

# Syrups

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Syrups are sweet, viscous, concentrated solutions of sucrose or other sugars in water or any other suitable aqueous vehicle. The pharmacopoeial syrups have a high concentration of sucrose (66.7%w/w according to IP and 85%w/v according to USP) which is necessary for stability. Stronger solutions tend to crystallize and more dilute solutions support microbial growth.

The aqueous sugar medium of dilute sucrose solutions is an efficient nutrient medium for the growth of microorganisms, particularly yeasts and moulds whereas, concentrated sugar solutions are quite resistant to microbial growth because of their high osmotic pressure.

Simple syrup requires no additional preservative if it is to be used soon. Preservatives are added if the syrup is to be stored. When properly prepared and maintained, the syrup is inherently stable and resistant to the growth of microorganisms. As formulated, the official syrup is both stable and resistant to microbial growth & crystallization. However commercial syrups must employ preservatives to prevent microbial growth and to ensure their stability during their period of use and storage.

Syrups should be stored at constant temperature, since fluctuations encourage crystallization and in well closed containers to prevent entry of moisture. Moisture can dilute the surface layer, allow microorganisms to multiply and fermentation occurs.

**There are two types of syrups:**

1. ***Non medicated or Flavoured syrups:*** These syrups contain flavouring agents but not medicinal substances. They are intended to serve as pleasant tasting vehicles for medicated syrups.

E.g. Orange syrup, Lemon syrup, Cocoa syrup, Raspberry syrup, Cherry syrup.

2. **Medicated syrups:** These preparations contain medicinal substance/s along with the other additives.

E.g. Ephedrine hydrochloride syrup, Paracetamol syrup.

Syrups provide a pleasant means of administering a liquid preparation containing a disagreeable tasting drug. They are particularly effective in the administration of drugs to children.

Syrups may contain a small concentration of alcohol as a preservative or as a solvent to incorporate flavouring agents.

### **Preparation of Syrups**

Syrups may be prepared by one of the following methods, depending on the physical and chemical character of the ingredients:

1. **Solution with the aid of heat:** This method is used when the ingredients of the syrup are not volatile in nature and are heat stable. The sugar is added to the purified water and heated until is completely dissolved. Other heat stable ingredients are then mixed with the hot syrup and made upto volume. The use of heat facilitates faster solution of sugar and other ingredients.

The disadvantage of this method is that heating may lead to the inversion of sucrose. The sweetness of the syrup will be altered, because invert sugar is sweeter than sucrose. The decomposed syrup attains a dark coloration due to caramellization and is more susceptible to fermentation and microbial growth.

2. **Solution by agitation without the aid of heat:** this method is used when the ingredients are heat sensitive and to prevent heat induced inversion of sucrose.

All the ingredients are dissolved in purified water by continuous agitation.

3. **Addition of sucrose to a medicated or flavoured liquid:** In this method, sucrose is added to the medicated liquid, which may be a tincture or an extract.

4. **Percolation:** In the percolation method, the medicinal agent may be percolated to form an extract, to which sucrose or syrup is added.

E.g. Ipecac syrup is prepared by adding glycerin and syrup to an extractive of powdered ipecac obtained by percolation.

# EXPERIMENT 1

## Simple Syrup IP

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### Aim

To prepare and submit 20 g of Simple syrup.

### Formula

Sl. No	Ingredients	Official formula	Working formula
1	Sucrose	667g	
2	Purified water (q.s)	1000g	

### Principle

Syrups are sweet, viscous, concentrated solutions of sucrose or other sugars in water or any other suitable aqueous vehicle. The pharmacopoeial syrups have a high concentration of sucrose (66.7 % W/W according to IP or approx 85%W/V according to U.S.P), which is necessary for stability.

Stronger solutions tend to crystallize and dilute solutions can support microbial growth. Therefore at 66.7%W/W, simple syrup acts as a self-preservative. The self-preservative activity of syrup is attributed to the high osmotic pressure.

Syrups should be stored at a constant temperature to prevent crystallization and in well-closed containers to prevent entry of moisture.

Moisture can dilute the surface layer and may allow microorganisms to multiply and fermentation may occur.

**Procedure**

1. A 100ml empty beaker was weighed and the weight was noted.
2. Half the quantity of purified water was placed in to the beaker. Calculated quantity of sucrose was weighed and added to the water.
3. Sucrose was dissolved by heating with occasional stirring.
4. After cooling, purified water was added to make up the required weight.

**Category**

Pharmaceutical aid (Vehicle) and sweetening agent.

**Storage**

Store in a cool and dry place.