extract and mixtures of these, with or without alfalfa infusion and thyroid extract, also give good results as a culture medium.

The tentative method for assaying pharmaceutical preparations of the digitalis series by the paramecial method is as follows:

1. Place 2 cc. of the pharmaceutical preparations in clean watch glasses and evaporate to dryness at a temperature of not more than 70° C. All alcohol must be evaporated, as even very small amounts of that substance will give rise to disturbing reactions in the test organisms and which will confuse the end results.

2. Re-dissolve the nearly dry material in the evaporating dishes in about 1.5 cc. of distilled water, or normal saline. This part of the procedure has caused much trouble as it appears to be well-nigh impossible to get a complete solution or complete colloidal suspension of the inspissated extract.

3. Draw the dissolved material into a 2-cc. pipette and make up to exactly 2 cc. and mix thoroughly. This constitutes the stock solution of which suitable dilutions are to be made in order to determine the end-reaction on the paramecia.

4. Using the fluidextract of digitalis as the standard of comparison, find that percentage dilution which will kill the paramecia within 3 minutes of time, but not within one minute of time, employing essentially the technic as proposed for the determination of the phenol coefficient of disinfectants.

The preliminary tests made have demonstrated the following:

1. *Paramecium caudatum*, and also other species of paramecium, appear to be quite resistant to the action of the digitalis series, since a dilution of 1:10 of the fluidextract of digitalis does not kill within three minutes of time.

2. The results obtained by the paramecial method with preparations of digitalis, strophanthus, apocynum and of squill, do not correspond with the results obtained by the official one-hour frog method. The comparative results are lower than those given in the U. S. P.

3. The results thus far obtained are sufficiently promising, however, to make it worth while to perfect the method and to give it further trial.

ABSTRACT OF DISCUSSION.

Paul S. Pittenger inquired whether there is any variation in the reaction of the paramecium and whether Dr. Schneider had a standard for comparison, as ouabain in the frog method.

The author of the paper replied that the work was in an experimental stage and a standard will have to be provided; the work will be continued, in which several other problems also enter.

NORTH PACIFIC COLLEGE OF OREGON,
SCHOOL OF PHARMACY,
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TEMPERATURE EFFECTS ON HYPOCHLORITE SOLUTIONS OF THE CARREL-DAKIN TYPE, INCLUDING THE PROPOSED U. S. P. X FORMULA.

BY IRWIN A. BECKER.

This investigation was suggested by some unusually unstable hypochlorite solution made by diluting a concentrated proprietary preparation. It was discovered that an unknown amount of heated water was unwittingly used in making

the dilution. To this fact the instability was readily laid, on account of the repeated admonition to make, dilute, and to use Carrel-Dakin solutions—cold.

Carrel-Dakin solution will hereinafter be designated Dakin's solution, Daufresne's technique as Daufresne's formula, and the U. S. P. technique as the U. S. P. formula.

One-liter quantities were made, excepting where simple dilutions were used. Two proprietary preparations were compared with those made. By "M. R. H. formula" is designated a diluted proprietary preparation with the lime removed by precipitation with sodium carbonate and bicarbonate.

The chlorinated lime used was from a 5-pound tin, with well-fitting lid. Two assays were made before using it—one with my-own-make *V.S.*, the other with purchased thiosulphate *V.S.*, being 20.9% and 20.3% respectively, the difference due, more likely, to sampling than to difference in titer of the volumetric solutions.

One liter of Daufresne's formula was made as follows:

Chlorinated Lime	30 Gm.
Monohydrated Sodium Carbonate	15 Gm.
Sodium Bicarbonate	12 Gm.

This made an alkaline solution that assayed 0.73% (19.6) hypochlorite.

In the U. S. P. formula the quantities taken were:

Chlorinated Lime	30 Gm.
Exsiccated Sodium Phosphate	30 Gm.

This solution also was alkaline, and assayed 0.54+% hypochlorite. The assay method used for the chlorinated lime is that given in "Coblentz's Volumetric Analysis."

Both formulas were started and finished the same evening.

"A" and "B" represented diluted proprietary preparations, "A" being the stronger; however, both were diluted to approximate 0.5% hypochlorite. Samples of each of these, including an M. R. H. formula, were placed in a large incubator at 37° C. for 24 hours, assayed, and this routine repeated twice, with the following results:

Daufresne	U. S. P. X.	"A".	"B".	M. R. H.
Before heat				
	−0.73%(19.6)	−0.54+%(14.5)	−0.498%(13.4)	−0.56%(15)	−0.47+%(12.6)
After 24 hours at 37° C.				
	−0.63%(16.9)	−0.533%(14.3)	−0.498%(13.4)	−0.545%(14.7)	−0.415+%(11.2)
After 48 hours at 37° C.				
	−0.63%(16.9)	−0.53+%(14.2)	−0.49+%(13.2)	−0.545%(14.7)	———
After 72 hours at 37° C.				
	−0.63%(16.9)	−0.53+%(14.2)	−0.49%(13.15)	−0.54%(14.5)	———
Unheated 48 hours				
	−0.624%(16.8)	−0.53+%(14.2)	None saved	None saved	0.343%(9.2)

(The figures in parentheses are the number of cc. volumetric solution actually consumed.)

A portion of the chlorinated lime was now removed from the container, all lumps crushed, and the whole thoroughly mixed—a sample assayed 20.8% chlorine.

Twenty-five (25) Gm. of this lime, 12.5 Gm. monohydrated sodium carbonate, and 10 Gm. sodium bicarbonate were taken for one-liter lots of each of the follow-

ing methods: Daufresne, cold; Daufresne, using water heated to 50° C.; U. S. P. X., allowing the sodium phosphate solution to become entirely cold before mixing using 300 cc. of water for the lime, and 500 cc. for the sodium phosphate solution. In all three methods water was passed through the filter to make 1000 cc.

The three lots were treated three ways,—one portion was put in amber bottles kept in a darkened place, and disturbed as little as possible; another portion was placed in flint bottles and kept in mixed daylight,—part time in direct sunlight, the rest of the time in varying degrees of diffused light; and a third portion was placed in the incubator for 24 hours, like the first two lots.

The results were as follows:

	Daufresne, cold water.	Daufresne, hot water.	U. S. P. X., cold.
When made	−0.53% (14.2)	0.537%(14.4)	0.48% (12.9)
After 24 hours, amber	−0.53% (14.2)	0.537% (14.4)	0.48% (12.9)
After 24 hours, heat	−0.52% (13.9)	0.533% (14.3)	0.48% (12.9)
After 24 hours, daylight	−0.52+% (14)	0.525% (14.15)	0.47−% (12.6)

From the tabulations it will be seen that the first lots made, and the dilutions, lost a little during the first 24 hours' incubation, but very little on subsequent heatings, and that the unheated 48-hour portions were equally as poor by age and daylight.

The same is practically true of the three succeeding lots made.

It should be noted that the neutral M. R. H. lot suffered most by age.

A portion diluted for assay was then heated to 50° C. and again assayed when cool, showing no deterioration.

Then a portion of the U. S. P. X. lot was heated to 50° C. and assayed about four hours afterward, showing a slight gain, probably by loss of some water, as follows: heated, 0.488% (13.1), unheated, in amber bottle, 0.484% (12.95), unheated, in flint bottle, in daylight, 0.47% (12.6). After 24 hours all three solutions still assayed the same.

CONCLUSIONS.

These results prove conclusively that Dakin solutions may be heated to 50° C. without serious injury, and that daylight is a stronger decomposing factor than heat.

The observations on the U. S. P. X. formula are that the gelatinous nature of the calcium phosphate precipitate holds some of the soluble hypochlorite so tenaciously that the amount of water is not sufficient to remove all of it, and that the filtration process is consequently too long and tedious.

The calcium carbonate precipitates yield the soluble hypochlorite more readily and filtration is fairly rapid.

The method of assaying the finished preparation is as follows: 10 cc. of preparation, contained in a suitable Erlenmeyer flask, is diluted to about 50 cc. with water used as a rinse for the 10 cc. cylinder measure; 1 Gm. potassium iodide is added, the fluid is rotated until solution is completed, quickly followed by 4 cc. glacial acetic acid, mixed and immediately titrated with $N/10$ sodium thiosulphate *V.S.* Ten cc. of a 0.5% sodium hypochlorite requires 13.43 cc. $N/10$ thiosulphate volumetric solution.

These results were not calculated arithmetically, but were read off on a properly set slide rule.

ABSTRACT OF DISCUSSION.

Lyman F. Kebler stated that many persons could not understand why the Post Office would not accept Labarraque's Solution and other chlorine-yielding preparations, as under some conditions chlorine gas would be given off, and that the gas or the spilling of chlorine solutions would bleach writing, corrode metal articles, and destroy photographic plates and films, when coming in contact with these. His Department welcomed direct information concerning the nature of preparations, as testing was the only means of learning the composition of such compounds, where no other information is available.

John C. Krantz, Jr. stated that the U. S. P. X formula was submitted by the University of Maryland; that he had this preparation tried at the Johns Hopkins Hospital, and the pharmacist there, had no difficulty in filtering the fluid from the precipitate, although the precipitate was bulky. He asked if the stability tests were made on solutions adjusted to the same degree of alkalinity, stating that Dakin's solution with a p_H 9 to p_H 11 were practically stable, and this was the controlling factor in the stability of the preparation.

I. M. Kolthoff agreed with the former speaker on the stability of Dakin's solution, and asked if the author experienced difficulty with the end of the titration.

Irwin A. Becker, answering the last speaker, stated that in titrating the iodine, the reagent was added to the solution until a pale yellow color was obtained (nearly the end-point), when the starch solution was added and the titration continued to the end-point, being careful not to overstep it.

In assaying chlorinated lime he found instances where the end-point was indefinite (the blue color returning after disappearing), the iodine apparently being liberated very slowly.

The addition of more acid, in each instance, made the end-point sharp and the discharge of the blue color permanent.

In regard to dichloramine-T he found no first-class sample, some being fairly good when first opened, but soon developing a strong chlorinous odor. He would readily recommend a solution like Dakin's, or a more concentrated one of similar kind, but it could not be sent through the mail because of bleaching, in case the container was broken or leaked.

In answering Dr. Krantz, he stated that he started out with the idea that heat was a more destructive agent than it proved to be, and because of this the sodium phosphate solution was allowed to become entirely cold before using in one batch of U. S. P. X formula, and dissolved in a larger amount of water so that it should not crystallize when cold.

One liter of Daufresne's formula was finished in 35 minutes, while the U. S. P. X liter, with the cold sodium phosphate solution, was allowed to filter over night and was not finished until after 8:30 A.M. the next morning, hastening it all he could.

Two batches were finished in one evening, the calcium phosphate precipitate requiring double the time of the calcium carbonate precipitate formula. The two proprietary preparations proved exceedingly stable under the heat conditions, more stable than the neutral solution made by precipitating the lime from one of them, this lime alkalinity being objected to by some of the doctors. Under very bad influences it became below par before four days.

THE SECTION ON EDUCATION AND LEGISLATION: ITS STATUS AND CHANCE.

BY J. G. BEARD.*

During the last few years the Section on Education and Legislation of the A. Ph. A. has failed to secure the support and interest which its intended position in the association machinery warrants. From being the most popular section in the organization, it has become the least liked, not so much from positive as from negative causes. Various reasons are advanced to explain the decline in prestige and power which it once enjoyed, and among these reasons are two which are most

* Secretary Section, A. Ph. A., 1924-1925.