sterilities. Sterilities concern not only aconites or drug plants but have an increasing bearing when dealing with human beings. It is from the plant that the fundamental concepts of this problem can best be procured. There are now plant collectors searching for new aconites, one part in the region north of India. Much more material is needed from the Far East and throughout all Asia, which seems to be the central point of dispersion for the aconites. Even all the aconites of our own country have not as yet been examined. Seed germination should be studied in more detail. Hybridizing these additional plants must be carried out and careful selection made for the best types. Plenty of time and money are needed in this type of research. When such projects are carried to the point that adequate material is available for our chemist, then and then only can we tell whether aconite deserves to be considered a useful drug plant or not. All drug plants should be treated in the same manner.

NOTE: Lantern slide plates used in the lecture will not be submitted for publication on account of the expense involved.

STABILITY OF IPECAC PREPARATIONS.*

BY SAMUEL W. GOLDSTEIN.

Very little work has been reported on the stability of ipecac preparations and the published results vary greatly. Roberts (1) observed that Wine of Ipecac deposited a sediment in which he found no trace of alkaloids upon examination after six months. Procter (2) stated that a Fluidextract of Ipecac prepared in 1859 with 87.5 per cent alcohol was in "perfect condition" after being undisturbed for four years. LaWall (3) found 2.76 per cent of alkaloid calculated as emetine in the clear supernatant liquid of a fluidextract prepared thirty-three years earlier and kept in a carefully sealed bottle. Wulling (4) reported that Acetic Extracts of Ipecac prepared with 6, 10 and 20 per cent acetic acid developed precipitates; while 50 per cent acetic acid yielded a product that remained clear. Guyer (5) reported that samples of Liquid Extract of Ipecac, B. P., which contained 2.0 per cent of alkaloids when prepared yielded 1.5 per cent of alkaloids after standing for two months. Thomson (6) found that samples of Liquid Extract of Ipecac, B. P. showed no loss in alkaloidal content after seven months.

In an earlier paper (7) the author reported on a series of extractions of ipecac using U. S. P. X and U. S. P. XI menstrua and acetic acid (9%). Part of the first percolates, which contained 61–85 per cent of the alkaloids extracted, were set aside in partly filled bottles standing in diffused sunlight. The behavior of these percolates on standing is reported herein.

EXPERIMENTAL.

The acetic acid extracts, on standing, became unsightly because of the continued sedimentation although they were filtered after three months and eight months. The preparations obtained using U. S. P. X and U. S. P. XI menstrua deposited small amounts of sediment and remained practically clear when filtered after standing for two months.

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* From the Laboratory of the Bureau of Chemistry of the Maryland State Department of Health.

The preparations were filtered at the intervals indicated and the filtrates were assayed for ether-soluble alkaloids (U. S. P. XI assay) and total solids (heated to constant weight in an oven at 100° C.). The results are given as per cent w/v in Tables I and II.

TABLE I.—RESULTS OF ALKALOIDAL DETERMINATIONS IN PER CENT w/v.

Menstrua.	Color of Bottle.	When Prepared.	After 3 Months.	After 8 Months.	After 16 Months.
U. S. P. XI	Blue	1.11	1.10	1.10	1.10
	Blue	1.07	1.09	1.03	1.02
U. S. P. X	Blue	0.83	0.82	0.82	0.82
Acetic acid (9%)	Blue	1.07	1.04	0.94	0.91
	Amber	1.20	1.18	1.14	1.14
	Flint	0.96	0.91	0.90	0.88
Large scale	Flint	1.21	....	....	1.18

TABLE II.—RESULTS OF TOTAL SOLIDS DETERMINATIONS IN PER CENT w/v.

Menstrua.	Color of Bottle.	When Prepared.	After 3 Months.	After 8 Months.	After 16 Months.
U. S. P. XI	Blue	15.47	14.92	14.95	14.96
	Blue	14.85	14.32	12.52	12.54
U. S. P. X	Blue	12.33	11.70	11.70	11.69
Acetic acid (9%)	Blue	19.58	19.24	15.92	14.94
	Amber	21.65	20.80	17.86	16.61
	Flint	16.81	15.59	13.59	12.37
Large scale	Flint	21.25	.....	.....	15.90

The ratios of alkaloids to other solids, *i. e.*, per cent of total solids minus per cent of alkaloids, are given in Table III.

TABLE III.—RATIO OF ALKALOIDS TO 100 PARTS OF OTHER SOLIDS.

Menstrua.	When Prepared.	After 3 Months.	After 8 Months.	After 16 Months.
U. S. P. XI	7.74	7.96	7.94	7.94
	7.76	8.24	8.97	8.86
U. S. P. X	7.21	7.53	7.53	7.54
Acetic acid (9%)	5.78	5.72	6.27	6.48
	5.76	6.02	6.82	7.38
	6.05	6.19	7.10	7.66
Large scale	6.03	....	....	8.01

DISCUSSION OF RESULTS.

The U. S. P. XI and U. S. P. X menstrua yielded elegant preparations which, over a period of sixteen months, lost 0.90 and 4.67 per cent of alkaloids in the case of the former and 1.21 per cent in the case of the latter; while the total solids decreased 3.29 and 15.5 per cent, respectively, in the former and 5.19 per cent in the latter. The preparations obtained using acetic acid (9%) lost 14.95, 5.00, 8.33 and 2.48 per cent of alkaloids; and 23.7, 23.3, 26.4 and 25.2 per cent of total solids, respectively.

No definite relation between loss of alkaloids and decrease in total solids is evident although in most cases the per cent decrease in total solids was roughly four times as great as the per cent decrease in alkaloids. The decrease in the per cent of alkaloids cannot be explained by occlusion or adsorption in the sediment, for while the sediment deposited in the last experiment with acetic acid (9%) was

next to the largest, the same preparation showed the smallest loss of alkaloids in that series. Light does not appear to have any particular effect on the alkaloidal content, but it appears to aid sedimentation. In all cases the ratio of alkaloids to total solids increased with time.

SUMMARY.

1. Ipecac preparations made by percolation with U. S. P. X and U. S. P. XI menstrua show little alkaloidal loss after sixteen months and deposit a small amount of sediment during the first two months after preparation.

2. Preparations made by percolation with acetic acid (9%) are not as stable as those prepared with hydro-alcoholic menstrua and should be prepared only for use in manufacturing processes.

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STABLE SUPERSATURATED SOLUTIONS OF CALCIUM GLUCONATE.[1]

BY GLENN L. JENKINS.

Various means have been developed to render supersaturated solutions of calcium gluconate stable. Heating in sealed ampuls (1) (2); the addition of alkali salts (3); the addition of boric acid or borax (4), (5), (6); the addition of aluminum chloride (7); the adjustment of the p_H of the finished product (8); and the addition of the soluble calcium salts of saccharic acid (9), mannonic acid (10) and lactobionic acid (11), (12) have all yielded products which have been used more or less in therapy. Numerous other compounds are reported in the references cited to produce some stabilization of supersaturated calcium gluconate solutions.

The observation that the calcium salt of methane disulfonic acid stabilized supersaturated calcium gluconate solutions led to the preparation and testing of a number of the soluble calcium salts of sulfonic acids. The salts prepared by heating the appropriate halide with an alkali sulfite and conversion of the product to the calcium salt included the calcium salt of: I, methane disulfonic acid (methionic acid) (13); II, ethyl sulfonic acid; III, ethane 1,1-disulfonic acid; IV, ethane 1,2-disulfonic acid; V, propane 1,2-disulfonic acid; VI, propane 1,2,3-trisulfonic acid and VII, benzene sulfonic acid (14). The average of two determinations of moisture at 180° C. and of two assays for calcium on the purified and dried salts are given in Table I.

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[1] Contribution from the Department of Pharmaceutical Chemistry of the College of Pharmacy of the University of Minnesota, June 15, 1937.