

matter, a neutral waxy substance, m. p. 97–98° C.; glycerol; linolenic; linolic; oleic; myristic and, possibly, stearic acid.

## REFERENCES

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- (3) Gunther, T. R., "The Greek Herbal of Dioscorides," edited and first printed, Oxford University Press, (1933), page 8.
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- (5) Goebel-Kunze, G., "Pharmaceutische Warenkunde," (1830), pages 259–260.
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## Notes on Mexican Drugs— I. Zapote borracho (*Lucuma salicifolia* Kunth, Sapotac.)

By Marcel Bachstsz and Attagracia Aragon\*

In his book, "Magische Gifte," V. A. Reko (1) describes the intoxicating effects of a peculiar Mexican fruit. This fruit,

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"Zapote borracho" ("drunk zapote"), is when unripe yellowish green, when ripe dull orange-yellow with yolk-yellow pulp. It can be bought in the markets of Oaxaca, Tehuacan, Puebla, and at times in Mexico City.

As the fruit is frequently eaten and no investigation appears to have been made of its constituents, it was decided to undertake such an investigation to determine if it contains any active principles.

"Zapote borracho" is identified as *Lucuma salicifolia* Kunth. The literature on the plant is very limited and is mainly devoted to the botanical aspect. Wilson Popenoe devotes in his "Manual of Tropical and Subtropical Fruits" (2) only a few lines to the fruit. He points out its similarity to the "canistel," which grows in the Florida Keys and in Cuba, but he does not give any information on its composition or its physiological action.

From our investigations, it can be stated that neither glycosides nor alkaloids are present. Extensive inquiries have also convinced us that this frequently eaten fruit has no harmful properties. It is probable that the popular Mexican name for the fruit, "Zapote borracho" ("drunk zapote"), has reference to the musty, alcoholic smell

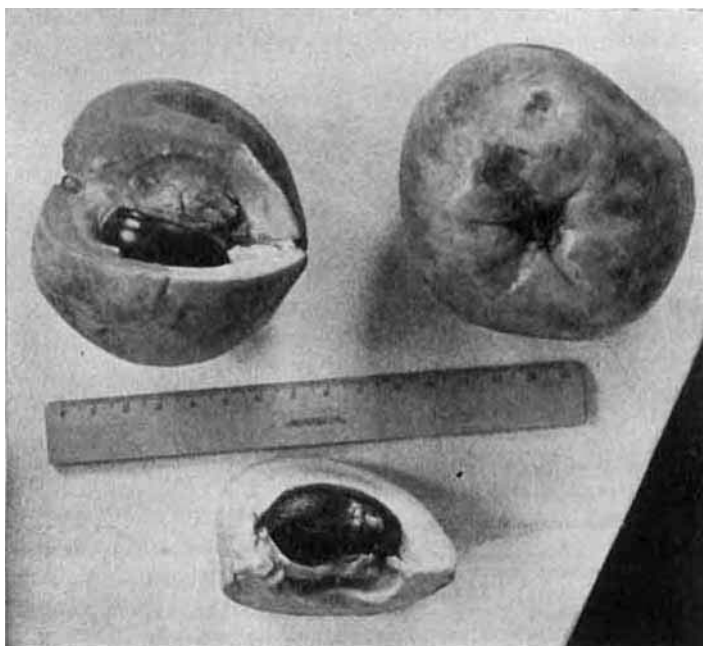


Fig. 1.

of the fruit, when overripe, and not to any intoxicating effect.

#### EXPERIMENTAL

The water content of the fruit, determined by the method of the A. O. A. C. (3) was found to be 66.13%, total ash 0.52%. The alkalinity of the fruit (referred to 100 Gm.) was found to be 16.6. The ash is rich in iron.

*Preliminary Examination.*—A hot water infusion gave a filtrate acid to litmus,  $p_H$  4.0. The infusion gave with ferric chloride tests for tannins. Very little foaming was observed on shaking, indicating the absence or the presence of only minute quantities of saponins. Iodine showed the presence of starch. Steam distillation did not indicate volatile constituents. Dilution of portions of the filtered decoction remaining from the steam distillation with alcohol produced a gummy precipitate indicative of mucilage or pectin (4); but the amount of precipitate was very small.

*Alkaloids, Glycosides and Carbohydrates.*—Extraction of the fruit with Prollius' fluid and with weak hydrochloric acid at different temperatures gave negative results with the usual alkaloidal reagents. The method of Stas-Otto (5) gave no indication of glycosides or of alkaloids. Carbohydrates are present.

*Protein.*—The fruit contained 14.5% of protein as determined by the Kjeldahl method (6).

*General Method.*—The fruit (50 Gm.) was extracted in a Soxhlet extractor with selective solvents (7) and the following results were obtained:

- (a) Petroleum ether: Minute quantity of dark colored resin, 2%.
- (b) Ether: Minute quantity of resin.
- (c) Chloroform: Resin, 1%.
- (d) Alcohol: Yellow coloring matter, minute quantities of tannin and carbohydrates.
- (e) Insoluble in water (8): 12% of the fruit material.

The alcoholic extract was taken up with water and gave the following reactions for carbohydrates: Barfoed's reaction (9), positive, indicating monosaccharides; Bial reaction (10), negative, showing the absence of pentoses; Seliwanoff's reaction (11), positive, showing the presence of fructose. The presence of sucrose was demonstrated by Rothenfusser's method (12).

The percentage of carbohydrates naturally varies with the ripening of the fruit. By the methods of the A. O. A. C. (13) there were found 14.85% of sucrose and some invert sugar at one stage and 2.7% of sucrose and 12.2% of invert sugar at maturity. This accords with the glucose percentage, 10.3%, as determined by the method of Willstaetter and Schudel (14).

#### SUMMARY

"Zapote borracho" contains tannin, starch, protein (14.5%), carbohydrates (14.85%)

and water (66.13%), but no glycosides or alkaloids. It would appear, therefore, that the fruit is quite harmless and that it possesses no intoxicating properties.

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- (1) "Magische Gifte," F. Enke, Stuttgart (1936).
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- (3) *Bull. A. O. A. C.*, 5th Edition (1940), XXVI.
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- (7) *Cf. Ref. 5*, page 30.
- (8) *Cf. Ref. 3*, XXVI, 7.
- (9) *Cf. Ref. 4*, page 149.
- (10) *Cf. Ref. 4*, page 152.
- (11) Hawk and Bergeim, "Practical Physiological Chemistry, 11th Edition, page 65."
- (12) *Cf. Ref. 5*, page 114.
- (13) *Cf. Ref. 3*, XXXIV, 29.
- (14) *Ber.*, 51 (1918), 780.

## Advantages of Iso-Alcoholic Elixirs of National Formulary VI\*

By J. W. Millar, S. J. Dean and R. A. Marshall

A partial survey of the retail pharmacies of this area (San Francisco and vicinity) has shown that many pharmacists are not taking advantage of the Iso-Alcoholic Elixirs, with the result that in most cases the Elixirs of the National Formulary are purchased in one pint or larger quantities and may remain upon the shelves of the prescription department for long periods of time, thereby losing much of their potency, due to exposure to light, change of temperature and various other causes, and becoming sufficiently altered so that the physiological action expected from their use is often lacking.

It is therefore proposed that many of these Elixirs be prepared extemporaneously, using the Iso-Alcoholic Elixirs so as to obtain the desired alcoholic content in the finished product—it being necessary then to add only the medicinal constituents to the predetermined iso-alcoholic mixture. The ad-

\* A contribution from the laboratories of the College of Pharmacy, University of California, Medical Center, San Francisco, California.