

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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## A STUDY OF VEHICLES FOR MEDICINES.\*

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## 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.

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The Syrup of Wild Cherry has quite an extensive use and might be taken to represent a sort of cherry syrup. When, however, one notes the kind of "wild cherry syrup" that is being palmed off for the official preparation, which if not actually delicious is not offensive, one is not surprised that so many people detest the taking of medicine. Some of these "wild cherry syrups" are turbid, some of them have undergone fermentation so as to be sour in addition to being bitter and highly astringent.

We understand that a new formula for syrup of wild cherry is being contemplated and it is hoped that it will be a great improvement over the present one. Nevertheless we wonder whether anyone who would have a choice between a nice syrup of cherry and the best possible Syrup of Wild Cherry would not unhesitatingly choose the cherry syrup. Thus when it comes to flavoring fountain drinks no one would think of using *Syrupus Pruni Virginianæ* to prepare a delicious and refreshing drink. Then why treat medicines with the less delightful flavor and taste and make it more offensive than it needs to be? We would therefore like to see the syrup of cherry introduced in the United States Pharmacopœia or the National Formulary, so as to give it a chance to compete with the Syrup of Wild Cherry for medical favor.

Possibly the reason why fruit syrups have not been introduced more extensively in official formularies is the difficulty of securing a uniformly satisfactory standardized product. Thus, for instance, the syrup of raspberry of the National Formulary V is unsatisfactory because it introduces the variable factor of fermentation, which is relied upon to destroy the pectin. Unfortunately, quite often the fermentation advances to the stage of vinegar production while the pectin is being destroyed, spoiling thereby the fine aroma of the raspberry. At other times a different form of fermentation causes the production of a musty odor which is likewise objectionable.

We therefore believe that it is very important to control the fermentation process which destroys the pectin bodies, in such a way as to have this fermentation limit itself to this effect without producing other changes.

With this in view we have experimented extensively: employing various degrees of temperature, various degrees of avoidance of exposure to air even to the extent of excluding the access of air by a layer of liquid petrolatum. We have employed taka-diastase (which was recommended for this purpose); we have tried modifying the  $p_H$  value by addition of alkali and acid, all this without entire satisfaction.

We have secured the best results by adding 0.1% of benzoic acid to the strained fruit juice and permitting the mixture to stand at room temperature until a small portion of the filtered juice remains clear when one-half its volume of alcohol is added to it.

*It seems that the presence of benzoic acid permits the activity of the pectinase, while inhibiting vinegar and other bacterial fermentation.*

Objection might be raised to the presence of benzoic acid in these fruit syrups as advocated in the subjoined formulas on the ground that the use of such preservative in food products is illegal. Granted that the use of benzoic acid to be undesirable in food products that might be consumed in unlimited quantities and for an indefinite length of time, bringing the possibility of ingestion of a toxic dose,

such danger is not present in the use of a teaspoonful or even a tablespoonful of a less than 1-2000 solution of benzoic acid, several times daily for the usually limited time that medicines are taken. A great deal might be said on the subject of the joint responsibility of the prescribing physician and the dispensing pharmacist for the keeping qualities of the medicines dispensed. An investigation of the condition of medicines after they have been kept in the patients' homes for several days or longer might result in shocking revelations and in the wish that more medicines would be thrown down the sink than be forced down the unwilling throat of a struggling babe. It is well known that the keeping quality of syrups is entirely dependent upon their concentration. It is many times necessary to employ a certain amount of water to dissolve the medicinal ingredient and, unless this quantity of water be adjusted with extreme care which is usually not given it, the syrup becomes diluted to the spoiling point. The necessity of preventing this is obvious and it is respectfully submitted that the more general employment of benzoic acid or some other preservative in medicinal syrups be given more serious consideration.

That benzoic acid may introduce incompatibility is freely admitted. This is, however, no worse than the incompatibility, *e. g.*, of syrup of wild cherry with iron salts.

We therefore respectfully submit the consideration of the following three formulas for admission in the United States Pharmacopœia or the National Formulary.

### **SYRUPUS RUBI IDÆI.**

#### **Syrup of Raspberry.**

##### **Syr. Rub. Id.**

Press the juice from fully ripe raspberries through a flannel cloth. Dissolve in the raspberry juice 0.1 per cent of benzoic acid, and let the solution stand at room temperature until a small portion of the filtered juice produces a clear solution with one-half its volume of alcohol. Then clarify the juice by straining through flannel cloth and paper if necessary, and add to each 450 cc. of the clarified juice 850 Gm. of sucrose. Dissolve the sucrose in the juice by heat on a water-bath, cool and remove the scum.

Preserve the product in well-stoppered bottles in a cool and dark place.

### **SYRUPUS FRAGARIÆ.**

#### **Syrup of Strawberry.**

##### **Syr. Frag.**

Press the juice from fully ripe strawberries through a flannel cloth. Dissolve in the strawberry juice 0.1 per cent of benzoic acid, and let the solution stand at room temperature until a small portion of the filtered juice produces a clear solution with one-half its volume of alcohol. Then clarify the juice by straining through flannel cloth and paper if necessary, and add to each 450 cc. of the clarified juice 850 Gm. of sucrose. Dissolve the sucrose in the juice by heat on a water-bath, cool and remove the scum.

Preserve the product in well-stoppered bottles in a dark place.

### **SYRUPUS CERASI.**

#### **Syrup of Cherry.**

##### **Syr. Ceras.**

Pit fully ripe, dark, sour cherries. Rub the cherries through a wide mesh sieve and crush kernels in a grinder. Dissolve in the mixture 0.1 per cent of benzoic acid and allow to stand for

three days at room temperature. The filtered juice should produce a clear solution with one-half its volume of alcohol. Should a turbidity form, allow the mixture to stand until a portion of the filtered juice remains clear with one-half its volume of alcohol. Press the juice through a flannel cloth and filter through paper; add to each 450 cc. of the filtered juice 850 Gm. of sucrose. Dissolve the sucrose in the juice by heat on a water-bath, cool and remove the scum.

Preserve the product in well-stoppered bottles in a dark place.

The question of policy of recognizing both raspberry and strawberry syrups might possibly be raised because of the close relation of these flavors to each other. That, however, they have rather specific disguising qualities may become, it seems to us, evident from the following two prescriptions.

In the administration of small quantities of antipyrine as in children's dosage, raspberry syrup seems to give a better disguise than most anything else we have tried. The following prescription might bear this out.

℞ Antipyrine..... 2.0  
 Water..... 2.0  
 Syrup of Raspberry, to make..... 60.0 cc.

M. and label: Teaspoonful in water every 2 hours. (For child three years old.)

℞ Sodium Citrate..... 15.0 Gm.  
 Water..... 7.5 cc.  
 Syrup of Strawberry, to make..... 60.0 cc.

M. and label: Teaspoonful in water every 2 hours.

In our opinion the same prescription with syrup of raspberry in the latter and the syrup of strawberry in the former is not quite as pleasant. Incidentally it might be mentioned that the citrates make raspberry syrup purplish; also that sodium citrate is less offensive to the palate than potassium citrate.

Syrup of cherry is an almost specific vehicle for the pleasant administration of acid as shown by the following prescription.

℞ Diluted Hydrochloric Acid..... 5.0 cc.  
 Syrup of Cherry, to make..... 60.0 cc.

M. and label: Teaspoonful in 1/2 wineglassful of water after meals.

The only competitor of cherry syrup is raspberry syrup which also results in a delicious combination, as is shown by the following formula.

℞ Diluted Hydrochloric Acid..... 5.0 cc.  
 Syrup of Raspberry, to make..... 60.0 cc.

M. and label: Teaspoonful in 1/2 wineglassful of water after meals.

The following two prescriptions might show a reason why syrup of wild cherry should be deleted in favor of syrup of cherry.

℞ Codeine Phosphate..... 0.25 Gm.  
 Ammonium Chloride..... 5.00 Gm.  
 Water..... 5.00 cc.  
 Syrup of Wild Cherry, to make..... 60.00 cc.

and the following

℞ Codeine Phosphate..... 0.25 Gm.  
 Ammonium Chloride..... 5.00 Gm.  
 Water..... 5.00 cc.  
 Syrup of Cherry, to make..... 60.00 cc.

It will be seen that not only does the cherry syrup yield a more pleasantly tasting dose, but it is clear, while the syrup of wild cherry is turbid from precipitation of codeine tannate.

Another comparison of interest is yielded by the following two prescriptions.

	℞	Iron and Ammonium Citrate.....	5.0 Gm.
		Syrup of Wild Cherry, to make.....	60.0 cc.
and			
	℞	Iron and Ammonium Citrate.....	5.0 Gm.
		Syrup of Cherry, to make.....	60.0 cc.

The former is ink, the latter is merely dark, and not unpalatable; though we believe the Syrup of Cinnamon (new formula) furnishes the better vehicle.

#### CONCLUSIONS.

1. We advocate a change in the preparation of the syrup of raspberry consisting in the introduction of 0.1 per cent of benzoic acid in the fruit juice undergoing depectinization.

2. We respectfully submit formulas for syrup of strawberry and syrup of cherry to consideration for admission by either the United States Pharmacopœia or the National Formulary.

3. In the preparation of these other fruit syrups we also find that the presence of 0.1 per cent benzoic acid is of value in the removal of pectin while preventing vinegar formation and other fermentations.

4. The syrup of cherry becomes much more highly flavored when it is made from the cherry juice that has been permitted to stand in contact with crushed cherry stones for several days, than if made without the maceration of the kernels.

5. Syrup of raspberry seems to form a particularly useful vehicle for anti-pyrine in small dosage; syrup of strawberry for sodium citrate and syrup of cherry for diluted hydrochloric acid.

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### HOSPITAL PHARMACY PRACTICE: AN INNOVATION.\*

BY J. SOLON MORDELL.<sup>1</sup>

In the latter part of 1925 a group of forty-five physicians and one pharmacist, members of the staff of the University Hospital and of the affiliated teaching hospitals of the College of Medicine, Syracuse University, embarked upon a program of rationalization of hospital drug therapy. This committee, representative of every branch of medical practice, and under the chairmanship of the Director of the Department of Pharmacology at the College of Medicine, was asked to investigate and to offer some organized plan to correct the existent drug situation.

Time, effort and finances were, and still are deservedly expended in improving diagnostic methods. Yet little interest has been shown in having drug treatment keep abreast of diagnostic progress. It was just such a problem which confronted this group in 1925. The condition was by no means a local one nor was it any

\* Section on Practical Pharmacy and Dispensing, A. Ph. A., Washington, D. C., meeting, 1934.

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