°	+1° to -1.0°
Refractive index	1.592 to 1.611	1.607 to 1.610	1.602 to 1.606
Cinamic aldehyde	90% to 96%	93% to 95%	80%
Nonaldehyde portion			
Acid number	4.4 to 13.9	5 to 8	
Ester number	50 to 183	80 to 163	

China Cassia.

	Limits.	Usual.	U. S. P. X.
Moisture (in bark)	12.5% to 18.0%	14.0%	
Yield	0.6% to 1.3%	0.7%	
Specific gravity	1.027 to 1.044	1.030 to 1.035	
Optical rotation	-1.7° to 0.0°	Below -0.7°	
Refractive index	1.588 to 1.604	1.595 to 1.600	
Cinamic aldehyde	81% to 90%	82% to 86%	
Nonaldehyde portion			
Acid number	10 to 35	21 to 24	
Ester number	42 to 184	84 to 89	

East Indian Cinnamon.

Moisture (in bark)	10.5% to 14.5%	12.0%
Yield	0.8% to 2.3%	1.0%
Specific gravity	1.019 to 1.037	1.027 to 1.032
Optical rotation	-1.4° to -4°	Below -2.8°
Refractive index	1.587 to 1.600	1.590 to 1.595
Cinamic aldehyde	80% to 90%	Approx. 83%
Nonaldehyde portion		
Acid number	4.6 to 13.2	6 to 8
Ester number	70 to 131	90 to 100

Ceylon Cinnamon.

Moisture (in bark)	9.5% to 17.5%	12.0%
Yield	1.0% to -1.5%	1.2%
Optical rotation	-2.4° to 0.0°	Below -0.6°
Specific gravity	1.017 to 1.034	1.021 to 1.027
Refractive index	1.579 to 1.589	1.584 to 1.587
Cinamic aldehyde	66% to 72%	Approx. 70%
Nonaldehyde portion		
Acid number	3.98 to 10.0	5.6 to 6.4
Ester number	127 to 145

Further work is contemplated in determination of acid and ester numbers on Saigon and China Cinnamons.

Oleum Coriandri.—Oils distilled from samples taken from 10 shipments of Russian and 10 shipments of Morocco coriander fruits gave the following data:

Russian Fruits.

Yield	0.6% to 1.0%	0.8%	0.5% (?) (N. F.)
Specific gravity	0.867 to 0.886	0.870 to 0.880	0.863 to 0.875
Optical rotation	+7° to +11°	Over +9°	+8° to +13°
Refractive index	1.458 to 1.466	Approx. 1.460	1.463 to 1.476

Morocco Fruits.

	Limits.	Usual.	U. S. P. X.
Yield	0.15% to 0.3%	0.2%	
Specific gravity	0.872 to 0.885	Over 0.880	
Optical rotation	+7.0 to +10.4°	Over +8.0°	
Refractive index	1.460 to 1.470	1.461	

Oleum Eucalypti.—Twenty assays of leaves imported and identified as *Eucalyptus globulus* gave the following data:

	Limits.	Usual.	U. S. P. X.
Yield	1.3% to 3.2%	2.0% to 3.0%	
Specific gravity	0.904 to 0.945	0.916 to 0.929	0.905 to 0.925
Optical rotation	-1.0° to +5.8°	0.0° to +4.0°	-10° to +10°
Refractive index	1.462 to 1.470	1.464 to 1.467	1.460 to 1.469
Freezing temperature	Below -22° C.		-15° C.

One assay of leaves from California and identified as *Eucalyptus globulus* gave the following data:

Yield	2.1%
Specific gravity	0.918
Optical rotation	+7.5°
Refractive index	1.470
Freezing temperature	Below -20° C.

Oleum Foeniculi.—Oils distilled from samples taken from 35 shipments of sweet fennel seed and 5 shipments of bitter fennel seed gave the following data:

	<i>Sweet Fennel.</i>		U. S. P. X.
	Limits.	Usual.	
Yield	1.5% to 5.5%	2.0% to 4.0%	
Specific gravity	0.965 to 0.982	Over 0.970	0.953 to 0.973
Optical rotation	+3.4° to +19.1°	Over 12.0°	+12° to +24°
Refractive index	1.525 to 1.552	Over 1.533	1.528 to 1.538
Congealing temperature	+3° C. to +16° C.	Over +7.0° C.	+3° C.

<i>Bitter Fennel.</i>			
Yield	3.2% to 4.8%		
Specific gravity	0.955 to 0.974	Below 0.970	
Optical rotation	+12.4° to +15.5°	Below +13.0°	
Refractive index	1.504 to 1.510		

Congealing temperature—not obtained apparently below -10° C.

Oleum Lavendulæ.—Oils distilled from samples taken from each of the 9 shipments of Lavender flowers gave the following data:

Yield	1.0% to 3.0%	Approx. 2.0%	
Specific gravity	0.865 to 0.920	Below 0.900	0.875 to 0.888
Optical rotation	+0.6° to -6.9°	Below -5.0°	-3° to -10°
Refractive index	1.461 to 1.465	Below 1.464	1.460 to 1.464

Oleum Myristicæ.—Oils distilled from samples taken from 21 shipments of sound East India nutmeg and 7 shipments of sound West India nutmeg gave the following data:

<i>West India.</i>			
Yield	8.5% to 10.0%	9.0%	
Specific gravity	0.862 to 0.868	0.865	0.859 to 0.924
Optical rotation	+40° to +50°	...	+12° to +30°
Refractive index	1.469 to 1.472	...	1.478 to 1.4895

<i>East India.</i>			
Moisture (in nutmegs)	6.0% to 9.0%		
Yield	6.5% to 11.0%	Over 8.0%	
Specific gravity	0.898 to 0.936	Over 0.900	
Optical rotation	+12.0° to +22.0°	Over +18°	
Refractive index	1.479 to 1.488	Over 1.481	

Shriveled East India nutmeg used chiefly for grinding yielded up to 23 per cent volatile oil having physical constants within the limits given for oil from the sound E. I. nutmeg.

Oleum Rosmarini.—Oils distilled from samples taken from 15 shipments of Rosmary leaves gave the following data:

	Limits.	Usual.	U. S. P. X.
Yield	1.3% to 2.0%	1.7%	
Specific gravity	0.911 to 0.932	0.920	0.894 to 0.912
Optical rotation	+4.8° to +19.3°	Below +10°	0.0° to +15.0°
Refractive index	1.464 to 1.472	Below 1.470	1.466 to 1.472

Oleum Santali.—Oils distilled from samples taken from 30 shipments of Sandalwood gave the following data:

Moisture (in wood)	4.0% to 8.8%	6.0%	
Yield	0.8% to 8.0%	4.0% to 6.0%	N. F. 3.5%
Specific gravity	0.964 to 0.979	Over 0.970	0.965 to 0.980
Optical rotation	-14.0° to -21.8°	Below -16.0°	-15° to -20°
Refractive index	1.502 to 1.505	1.504 to 1.508
Santalol	89% to 96%	Over 93%	Not less than 90%

Oleum Sassafras.—Oils distilled from samples taken from 7 lots of sassafras bark of domestic origin obtained from drug houses gave the following data:

Yield	1.0% to 7.0%	Approx. 4.0%	
Specific gravity	1.060 to 1.080	Over 1.070	1.065 to 1.077
Optical rotation	+1.7° to +4.0°	Over +3°	+3° to +4°
Refractive index	1.522 to 1.532	Over 1.524	1.525 to 1.535

The author is continuing investigations on this class of products, and expects to publish further articles from time to time as material is accumulated. These will include interpretations of the data accumulated and it is believed will warrant recommendations for changes in the standards for judging the quality of such products. Sufficient information is already available, for example, to point to the conclusion that much of the practically worthless cinnamon bark now on the market, can be excluded from the country by the adoption of a suitable quality standard.

A NOTE ON THE EXTENT OF EMULSIFICATION OF ALKALOID-CONTAINING PREPARATIONS WITH IMMISCIBLE SOLVENTS AT DIFFERENT DEGREES OF p_H .

BY W. W. F. ENZ AND C. B. JORDAN.*

Sub-committee No. 6, Proximate Assays, has voted to use the general method of U. S. P. IX in outlining crude drug assay, that is, general directions on proximate assays in Part II with specific directions in each monograph. In Part II of U. S. P. IX under the general directions for alkaloidal assay, the following statement was questioned: "Emulsions are less apt to form in strongly acid or alkaline solutions than in those which are neutral....."

In the assay of alkaloidal-containing crude drugs and their preparations troublesome emulsions frequently occur. In order to determine whether the extent of emulsification would be affected by changes in the p_H as indicated by the above statement appearing in the U. S. P. IX, portions of five official alkaloid-

* Purdue University School of Pharmacy.