

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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- (4) Morrow, C. A., "Biochemical Laboratory Methods," (1927), page 234.
- (5) Rosenthaler, L., "Grundzuege der chemischen Pflanzenuntersuchung," (1928), page 19.
- (6) *Cf. Ref. 3.*
- (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.

Table I.—Alcoholic Content of Elixirs

Elixir	Low Elixir	High Elixir	% Alcohol N. F. Monograph	% Alcohol in Extemporaneous Preparations
1. Almond Comp.	1	(1 Water)	3-5	4.2
2. Aminopyrine	6	1	17-20	18.7
3. Arom. Rubrum	4	1	22-24	22.4
4. Barbitol	2	1	29-32	31.0
5. Calc. Lacto-phos.	6	1	17-20	18.6
6. I. Q. and S.	4	1	22-24	22.1
7. Pepsin	12	1	13-15	14.1
8. Pepsin Comp.	7	1	16-19	17.3
9. Phenobarb.	6	1	17-20	18.5
10. Rhei. Alk.	3	2	34-38	35.8
11. Sod. Brom.	2	(1 Water)	5-7	5.8
12. Terpin Hyd.	1	1	38-42	42.2
13. Triple Brom.	1	(1 Water)	3-5	4.35
14. Vanilla Comp.	5	(1 Water)	7-9	7.6

vantages of this method are that the Iso-Alcoholic Elixirs of the National Formulary suffer no deterioration over long periods of time and may therefore be prepared in quantities of one gallon or more and used as required for the extemporaneous preparations.

No difficulty has been encountered in this laboratory in the preparation of the various Elixirs of the N. F. by this method and in many cases the time required for preparation has been materially decreased.

A 1 per cent solution of Amaranth was substituted for Cudbear in the Iso-Alcoholic Elixirs of Amino-pyrene, Aromatic Rubrum, Pepsin Compound and Phenobarbital. This substitution has given, we believe, a greater brilliancy and is less affected by light exposure and change of p_H .

It has been observed that in the case of Elixir of Phenobarbital, where the prescribed amount of Phenobarbital is in excess of that required for the Official Elixir of Phenobarbital in the N. F., sufficient of the high Iso-Alcoholic Elixir should be used to obtain at least a 30 per cent alcoholic vehicle, this being in accord with the findings of Fantus and Dyniewicz (1, 2).

EXPERIMENTAL

Fourteen elixirs were prepared according to the directions of the National Formulary VI, also fourteen duplicates were prepared using the Iso-Alcoholic Elixirs of the N. F.

The alcoholic content was determined in the samples prepared from the iso-alcoholic elixirs.

Each pair of samples of the duplicate sets of Elixirs was compared as to color, odor and taste and found to be identical. After standing over a period of more than ninety days, no apparent change had occurred.

SUMMARY

(1) The use of the Iso-alcoholic Elixirs of the N. F. permits the pharmacist to prepare the elixirs of the N. F. extemporaneously at a considerable saving of time.

(2) The extemporaneous preparations are strictly comparable with the same elixir of the N. F. as to alcoholic content, color and taste.

(3) Amaranth may be substituted for Cudbear to advantage in some elixirs.

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Particle Size Studies

II. The Grain Size Distribution of Bismuth Subsalicylate U. S. P.*

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INTRODUCTION

The Pharmacopœia (1) describes Bismuth Subsalicylate as "an amorphous or micro-crystalline powder." New and Non-Official Remedies (2) lists as accepted one brand of the drug and ten oil-suspensions of the product. Since for the best development of the action of the drug as well as for its mechanical suspension in oil, a very fine divi-

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