

MR. MAYO: Physically there is a difference in the degree of hardness and that is shown and mentioned in the paper; chemically the reaction is apparently the same.

MR. GRIFFITH: I wonder if I am right in saying that it depends on the nature of the oil with which you start. Palmitin oils, oils containing an amount of palmitin, do not show physical changes as quickly as those containing a large amount of olein. Consequently an oil containing a certain amount of palmitin and olein is not of such hard consistency when the end reaction is reached.

MR. JONES: About five years ago I started with some investigations along these lines. I used "Crisco;" tried it out as a substitute for ordinary lard in the making of zinc oxide ointment, advocating the adoption of a petrolatum vehicle in that particular ointment, which was afterward rejected. I have a sample of that ointment on hand which is fully five years old. However, I do not advocate keeping zinc ointment five years. This sample is perfectly smooth and a fine ointment.

One of the peculiarities of hydrogenated fats, particularly with the "Crisco," is, that when melted and quickly cooled a smooth product is obtained. The stiffness of such fat is dependent on the amount of unsaturated fatty acids or glycerides which are present.

Hydrogenated cacao butter is peculiar. When it is hydrogenated a waxy substance results which resembles in appearance carnauba wax. It has a brittle structure which probably makes it useful as a base for cacao butter suppositories.

I took up the matter with the "Crisco" manufacturers and asked them why they could not put out a stiffer hydrogenated fat than "Crisco." They replied that it was used mostly for cooking and the women did not care whether it cooled smoothly, or not. By inclusion of fifteen percent of wax a very smooth product of desirable consistency is obtained.

THE CHAIRMAN: About four years ago I had occasion to examine a sample of zinc oxide ointment. I thought there was petrolatum in it, but I found that was not the case. The melting point of the fat was a little higher than it should be, and it was certainly made of a hydrogenated oil. It was put up by a large pharmaceutical manufacturing firm, labeled strictly U. S. P. If the degree of absorption is the same it makes no particular difference, or as is usually the case with zinc oxide ointment, but when it is used in cases where rapidity of penetration is essential this point should be considered.

(Samples of hydrogenated oils were supplied by courtesy of Procter & Gamble Company.—E. V. K.)

LABORATORIES OF THE CINCINNATI SOAP COMPANY
AND THE WM. S. MERRELL COMPANY.

THE FUNCTION OF GLYCERIN IN SOME U. S. P. AND N. F. PREPARATIONS.*

BY EDSSEL A. RUDDIMAN.

The object of these experiments was to determine if possible the value of glycerin in some preparations; whether it adds to the permanency or in any way makes them better.

Samples were made up in August 1918, following the formulas of the U. S. P. and N. F. At the same time samples were made up in which glycerin was replaced by other fluids. Five samples of each preparation were made as follows:

- No. 1. In each case the formula given was used.
- No. 2. Glycerin was replaced by syrup.
- No. 3. Glycerin was replaced by water.
- No. 4. Glycerin was replaced by a commercial solution of invert sugar.

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., New York meeting, 1919.

No. 5. Glycerin was replaced by a solution of glucose, specific gravity about 1.21.

To avoid repetition, reference will be made to these samples by number instead of stating the modifications of the formula each time.

The solution of invert sugar used had some yellow color and this accounts in some cases for the preparations made from it being darker than others.

These preparations were examined about the middle of February 1919, and again in August, the notations being given in the following table:

TABLE SHOWING VARIATIONS IN PREPARATIONS—PERCENT GLYCERIN REFERS TO AMOUNT IN U. S. P. OR N. F. PREPARATION.

Preparation.	When first made.	At end of six months.		At end of one year.	
	Color.	Color.	Appearance— Precipitate.	Color.	Appearance— Precipitate.
Elixir of Bismuth (12.5% Glycerin).					
No. 1.....	Colorless	Colorless	Clear	Colorless	Clear
No. 2.....	Colorless	Colorless	Clear	Colorless	Clear
No. 3.....	Colorless	Colorless	Clear	Colorless	Clear
No. 4.....	Pale yellow	Deep yellow	Clear	Light amber	Clear
No. 5.....	Colorless	Colorless	Clear	Colorless	Clear

Remarks—Practically the same except in sweetness.

Elixir Calcium and Sodium Glycerophosphates (30% Glycerin).

No. 1.....	Colorless	Colorless	Clear	Colorless	Clear
No. 2.....	Colorless	Colorless	Clear	Very pale yellow	Clear
No. 3.....	Colorless	Colorless	Clear	Colorless	Clear
No. 4.....	Pale yellow	Pale yellow	Clear	Pale yellow	Clear
No. 5.....	Colorless	Colorless	Clear	Colorless	Clear

Remarks—Difference in sweetness. No. 1 had disagreeable taste on account of so much glycerin—Choice, No. 2.

Elixir of Gentian (5% Glycerin).

No. 1.....	Red	Red	Clear	Red	Clear
No. 2.....	Red	Red	Clear	Red	Clear
No. 3.....	Red	Red	Clear	Red	Clear
No. 4.....	Red	Red	Clear	Red	Clear
No. 5.....	Red	Red	Clear	Red	Clear

REMARKS—No appreciable difference—Choice, No. 2.

Compound Elixir of Glycerophosphates (35% Glycerin).

No. 1.....	Greenish yellow	Reddish	Slimy precipitate	Dirty brown	Black precipitate covering bottom of bottle
No. 2.....	Greenish yellow	Deep straw	Flaky precipitate	Pale greenish brown	Similar to No. 1
No. 3.....	Greenish yellow	Light amber	Flaky precipitate	Light straw	Flaky, brownish yellow
No. 4.....	Darker green	Light amber	Flaky precipitate	Red-brown	Light brown
No. 5.....	Similar to No. 1	Deep straw	Slight precipitate	Similar to No. 2	Light brown.

Remarks—None of these samples are satisfactory. In taste, No. 2 is preferable to No. 1.

Preparation.	When first made.	At end of six months.		At end of one year	
	Color.	Color.	Appearance— Precipitate.	Color.	Appearance— Precipitate.
Solution of Ferric Hypophosphite (15% Glycerin).					
No. 1.....	Green	Green	Crystalline film at bottom	Dark green	Thin crystalline layer
No. 2.....	Green	Much darker than No. 1	Considerable precipitate
No. 3.....	Green	Similar to No. 1	Crystalline film	Lighter than No. 1	Similar to No. 1. Some, but suspended
No. 4.....	Green	Much darker than No. 1	Not perceptible	Dirty reddish brown
Remarks—Considerable pressure in all. Bottle No. 2 burst.					
Solution of Ferrous Chloride (25% Glycerin).					
No. 1.....	Green	Green	Clear	Yellowish green	Very slight flocculent precipitate
No. 2.....	Green	Very dark	Slimy precipitate	Light brown	Dark brown precipitate covers bottom
No. 3.....	Green	Green	Clear	Light green	Clear precipitate
No. 4.....	Green	Dark brown	Slimy precipitate	Darker than No. 2	Similar to No. 2
No. 5.....	Green	Green	Slight precipitate	Light green	Very slight precipitate
Remarks—Nos. 2 and 4 had an odor of caramel. No ferric iron present at end of a year.					
Solution of Ferric Salicylate (17.5% Glycerin).					
No. 1.....	Deep red	Deep red	Clear	Very dark	None settled
No. 2.....	Deep red	Deep red	Clear	Very dark	None settled
No. 3.....	Deep red	Darker than No. 1	Clear	Very dark	None settled
No. 4.....	Deep red	Very dark	Clear	Very dark	None settled
No. 5.....	Deep red	Darker than No. 1	Slight precipitate	Very dark	None settled
Remarks—All samples were a little turbid.					
Compound Solution of Hypophosphites (35% Glycerin).					
No. 1.....	Light yellow	Straw	Clear	Straw	Clear
No. 2.....	Light yellow	Straw	Clear	Darker than No. 1	Clear
No. 3.....	Light yellow	Amber	Clear	Dark amber	Clear
No. 4 (lost).....
No. 5.....	Light yellow	Similar to No. 1	Clear	Between No. 1 and No. 2	Clear
Remarks—Trace of mold in No. 2 and No. 5—Choice, No. 1.					
Compound Solution of Phosphates (37.5% Glycerin).					
No. 1.....	Greenish yellow	Red straw	Considerable flaky precipitate	Reddish brown	Considerable crystalline mass
No. 2.....	Similar to No. 1	Dark reddish	Considerable precipitate	Very dark reddish brown	Crystalline precipitate
No. 3.....	Similar to No. 1	Light straw	Similar to No. 2	Light greenish yellow	Similar to No. 2
No. 4.....	Little darker than No. 1	Very dark red	Slight precipitate	Similar to No. 2	Less than No. 2
Remarks—Crystals were small isometric. Odor of caramel in No. 2 and No. 4. None were satisfactory.					

Preparation.	When first made.	At end of six months.		At end of one year.	
	Color.	Color.	Appearance— Precipitate.	Color.	Appearance— Precipitate.
Syrup of Hypophosphites (5% Glycerin).					
No. 1.....	Colorless	Colorless	Clear	Clear	Colorless
No. 2.....	Colorless	Colorless	Clear	Colorless	Clear
No. 3.....	Colorless	Colorless	Clear	Colorless	Clear
No. 4.....	Pale yellow	Pale yellow	Very slight precipitate	Yellowish	Slight precipitate
No. 5.....	Colorless	Colorless	Clear	Colorless	Clear

Remarks—Very slight growth in No. 2 and No. 3—Choice, No. 1

Syrup of Ipecac (10% Glycerin).					
No. 1.....	Red-brown	Red-brown	Slight precipitate	Red-brown	Slight precipitate
No. 2.....	Red-brown	Red-brown	Slight precipitate	Red-brown	Slight precipitate
No. 3.....	Red-brown	Red-brown	Slight precipitate	Red-brown	Slight precipitate
No. 4.....	Red-brown	Red-brown	Slight precipitate	Lighter than No. 1	Slight precipitate
No. 5.....	Red-brown	Darker than No. 1	Slight precipitate	Darker than No. 1	Slight precipitate

Remarks—No. 3 is U. S. P., except acetic acid is omitted—Choice, No. 2.

Syrup of Wild Cherry (5% Glycerin).					
No. 1.....	Red	Red	Slight precipitate	Red	Slight precipitate
No. 2.....	Red	Red	Slight precipitate	Red	Slight precipitate
No. 3.....	Red	Red	Slight precipitate	Red	Slight precipitate
No. 4.....	Red	Red	Slight precipitate	Red	Slight precipitate
No. 5.....	Red	Red	Slight precipitate	Red	Slight precipitate

Remarks—When first made, No. 1 was slightly darker than others, but in February they were similar—Choice, No. 2.

Syrup of Ammonium Hypophosphite (10% Glycerin).					
No. 1.....	Pale yellow	Pale yellow	Very slight precipitate	Yellow	Very slight precipitate
No. 2.....	Pale yellow	Pale yellow	Very slight precipitate	Yellow	Very slight precipitate
No. 3.....	Pale yellow	Slightly lighter	Very slight precipitate	Sample lost
No. 4.....	Slightly darker	Slightly darker	Very slight precipitate	Light amber	Very slight precipitate
No. 5.....	Pale yellow	Pale yellow	Very slight precipitate	Yellow	Very slight precipitate

Remarks—Practically no difference except No. 4 is deeper yellow—Choice, No. 2.

Syrup of Ferrous Chloride (12.5% Glycerin).					
No. 1.....	Pale yellow	Pale yellow	Very slight precipitate	Light yellow	Very slight precipitate
No. 2.....	Pale yellow	Pale yellow	Very slight precipitate	Light yellow	Very slight precipitate
No. 3.....	Pale yellow	Pale yellow	Very slight precipitate	Light yellow	Very slight precipitate
No. 4.....	More yellow	Pale yellow	Very slight precipitate	Light brown	Very slight precipitate
No. 5.....	Pale yellow	Pale yellow	Very slight precipitate	Light brown	Very slight precipitate

Remarks—Practically no difference except No. 4 is a little darker. No ferric iron was present at end of a year.

Preparation.	When first made.	At end of six months.		At end of one year.		
	Color.	Color.	Appearance— Precipitate.	Color.	Appearance— Precipitate.	
Syrup of the Phosphates of Iron, Quinine and Strychnine (10% Glycerin).	No. 1.....	Light yellow	Dark	Small crystals	Dark reddish	Crystalline precipitate
	No. 2.....	Light yellow	Darker than No. 1	Similar to No. 1	Similar to No. 1	Similar to No. 1
	No. 3.....	Light yellow	Slightly darker than No. 1	Nearly clear	Similar to No. 1	Very slight precipitate
	No. 4.....	Deeper yellow	Darkest	Clear	Darker than No. 1	Very slight precipitate
	No. 5.....	Light yellow	Similar to No. 2	Crystals on sides of bottle	Similar to No. 1	Large crystalline precipitate

Remarks—None of these formulas are satisfactory.

Compound Syrup of Hypophosphites (5% Glycerin).

No. 1.....	Pale straw	Deep straw	Clear	Deeper than others	Clear
No. 2.....	Pale straw	Pale straw	Clear	Pale straw	Clear
No. 3.....	Pale straw	Pale straw	Clear	Pale straw	Clear
No. 4.....	Straw	Deep straw	Clear	Darker than No. 3	Clear
No. 5.....	Pale straw	Pale straw	Clear	Lightest	Clear

Remarks—But little difference in color between them. Slight growth in No. 5—Choice, No. 2.

Compound Syrup of the Phosphates (15% Glycerin).

No. 1.....	Red	Dark red	Flocculent precipitate	Dark red	Considerable precipitate
No. 2.....	Red	Similar to No. 1	Less precipitate than No. 1	Similar to No. 1	Less than No. 1
No. 3.....	Red	Similar to No. 1	More precipitate than No. 2	Similar to No. 1	Least precipitate
No. 4.....	Red	Very dark	Less precipitate than No. 2	Similar to No. 1	Similar to No. 1
No. 5.....	Red	Very dark	Less precipitate than No. 1	Darker than No. 1	Similar to No. 2

Remarks—None of these samples were satisfactory.

Syrup of Phosphates with Quinine and Strychnine (15% Glycerin).

No. 1.....	Light greenish yellow	Dark	Bulky precipitate	Dark reddish brown	Bulky precipitate
No. 2.....	Light greenish yellow	Dark	Less than No. 1	Similar to No. 1	Slight precipitate
No. 3.....	Light greenish yellow	Lighter than No. 1	Less than No. 2	Lighter than No. 1	More precipitate than No. 2
No. 4.....	Straw	Darker than others	Slight precipitate	Similar to No. 1	More precipitate than No. 3
No. 5.....	Light straw	Lighter than No. 1	Slight precipitate	Similar to No. 1	Less precipitate than No. 1

Remarks—None of these samples were satisfactory.

Preparation.	When first made.	At end of six months.		At end of one year.	
	Color.	Color.	Appearance— Precipitate.	Color.	Appearance— Precipitate.
Compound Syrup of White Pine (10% Glycerin).					
No. 1.....	Red	Red	Flocculent pre- cipitate	Red	Flocculent pre- cipitate
No. 2.....	Red	Red	Flocculent pre- cipitate	Red	Flocculent pre- cipitate
No. 3.....	Red	Red	Flocculent pre- cipitate	Red	Flocculent pre- cipitate
No. 4.....	Red	Red	Flocculent pre- cipitate	Red	Flocculent pre- cipitate
No. 5.....	Red	Red	Flocculent pre- cipitate	Red	Flocculent pre- cipitate
Remarks—No appreciable difference—Choice, No. 2.					
Compound Syrup of Stillingia (10% Glycerin).					
No. 1.....	Red	Red	Bulky, floccu- lent precipi- tate	Red	Bulky, floccu- lent precipi- tate
No. 2.....	Red	Red	Bulky, floccu- lent precipi- tate	Red	Bulky, floccu- lent precipi- tate
No. 3.....	Red	Red	Bulky, floccu- lent precipi- tate	Red	Bulky, floccu- lent precipi- tate
No. 4.....	Red	Red	Bulky, floccu- lent precipi- tate	Red	Bulky, floccu- lent precipi- tate
No. 5.....	Red	Red	Bulky, floccu- lent precipi- tate	Red	Bulky, floccu- lent precipi- tate
Remarks—No appreciable difference—Choice, No. 2.					

In sample No. 5 of the syrup of hypophosphites, syrup of ferrous chloride, and syrup of the phosphates of iron, quinine and strychnine, the "heavy" syrupy glucose was used in place of the solution of specific gravity 1.21.

All of the samples of solution of ferric hypophosphite produced gas and in sample No. 2 a sufficient amount to burst the bottle. This gas is due not to fermentation but to the oxidizing effect of the ferric salt in strong solution on the citrate in the presence of light. Difficulty was experienced in getting all of the iron salt into solution and the addition of more citrate seemed to cause greater subsequent precipitation. Samples in which the iron hypophosphite was cut from 165 Gm. per liter to 150 Gm. per liter showed less precipitation.

Samples of elixir of hypophosphites, compound elixir of vanillin, and mixture of rhubarb were made in the summer of 1919. At the end of six weeks there was no appreciable difference in appearance between the N. F. samples and those made by replacing glycerin by syrup or by water.

SUMMARY.

Invert sugar tends to lessen the amount of precipitation for a time. At the end of six months, the amount of precipitate was less in the samples containing invert sugar than in samples not containing it although at the end of twelve months there was not much difference in most cases.

These experiments go to show that glycerin is not necessary for the permanency of these preparations except in a few cases as in compound solution of hypophos-

phites and syrup of hypophosphites. The large amount of glycerin, as in elixir of calcium and sodium glycerophosphates and compound elixir of glycerophosphates, is objectionable because of the disagreeable taste which develops. On the other hand glycerin is preferred to syrup when the preparation contains a large percentage of acid or inorganic salt because sugar is so easily caramelized.

CHEMICAL RESEARCH DEPARTMENT,
PARKE, DAVIS & Co.,
DETROIT, MICHIGAN,
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ABSTRACT OF DISCUSSION.

MR. RAUBENHEIMER: While it is true that glycerin can be replaced to some extent, as Professor Ruddiman has reported, there are a great many preparations wherein it is absolutely necessary. The standards must be complied with, and the author has this in mind. The work done by him will, doubtless, prove of value in the revision of the standards.

PROTECTIVE OINTMENTS AGAINST MUSTARD GAS.*

BY JOHN M. WILLIAMS.

Mustard gas, dichlorodiethylsulphide, is an intense vesicant as well as being very toxic when inhaled. It has a marked action upon the eyes, causing temporary blindness, and quickly produces intense hoarseness followed by inflammation of the lungs. It penetrates clothing, producing a flesh wound of much the same character as the burn from phosphorus.

Mustard gas is produced by passing dry, pure ethylene into sulphur chloride at a temperature maintained within very narrow limits. Of the manufacture I will not go into detail.

Mustard gas was first used by the Germans on the Ypres sector in July 1917, and proved a formidable weapon, and had the Germans been able to manufacture it then on such a large scale as the Allies were doing at the time of the Armistice, there is little doubt that the allied lines would have melted, with a different conclusion of the war.

The need for a protection against mustard gas is realized when you consider the terrible burning effect of the liquid or gas. A small drop of the liquid on the skin will cause a marked erythema within a few hours, followed by a large blister, and a sore that heals very slowly. Exposure to the vapor gives a similar result, the severity of the burn depending upon the concentration of the vapor and the length of the exposure.

In considering possible preventatives or curative agents, attention must be drawn to the fact that absolutely no immediate effect of exposure of the external skin to mustard gas can be noticed. This decreases the value of any possible curative agents, and to be efficacious must be applied shortly after exposure. Exhaustive investigations failed to find an effective curative agent, although washing the exposed parts with kerosene, or soap and water, within one minute would keep it from burning. If washed within one-half hour a redness would appear, but this treatment is impossible under field conditions.

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., New York meeting, 1919.