By removing most of the quinine from mixtures of the two alkaloids, as is possible by a careful working of this process, the strychnine may be obtained in a state sufficiently pure for identification. The Bliss method, therefore, may be found useful in the qualitative analysis of medicines, although it appears to have no advantage over the well-known ferrocyanide method.

SEPARATION OF STRYCHNINE FROM QUININE.

BLISS METHOD.

	Weight taken.	Weight recovered.	Percentage recovered.	Remarks.
Quinine	0.20057	0.2216	110.5	contained strychnine
Strychnine	0.0197	0.0023	11.7	
Quinine	0.20057	0.2151	107.3	
Strychnine	0.0197	0.0049	24.9	
Quinine	1.00286	1.0708	106.8	contained strychnine
Strychnine	0.0985	0.0274	27.8	
Quinine	0.30527	0.3191	104.53	
Strychnine	0.01964	0.0054	27.5	
Quinine	0.30527	0.3083	101.0	
Strychnine	0.01964	0.0158	80.5	
Quinine	0.07215	0.0838	116.1	
Strychnine	0.01635	0.0038	23.2	contained quinine
Quinine	0.24456	0.2560	104.7	contained strychnine
Strychnine	0.05544	not recovered		
Quinine	0.49173	0.5688	115.7	contained strychnine
Strychnine	0.11147	0.0318	28.5	
Quinine	0.50248	0.5136	102.2	contained strychnine
Strychnine	0.01964	0.0067	34.1	free from quinine
Quinine	0.6139	0.6222	101.3	contained strychnine
Strychnine	0.01964	0.0123	62.6	

LABORATORY OF THE AMERICAN MEDICAL ASSOCIATION; AND ALSO THE UNIVERSITY OF ILLINOIS SCHOOL OF PHARMACY.

THE ESTIMATION OF CRUDE FIBER IN GUM KARAYA.

BY E. H. GRANT.*

Gum Karaya, otherwise known in this country under the names of gum kadaya and Indian gum, and in India under many other names, is used very extensively as a thickening agent in foods and drugs; for various technical purposes, such as calico sizing, and in the manufacture of shoe polish.[1] Most of the gum is imported from Bombay, either directly or through the London markets, in bags holding approximately $1^1/_2$ cwt. (168 lbs.) each. During the year 1918 there were imported through New York a total of 1,260,000 pounds. It is carefully graded in India according to color and amount of foreign matter present. The principal impurity is the bark clinging to the gum. The presence of stones, especially those imbedded in the gum, is comparatively rare. This is quite in contrast to the lower grades of tragacanth which rarely contain bark in appreciable quantities, but very

* Work done while in charge of drug work, U. S. Food and Drug Inspection Laboratory, New York. Read before Cincinnati Section, A. Ph. A., October 1920.

[1] For discussion of the origin and uses of this gum, see "Karaya Gum, a Substitute for Tragacanth," Ewing, J. AMER. PHARM. ASSOC., 7, 787, 1918.

often have stones and dirt sticking to the gum. The explanation for this difference lies in the way the two gums are formed and collected. The plant which yields tragacanth (*Astragalus gummifer* Labill, and other species) is a low shrub. The gum is obtained by slittling the bark and allowing the gum forming material to ooze out. Before this gum is entirely dry it is cut off with a knife. The bark, being relatively tougher, is not pulled off. If the gum is allowed to drop upon the ground, any dirt and stones which come in contact with it will adhere. On the other hand, gum karaya is borne by a large, deciduous tree (*Sterculia urens* Roxb. and other species). The bark is more corky. Apparently the gum is collected in a harder state than is tragacanth, and when it is pulled off considerable quantities of the bark come with it.

The various grades of karaya contain more or less bark. Part of this may be removed by various milling processes whereby the bark is rubbed from the gum and is then blown or sifted away. Further quantities of the bark are removed by breaking up the gum and sifting it.

Gum karaya is insoluble in water, but by boiling with dilute acid it is hydrolyzed and made soluble. The amount of bark can be estimated by a determination of the crude fiber. If this analysis is attempted in the usual manner it will be found that when the boiling acid is poured upon the dry gum, the gum will cake together and stick to the flask so that it burns and the acid does not attack it. The following modification of the usual method has been devised by the author to overcome the above-mentioned difficulties:

To two grammes of the finely ground gum in a 500-Cc. flask add 50 Cc. of cold 1.25% sulphuric acid, in small portions. Shake gently so as to form as uniform a mixture as possible, taking care that it does not splash so high on the sides of the flask that the acid will not attack it later. Allow to stand over night, then mix again, if necessary. Add 150 Cc. of boiling 1.25% sulphuric acid, connect the flask with an inverted condenser or place a funnel in its neck. Heat rapidly to boiling and then turn the flame down so that the solution boils gently. Heat for 30 minutes, counting from the time the boiling acid was added. Filter through paper, and wash once with boiling water. Rinse the bark back into the same flask with 200 Cc. of a boiling 1.25% solution of sodium hydroxide, free, or nearly so, from sodium carbonate, boil at once and continue boiling gently for thirty minutes. Filter on a Gooch crucible, wash with boiling water, dry at 110° and weigh, after which incinerate completely and weigh again. The difference between these weights multiplied by 50 gives the percent of crude fiber.

In order to test out the accuracy of this method, two samples of ground gum, "A," a mixture of gums of fair quality, suitable for use in foods, and "B," a mixture of the tailings from cleaning these gums, and suitable only for technical purposes, were submitted to five analysts. Their reports are as given in Table I.

The relation between the appearance of the gum and the crude fiber present is shown by Table II.

The efficiency of the commercial methods of cleaning is shown in Table III. Evidently very little care was given to eliminating the bark from the last shipment. This is shown further by the fact that the refuse discarded during the process of cleaning amounted to only 1% of the total weight.

The crude fiber of the bark separated from gum karaya is about 38% so that the amount of bark present in a sample of gum may be figured approximately by multiplying the crude fiber found by 2.63.

TABLE I.—CRUDE FIBER DETERMINATIONS ON THE SAME SAMPLES BY DIFFERENT ANALYSTS.

Analysts.	Gum A.	Gum B.
1	0.32%	2.10%
	0.46%	2.06%
2	0.48%	2.05%
	0.57%	2.35%
3	0.50%	2.50%
	0.52%	2.67%
4	0.60%	2.10%
5	....	2.02%

TABLE II.—CRUDE FIBER DETERMINATION IN COMMERCIAL SHIPMENTS AS IMPORTED.

Laboratory No.	Crude fiber %.	Description of sample.
73264	0.54	Bark on 1/4 pieces; much soil; cherry-red; average sized pieces.
...	0.52	Selected sample; barely passable grade; bark on 1/2 pieces; transparent; little soil; average sized pieces.
...	0.00	Selected sample; best grade; no bark present; color transparent; no soil; pieces average size.
71917	0.24	Very little bark; transparent; no soil; pieces average size.
73265	1.07	Much bark; color red and yellow; much soil; size No. 5 sieve.
...	0.28	Selected; bark small amount on 1/2 of pieces; transparent; little soil; average size.
...	0.65	A little bark on every piece; color mixed; little soil; average size.
74416	0.70	A little bark on every piece; color mixed; little soil; average size.
74485	1.23	Much bark; dark color; little soil; pieces average size.
74781	1.60	Bark in excessive amount; shipments being cleaned (Nov. 2/18).
74779	0.95	Bark in excessive amount; shipments being cleaned (Nov. 2/18).
74879	0.98	Bark in excessive amount; shipments being cleaned (Nov. 2/18).
74878	1.30	Bark in excessive amount; shipments being cleaned (Nov. 2/18).
74923	1.30	Bark in excessive amount; shipments being cleaned (Nov. 2/18).

TABLE III.—REDUCTION OF CRUDE FIBER BY COMMERCIAL METHODS OF CLEANING.

Laboratory No.	Before cleaning.	After cleaning.
74485	1.23%	0.78%
74779	0.95%	0.73%
74781	1.60%	0.51%
74878	1.30%	0.50%
74879	0.98%	0.46%
75607	1.35%	0.54%
76971	1.07%	0.96%

DRUG TOPICS.*,[1]

No. 2. The Moisture Content of Aromatic Drugs.[2]

BY WALTER C. BURNS.

The loss in weight which a drug suffers at 100° or thereabouts has customarily been computed as its moisture content. That such results may be as inaccurate

* From the Laboratory of Edward Kremers.

[1] The first note to be published under this general heading was the one by Raymond C. Schulz, "On the Ash of Kamala," which appeared in the *Pharmaceutical Review*, 25, 129 (1907). There has been no lack of material, but the time to edit laboratory notes seemed to be wanting. —E. K.

[2] Extracts from a thesis on "The Moisture Content of Aromatic and Other Drugs." University of Wisconsin, 1912.