

Boric acid is a most widely used antiseptic for the treatment of the eye conditions, and yet its solution (1 to 100) does not kill typhoid bacilli even after 15 minutes.

Hydrogen Peroxide is one of the most largely used antiseptics, and yet its germicidal powers are so weak, compared with phenol, that the determination of its coefficient is admittedly impracticable. (Bulletin No. 82, Hygienic Laboratory, 1912, 65).

The Hygienic Laboratory Method of standardizing disinfectants, with and without organic matter, has been adopted by the Council of Pharmacy and Chemistry of the American Medical Association, and it is very probable that the use of this method will become general in the United States, and displace other methods. It is not a perfect method and is not claimed to be, but its use within certain limitations (that is, applied only to disinfectants of the coal tar group), will do much to standardize a very variable group of commercial products.

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#### THE EFFECT OF PARA'ORMALDEHYDE, PHENOL AND CREOSOTE ON THE DIGESTIVE ACTION OF PEPSIN, PANCREATIN AND DIASTASE.\*

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Paraform, the crystallized, polymeric form of formaldehyde, has for a considerable number of years been to a slight extent employed in doses of from 5 to 15 grains as an intestinal antiseptic. Owing to the readiness with which formaldehyde is liberated from paraform, and the well-known disturbing action of this vigorous gas on digestive processes and its tendency to harden tissues and render protein substances insoluble, the use of paraform in these heroic doses has been limited.

Our interest was recently directed to a more careful study of effect of paraform on the digestive ferments by a suggestion from Dr. Walter J. Freeman of Philadelphia, who wished to employ this drug in small doses in the form of lozenges or pastilles. Some tablets were prepared, each containing Paraform  $\frac{1}{4}$  grain, Sodium Bicarbonate  $2\frac{1}{2}$  grains, Talcum 1 grain, Sugar q. s. 20 grains, Oil of Peppermint q. s. to flavor, and tests were then made to determine what interfering effect, if any, these would have on the artificial digestion of proteids and starch.

As we wished to have something with which to compare the paraform, we also ran tests in which the effects of phenol and of creosote were studied. In order to make the experiments comparable as nearly as possible to its use in the case of patients under normal food conditions, we considered the average amount of egg albumin taken at one time as a "food dose" to be that contained in two eggs, or about 30 grams. In the tests with starch, 22.5 to 24 grams of dried starch were taken as normal food dose. The amounts of paraform, phenol

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and creosote to be taken as one dose, were considered to be respectively,  $\frac{1}{4}$  grain, 1 grain and 3 minims. All tests were based upon these ratios between food and medicament.

EFFECTS UPON PEPSIN.

Digestion tests were run in strict accord with the U. S. P. method for testing pepsin. A blank test run without pepsin or added substance other than egg albumin and acid solution gave the volume of egg albumin (40 cc.) upon which to base percentages. A second test with added pepsin showed the latter to be strictly 1-3000 and to leave, therefore, 1 cc. of undigested albumin. The following table shows these results, together with the results obtained when paraform, phenol and creosote were added in the proportions respectively of  $\frac{1}{4}$  grain, 1 grain and 3 minims to 30 gm. of coagulated egg albumin.

	Contents.	Amount Egg Alb. left.	Decrease in Activity of Pepsin.
No. 1	10 gm. egg, 35 cc. Acid Sol.....	40 cc.	0
No. 2	10 gm. egg, 35 cc. Acid Sol. 5 cc. Pepsin Sol.	1 cc.	0
No. 3	10 gm. egg, 35 cc. Acid Sol. 5 cc. Pepsin Sol. 1-12 gr. Paraform.....	1 cc.	0
No. 4	10 gm. egg, 35 cc. Acid Sol. 5 cc. Pepsin Sol. 1-3 gr. Phenol.....	2 cc.	5%
No. 5	10 gm. egg, 35 cc. Acid Sol. 5 cc. Pepsin Sol. 1 min. Creosote.....	4 cc.	10%

The above tests show that a normal dose of Paraform ( $\frac{1}{4}$  gr.) has no inhibiting effect upon the digestive action of Pepsin, that a normal dose of Phenol (1 gr.) has a slight inhibiting effect, and that a normal dose of Creosote (3 min.) has more inhibiting effect than phenol.

To find out how much three times the normal dose of Paraform, Phenol and Creosote would inhibit the activity of the Pepsin, the following experiments were conducted:

	Contents.	Amount Egg Alb. left.	Decrease in Activity of Pepsin.
No. 1	10 gm. egg, 35 cc. Acid Sol.....	43 cc.	0
No. 2	10 gm. egg, 35 cc. Acid Sol. 5 cc. Pepsin Sol.	1 cc.	0
No. 3	10 gm. egg, 35 cc. Acid Sol. 5 cc. Pepsin Sol. 1-4 gr. Paraform.....	24 cc.	55.8%*
No. 4	10 gm. egg, 35 cc. Acid Sol. 5 cc. Pepsin Sol. 1 gr. Phenol.....	3 cc.	7%
No. 5	10 gm. egg, 35 cc. Acid Sol. 5 cc. Pepsin Sol. 3 min. Creosote.....	29 cc.	67%

\* As the Paraform tablets contained sodium bicarbonate it was believed that the large amount of egg albumin left was due to the fact that the acid was partly neutralized by the bicarbonate. A new series of tests were made, and the tablet neutralized with 0.3 percent Hydrochloric Acid before adding it to the Pepsin, Acid Sol. and Egg Albumin mixture. After 2½ hours there remained 12 cc. egg albumin or 28 percent decrease in activity of Pepsin due to three times the normal dose of Paraform, exclusive of the inhibiting effect of the bicarbonate in the tablet.

EFFECT UPON PANCREATIN.

Digestion tests made with starch in accordance with the U. S. P. method showed that Paraform, Phenol and Creosote have no inhibiting effect upon the

converting power of the Pancreatin even if the dose is increased to three times the medicinal dose. 22.5 gm. of starch was taken as a normal dose in the tests with Pancreatin. The following table shows the effect of the "normal" doses of paraform, phenol and creosote:

	Contents.	Color.	Decrease in Activity of Pancreatin.
No. 1	7.5 gm. starch, 0.3 gm. Pancreatin.....	Wine	0
No. 2	7.5 gm. starch, 0.3 gm. Pancreatin, 1-12 gr. Paraform.....	Wine	0
No. 3	7.5 gm. starch, 0.3 gm. Pancreatin, 1-3 gr. Phenol.....	Wine	0
No. 4	7.5 gm. starch, 0.3 gm. Pancreatin, 1 min. Creosote.....	Wine	0

The next table shows that even 3 times these "normal" doses was without effect upon the conversion of starch.

	Contents.	Color.	Decrease in Activity of Pancreatin.
No. 1	7.5 gm. starch, 0.3 gm. Pancreatin.....	Wine	0
No. 2	7.5 gm. starch, 0.3 gm. Pancreatin, 1-4 gr. Paraform.....	Wine	0
No. 3	7.5 gm. starch, 0.3 gm. Pancreatin, 1 gr. Phenol.....	Wine	0
No. 4	7.5 gm. starch, 0.3 gm. Pancreatin, 3 min. Creosote.....	Wine	0

#### EFFECT UPON DIASTASE.

About 24 gm. of starch was taken as a normal dose, in tests with Diastase.

	Contents.	End of 1 hr.	End of 1¼ hrs.	End of 1½ hrs.	End of 2 hrs.	Decrease in Activity of Diastase.
No. 1	16 gm. starch, 0.064 gm. Diastase.	Blue	Pale Blue	Pale Purple	Wine	0
No. 2	16 gm. starch, 0.064 gm. Diastase, 2-4 gr. Paraform.....	Very Blue	Blue	Blue	Pale Blue	Approx. 10%
No. 3	16 gm. starch, 0.064 gm. Diastase, 2 grs. Phenol.....	Blue	Pale Purple	Wine	Pale Wine	0
No. 4	16 gm. starch, 0.064 gm. Diastase, 6 min. Creosote.....	Pale Blue	Pale Purple	Wine	Pale Wine	0

The above table shows that Phenol and Creosote, in three times their normal doses, have no inhibiting effect upon Diastase. In the case of Paraform there is a slight inhibiting effect amounting approximately to 10 percent of the activity of the Diastase.

#### SUMMARY.

*Paraform.* A normal dose of paraform ( $\frac{1}{4}$  grain) had no inhibiting effect upon the action of either pepsin, pancreatin or diastase.

Three times the normal dose of paraform ( $\frac{3}{4}$  grain) had an inhibiting effect upon the action of pepsin amounting to about 28 percent and on diastase amounting to about 10 percent.

Three times the normal dose of paraform ( $\frac{3}{4}$  grain) had no inhibiting effect upon the action of pancreatin.

*Phenol.* A normal dose of phenol (1 grain) had an inhibiting effect on pepsin amounting to about 5 percent, while three times the normal dose seemed to increase the inhibiting effect only to about 7 percent.

Three times the normal dose of phenol (3 grains) had no inhibiting effect either upon pancreatin or diastase.

*Creosote.* A normal dose of creosote (3 minims) had an inhibiting effect upon pepsin amounting to about 10 percent, while three times the normal dose of creosote (9 minims) increased the inhibiting effect on pepsin to about 67 percent.

Three times the normal dose of creosote (9 minims) seemed to have no inhibiting effect either upon pancreatin or diastase.

It must be remembered, of course, that all of these experiments were carried out as laboratory experiments in glass and it does not necessarily follow that paraform administered either to healthy or sick patients, would be without disturbing influences on digestion.

ANALYTICAL LABORATORY OF H. K. MUIFORD COMPANY, June 19, 1913.

EXAMINATION OF TIN FOILS FOR ARSENIC, AND A MODIFIED GUTZEIT'S TEST.\*

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I submit the following in answer to query No. 5, being data on a few tin foils which were obtained from several sources, i. e., Chocolate Candy, Gum, Tobacco, etc.

The work was carried out by first effecting solution by means of aqua regia, dispelling excess of acid, acidulating with dilute hydrochloric acid, and warming until a clear solution was obtained, except in the case of the so-called lead foils.

The arsenic was then determined qualitatively by means of a Marsh Arsenic Tube, and checked by a proposed modified Gutzeit's Method, both methods being continued one hour.

Below are given the foils in two groups, first, those which are practically pure tin foils; second, those which show a heavy lead reaction, and herein designated as lead foils.

Tin Foils—	
Fleishman's Yeast.....	Arsenic absent
Baker's Bitter Chocolate.....	Arsenic absent
Wittman's Candy "Sampler".....	Arsenic absent
Wittman's Candy "Sampler," gilded.....	Arsenic trace
Cream Cheese, Shefford Cheese Co.....	Arsenic absent
Mulford's Phenolphthalein Chocolates.....	Arsenic absent
Peter's Sweet Milk Chocolate.....	Arsenic trace
Peter's Sweet Milk Chocolate, 2 specimens.....	Arsenic absent
Hershey's Sweet Milk Chocolate.....	Arsenic trace
Bryn Mawr Chocolate, green foil.....	Arsenic absent
Bryn Mawr Chocolate, lavender foil.....	Arsenic absent
Wilbur's Chocolates.....	Arsenic absent
Fleishman's Yeast Spec., No. 2.....	Arsenic absent
Lead Foil—	
Johnson's Bitter Chocolates.....	Arsenic absent
Beechnut Chewing Gum.....	Arsenic absent
Piper Heidseck Chewing Tobacco.....	Arsenic absent
Beeman's Chewing Gum.....	Arsenic absent
Fatima Cigarettes.....	Arsenic present
Five Brothers Tobacco.....	Arsenic absent

\* Presented to the Pennsylvania Pharmaceutical Association, July, 1913.