

Fixed Oils of Mexico. II. Caoba (*Swietenia macrophylla* Kina)¹

RODOLFO RUIZ MUNGUÍA, RICARDO MILLARES, N. F. GURLEY, and W. R. LLOYD,
Armour Research Foundation, International Division, Mexico, D. F.

CAOBA is the native name for the mahogany tree of Mexico. *Swietenia macrophylla* Kina (Family Meliaceae) is found in the Mexican states of Tabasco, Chiapas, Yucatán, and the territory of Quintana Roo. This species is probably the most important of the Mexican mahoganies and produces an excellent wood. The stands being exploited at present are wild. The caoba of Mexico is also known variously by the regional names: "cóbano"; "flor de venadillo"; "gateado"; "zopilote"; "palo de zopilote"; "rosadillo"; and "tzopilotl" (2, 3). Two other species of mahogany are found in Mexico: *S. cirrhata* Blanke in Sinaloa and Oaxaca; and *Sy humilis* Zucc. in Michoacán and Chiapas (3).

The fruit of the caoba is a large ovoid approximately 4 to 5 inches in length and 2 to 3 inches in diameter at the largest point. The outer part consists of a hard shell which is divided into 5 more or less equal segments. Inside the fruit there is a center core surrounded by approximately 60 seeds which occur at the end of broad paper-like capsules, the seeds being grouped at the broad end of the globular fruit.

The seeds of the caoba fruit contain about 50% of a semidrying oil. The literature does not reveal that any appreciable amount of work has been reported on this oil. Jamieson reports the following data on a sample of mahogany oil obtained from *S. mahogani* (4):

Refractive Index.....	1.4694
Saponification Number.....	178.9
Iodine Number (Hanus).....	116.2
Unsaponifiables.....	8.15%

S. mahogani is the most common species of mahogany in the commercial timbering areas of the Antilles.

Experimental

The material used in the present study was gathered from wild caoba trees in the state of Yucatán, Mexico. The seeds were separated by hand and crushed in a mortar and pestle for quantitative determination of oil yield of the seeds. The extractions were made in a Soxhlet extractor using petroleum ether (B.P. 30°-60°C.) and an average yield of 50% obtained, on triplicate samples.

Larger quantities of oil were obtained by crushing the seed in a Wiley mill and extracting in a large Soxhlet extractor using petroleum ether as the solvent. After removal of the solvent, a fluid, reddish-yellow oil was obtained. The oil has an intensely bitter taste.

The physical characteristics of the oil were determined by A.O.C.S. Methods (5), and the results are reported in Table I.

The chemical characteristics as determined by A.O.C.S. Methods (5) are reported in Table II.

Calculations of the composition of the unsaturated acids of caoba oil were made using the iodine number

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TABLE I

Physical Characteristics of Caoba Oil

Specific Gravity 25/25.....	0.9188
Refractive Index N_{20}^D	1.4726
Melting Point.....	9.9°C.
Melting Point of Fatty Acids.....	36.0°C.

TABLE II

Chemical Characteristics of Caoba Oil

Saponification Number.....	196.1
Acid Number.....	3.27
Unsaponifiables.....	1.39%
Iodine Number (Wijs 1 hr.).....	104.9
Thiocyanogen Number.....	65.7
Acetyl Number.....	0.35
Saturated Acids.....	25.28%

and thiocyanogen number according to the A.O.C.S. Method (5). The results are given in Table III.

The composition of the saturated fatty acid fraction will be reported separately.

TABLE III

Composition of Caoba Oil (%)

Linoleic acid as glycerides.....	48.4
Oleic acid as glycerides.....	24.5
Saturated glycerides.....	25.7
Unsaponifiables.....	1.4

Discussion

The seed of the caoba offers a possible source of additional vegetable oil for soaps and other non-food uses for local consumption in Mexico. The quantity of oil available from wild stands of mahogany is limited and this, coupled with the difficulties of collection and separation of the seed, more or less preclude the commercial development of the oil on a large scale at the present time. If a method can be developed for the debittering of the oil and if the exploitation of the mahogany timber industry of Mexico is put on a sustained yield basis, this oil might be a valuable addition to the vegetable oil reserves of the Western Hemisphere.

Summary

The physical and chemical characteristics of the oil of the caoba seed (*S. macrophylla* Kina) have been reported. The composition of the oil has been calculated.

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