The subject seems important enough to be carried somewhat further in order to explain fully the conditions under which alcohol can affect the pituitary extract unfavorably.

The writer has observed that a commercial sample of pituitrin shows an opalescence from the action of strong alcohol but that a mixture of equal parts pituitrin and 95% alcohol shows no permanent opalescence and no precipitate. Diluted and injected into the circulation of an anesthetized dog in the usual method of testing there is no perceptible lowering of its activity. This is very much in excess of the possible alcohol content from washing the syringe or the site of injection.

A further experiment has been carried out on a highly active dry pituitary product. This material was ground in a mortar and rubbed thoroughly with 95% alcohol adding successive portions and filtering the alcohol to obtain a clear solution.

Three series of tests were made on the resulting products, namely, tests of the dry material after being washed with alcohol, tests of the residue remaining on recovery of the alcohol, first, an aqueous solution of this residue and second a hydro-alcoholic solution of the residue.

The results of these tests showed that 95% alcohol is not a solvent for the active principle nor has it any deleterious action; the active agent was no less active and the residue from evaporation of the alcohol had neither pressor nor oxytocic activity.

The only reaction between alcohol and pituitary extracts is when the former is present in great excess, in which case it acts as a precipitant.

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THE DETERIORATION OF TINCTURE OF DIGITALIS.*

BY PAUL S. PITTENGER.

In a recent publication entitled "The Deterioration of 'U. S. P.' and 'Fat-Free' Tinctures of Digitalis," Pittenger and Mulford, Jr.,[1] gave the results of a series of experiments which were carried out with two objects in view:

First, to show that Tinctures of Digitalis deteriorate quite rapidly and

Second, to advance experimental data to disprove the statements made at several medical society meetings, that fat-free preparations deteriorate more rapidly than the regular U. S. P. tincture.

The results of physiologic assays made on each of 15 samples five and eight months, respectively, after the first test, were given to substantiate the author's claims that "Most tinctures of digitalis *do deteriorate*" and that "Fat-free tinctures of digitalis *do not deteriorate at a greater rate than the U. S. P. tincture.*"

Since publication of the above paper, Hamilton in a recent publication[2] takes exception to the results given because the fifteen samples tested showed an average

* Read before Scientific Section, A. Ph. A., Chicago meeting, 1918.

[1] Pittenger and Mulford, Jr., JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION, March 1918, p. 236.

[2] Hamilton, "The Deterioration of Digitalis Extracts," JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION, May 1918, p. 433.

deterioration of 34.8 percent in 8 months which he states "would lead one to infer that the tincture is practically worthless." Exception was also taken to the fact that the regular tinctures made with 50 percent alcohol showed an average deterioration of 47.8 percent and that the Fat-free Tinctures made with 80 percent alcohol showed an average deterioration of 40.7 percent, while the Fat-free Tinctures made with 50 percent alcohol showed an average deterioration of only 22.8 percent. "From this" the author states "one might conclude that a tincture is of little value unless made by extracting fat-free leaves with 50 percent alcohol, since Fat-free Tincture with 80 percent alcohol is apparently no more stable than that with less alcohol."

It was not the intention of the authors to use the results given to show the *average* rate of deterioration of Tinctures of Digitalis or to claim, or infer that a tincture made with 80 percent alcohol was less stable than one made with 50 percent alcohol. In fact, several years ago when the menstruum for the U. S. P. Tincture was 50 percent the author carried out many tests on the comparative rate of deterioration of Tinctures of Digitalis made with menstruums of 50, 60, 70 and 80 percent of alcohol, respectively, and found that as a general rule the higher the percentage of alcohol employed the slower the rate of deterioration. On the basis of these experiments we raised the alcoholic content of our digitalis specialties to 80 percent several years before the U. S. P. increased the percentage of alcohol in the official tincture.

Unfortunately, in the set of experiments quoted, for some unknown reason the opposite condition of affairs prevailed.

I therefore thoroughly agree with Hamilton in that "It seems improbable that tinctures with low alcoholic content would be uniformly found more stable than when extracted with 80 percent alcohol, whether the drug was fat-free or not," also "that no data either good or bad should be accepted as representing the average condition of digitalis after any particular period of aging."

This latter point is clearly illustrated in the paper by Hamilton, referred to above, in which the results of a series of experiments by Houghton and Hamilton[1] on Tinctures of Digitalis made with *50 percent alcohol* are given with the following conclusion: "*That a maximum average loss of 10 percent a year can be expected in tinctures or fluidextracts of digitalis.*" On the same page are given the results of experiments carried out by Rowe on 6 Tinctures of Digitalis made with *70 percent alcohol* in which he found *an average loss on 6 samples of 21 percent in* $6^1/_2$ *months.*

Owing to the deterioration which occurs in digitalis preparations, we established, 4 or 5 years ago, a routine by which all tinctures of digitalis which are not sold within 3 months from date of manufacture are sent to the laboratory to be retested in order to determine whether or not the preparation has deteriorated. If it is still of standard activity it is given a new date of test. If deterioration is shown, however, it is taken from stock, fortified and restandardized.

The results of these tests are very interesting and show that the rate of deterioration of tincture of digitalis varies greatly with different lots. While the great majority of samples deteriorate, and some deteriorate very rapidly, there are quite a few samples which apparently do not deteriorate at all.

[1] Houghton and Hamilton, *Am. Jour. of Pharmacy*, Oct. 1909.

I have also noticed that in many cases preparations deteriorate rather rapidly during the first three months and then remain practically permanent thereafter.

The accompanying table shows some of the data on the deterioration of Tincture of Digitalis that we have obtained by the above method of routine testing.

DATA SHOWING DETERIORATION OF TINCTURE OF DIGITALIS.

1st Test.	Date.	2nd Test.	Date.	3rd Test.	Date.	4th Test.	Date.	No. of months between first and last test	Deterioration.	Aver. Deter. per Mo. During 1st 3 or 4 Months.	Av. Deter. per Month After 1st 3 or 4 Months.
100%	9/11	85%	1/12	85%	6/12	85%	9/12	12	15%	3.7%	0
132%	9/11	127%	1/12	127%	6/12	127%	9/12	12	3%	0.7%	0
144%	9/11	125%	1/12	110%	6/12	110%	9/12	12	23%	3.2%	1.3%
133%	9/11	126%	1/12	115%	6/12	115%	9/12	12	1.3%	1.3%	0
125%	9/11	110%	1/12	110%	6/12	110%	9/12	12	12%	3.0%	0
100%	9/11	80%	1/12	75%	6/12	75%	9/12	12	25%	5.0%	6.6%
145%	9/11	145%	1/12	135%	6/12	135%	9/12	12	6.9%	0	0.8%
200%	9/11	153%	1/12	153%	6/12	153%	6/12	12	23%	5.7%	0
127%	11/11	80%	2/12	80%	6/12			8	37.9%	12%	0
100%	5/11	74%	6/12					13	26%	X	2.3%
130%	5/12	100%	8/12	71%	11/12			6	45%	7.9%	9.6%
100%	6/12	80%	9/12	75%	1/13	70%	4/13	10	30%	6.6%	1.4%
91%	1/13	65%	5/13					4	28%	7.0%	X
90%	3/13	62%	6/13					3	31%	10%	X
100%	11/12	83%	7/13					8	17%	4.2%	X
111%	3/13	111%	7/13					4	0	0	X
133%	11/12	133%	12/12	80%	7/13	71%	12/13	13	45%	0	3.7%
100%	10/12	100%	7/13					9	0	X	0
133%	12/12	71%	12/13					12	46%	X	3.8%
100%	11/12	67%	12/13					13	33%	X	2.5%
142%	11/12	125%	2/13	120%	5/13	115%	8-13	9	19%	3.6%	1.3%
111%	3/13	111%	7/13	111%	12/13			9	0	0	0
133%	10/13	100%	1/14					3	25%	8%	X
115%	9/13	83%	1/14					4	27%	7%	X
100%	8/13	100%	1/14					5	0	0	0
100%	1/14	83%	4/14					3	17%	5.6%	X
100%	2/14	85%	5/14	75%	8/14			6	25%	5%	3.3%
83%	2/14	83%	5/14	83%	8/14			6	0	0	0
144%	2/14	120%	5/14	110%	8/14	110%	11/14	9	23%	5.3	1.5%
83%	10/14	77%	1/15					3	7.2%	2.4%	X
108%	9/14	85%	1/15	62%	3/15			5	42%	7%	13%
108%	2/15	100%	5/15					3	7.4%	2.4%	X
110%	3/16	90%	9/16					6	18%	X	3%
118%	7/16	91%	11/16					4	22%	5.5%	X
125%	12/16	110%	3/17	100%	6/17			6	20%	4%	3%
125%	12/16	111%	7/17	100%	9/17			9	20%	1.7%	4.5%
100%	7/17	100%	9/17	100%	11/17	100%	1/18	6	0	0	0
135%	6/16	135%	9/16					3	0	0	X
125%	7/17	110%	2/18	110%	5/18			10	20%	1.7%	0
125%	11/17	110%	2/18	110%	5/18			6	20%	4%	0
166%	10/17	166%	12/17					2	0	0	0
125%	11/17	110%	2/18	100%	5/18			6	20%	4%	3%
110%	12/17	100%	3/18	85%	6/18			6	22%	3%	5%

The tabulated results show the average deterioration in 9 to 13 months of 43 samples to be 18.8 percent. The average deterioration of 38 samples during the first three or four months being 4 percent per month, while the average deterioration of 32 samples after the first three or four months was 2.4 percent per month.

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TABLETS FOR THE DISINFECTION OF DRINKING WATER.*

BY BERNARD FANTUS.[1]

For the disinfection of small quantities of drinking water, such as those that might be gathered and carried by rapidly moving troops, tablets constitute by far the most satisfactory form for use. Hence the study of these becomes of special importance in war time. To be ideal, such tablets should be small, prompt and reliable in action, perfectly harmless, and leave the water free from offensive odor or taste, and finally be relatively inexpensive. This study was undertaken to determine the nearest approach to the ideal.

Chlorine, by far the most potent disinfectant, is at the same time the most harmless, as in exercising its disinfecting action, it is changed to chloride ions. While liquefied chlorine is the most satisfactory form in which to use this agent for water disinfection on the large scale—the city of Chicago for instance, adding to its drinking water from three to five pounds of liquefied chlorine per million gallons of water—it is, of course, out of the question for the purpose under consideration.

Lime, in the form of chlorinated lime, is probably the most convenient and cheapest vehicle for chlorine; and this is, no doubt, the reason why the health department of the city of Chicago took up, in 1916, the question of preparation of chlorinated lime tablets. I am indebted to Dr. D. O. Tonney, the Director of the Municipal Laboratories, for permission to publish the data obtained by Mr. Jay Kaplan in this inquiry.

TABLET TRITURATES OF CHLORINATED LIME.

"The tablets were prepared as follows: Chlorinated lime containing not less than thirty percent of available chlorine is moistened slightly in a mortar to make a thick paste. It is important to add the smallest amount of water which will give a suitable consistency to the mixture. Very often the market product is sufficiently moist without further treatment. A tablet triturate mold of vulcanite, having fifty perforations, 5 mm. in diameter and 3.5 mm. in depth is used. The perforated half of the mold is placed on a glass plate and the paste is pressed into the impressions with a spatula. The mold is then placed for from five to ten minutes in an oven at 40° to 50° C. The tablets are now carefully forced out by fitting the two parts of the mold together and applying slow pressure. The tablet triturates thus prepared are shaken into bottles and tightly stoppered. The tablets ordinarily weigh from 120 mg. to 140 mg., and contain from 30 to 40 mg., of available chlorine. For distribution they are put up in homeopathic vials, ten tablets to the vial. The vials are tightly stoppered and kept, if possible, in a dark, cool place. Under average conditions, the disinfectant retains its potency for

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[1] Associate Professor of Therapeutics, Rush Medical College of Chicago.