

THE STABILIZATION OF SYRUP OF HYDRIODIC ACID, U. S. P. X.

BY WILLIAM J. HUSA² AND LYELL J. KLOTZ.

The troublesome discoloration of hydriodic acid preparations due to liberation of free iodine was overcome many years ago by use of hypophosphorous acid. The darkening of Syrup of Hydriodic Acid due to decomposition of the sugar, however, has remained as a problem up to the present time (1). The sucrose in Syrup of Hydriodic Acid is rapidly hydrolyzed into dextrose and levulose (2), (3). Haussmann (4) ascribed the discoloration to the decomposition of the levulose formed in this inversion.

In syrups of hydriodic acid containing no hypophosphorous acid, the dextrose formed on hydrolysis of sucrose tends to reduce any free iodine formed. From this point of view sucrose has sometimes been considered as a preservative in the syrup. In Syrup of Hydriodic Acid, U. S. P. X it would be erroneous to consider sucrose as a preservative because the hypophosphorous acid is fully effective in preventing the appearance of free iodine and the sucrose is the direct cause of the discoloration which occurs. Diluted Hydriodic Acid, U. S. P., will remain colorless indefinitely but as soon as sucrose is added to prepare the syrup an unstable preparation results.

From the above considerations it was thought that if Haussmann's views were correct, it should be possible to prepare a stable syrup of hydriodic acid by using hypophosphorous acid to prevent the appearance of free iodine and employing dextrose to give the preparation the properties of a syrup. Accordingly, syrups of hydriodic acid were prepared following the U. S. P. directions with the exception that the sucrose was omitted and the following sweetening agents used: (a) dextrose, C. P., 700 Gm. per L., (b) dextrose, commercial,³ 700 Gm. per L., (c) Glucose, U. S. P., 435 cc. per L. The deterioration of these syrups was compared with that of a U. S. P. Syrup of Hydriodic Acid in an accelerated test consisting of storage in an oven at 50° C. in completely filled, tightly stoppered bottles. The results are shown in the following table.

As indicated in Table I, dextrose proved vastly superior to sucrose in the syrup stored at 50° C. Tests are in progress under various other conditions of storage. The C. P. dextrose gave a colorless syrup to start with while the commercial dextrose yielded a syrup of a slight yellow tint; the yellow color of the syrup prepared from U. S. P. Glucose might be considered objectionable. By use of 700 Gm. of dextrose per L., a product of excellent palatability was obtained.

According to present price quotations, a syrup prepared with the above quantity of commercial dextrose should cost about 3¢ more per liter than the present Syrup of Hydriodic Acid; a preparation containing C.P. dextrose should cost approximately 80¢ more per liter. Obviously, these slight price increases are negligible in comparison with the greater stability of the preparation.

About 35 years ago, Scoville (5) prepared samples of syrup of hydriodic acid using glucose in place of sucrose but the preparations clouded on standing. The clouding may have been due to impurities but was not observed in syrups made with any of the grades of dextrose used in the present study.

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² Head Professor of Pharmacy, University of Florida.

³ For this we are indebted to the Penick and Ford Co., Cedar Rapids, Iowa.

TABLE I.—DETERIORATION OF SYRUPS OF HYDRIODIC ACID CONTAINING VARIOUS SUGARS.

Syrup Containing per Liter.	Appearance of Syrups after Storage in Oven at 50° C.			
	0 Days.	30 Days.	60 Days.	90 Days.
450 Gm. Sucrose (U. S. P. Syrup)	Colorless	Yellow; contains ppt. which re- dissolves on shaking	Dark brown liquid; copious black ppt. which partially redissolves on shaking	Black solution; black ppt.
700 Gm. C. P. Dextrose	Colorless	Colorless	Colorless solu- tion; traces of ppt. which re- dissolves on shaking	Pale yellow solu- tion; traces of ppt. which re- dissolves on shaking
700 Gm. Commercial dextrose	Slight yellow tint	Nearly colorless	Nearly colorless; traces of a black ppt. which re- dissolves on shaking	Pale yellow solu- tion; traces of a black ppt. which redis- solves on shak- ing
435 cc. U. S. P. glucose	Yellow	Yellow	Dark yellow	Very dark yellow

SUMMARY.

It has been found that a Syrup of Hydriodic Acid of greatly increased stability can be prepared by replacing the sucrose in the official formula by dextrose. Dextrose of C.P. quality gives the best preparation although a satisfactory preparation results from the use of commercial dextrose.

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SCHOOL OF PHARMACY,
UNIVERSITY OF FLORIDA,
GAINESVILLE, FLORIDA.

A STUDY OF VEHICLES FOR MEDICINES.*

BY BERNARD FANTUS, H. A. DYNIEWICZ AND J. M. DYNIEWICZ.

IX. FRUIT SYRUPS.

It may seem strange that fruit syrups, as delicious as they are and as extensively as they are employed in cooking and for the flavoring of beverages, are not used to a greater extent as vehicles for medicines. Syrup of Orange is the only U. S. P. representative of fruit syrups prescribed under its own name; and Syrup of Citric Acid, which is really an artificial lemon syrup, the only other one. In the National Formulary we have the Syrup of Raspberry.

* From the Laboratory of Pharmacology of the College of Medicine, University of Illinois.