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Review Article

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# Preparation And Evaluation of Syrup- A Review

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**Abstract** Syrups are adaptable sweeteners that can be used to enhance the sweetness and richness of a variety of foods and drinks. They are available in a variety of tastes and forms. They give a range of flavours from straightforward sweetness to intricate fruit or nutty overtones, and they are essential in augmenting taste and texture. Most herbal syrup was originally derived from plant herbal medicine refers to use extract of fruit for medicinal purposes. Along with other dosage from herbal drugs also formulated inform of syrups. Today syrup is used for treatment of many ailments and to overcome symptoms of diseases. Coughing is a most common problem are face by the all people. There are two types of coughs one is the Dry cough and second is wet cough. The dry cough is no mucous and secretion while in wet cough there is cough mucous or secretion. The syrup is most commonly used and popular dosage form there is used in curing the cough and cold because it has ease of patient's compliance. The herbal cough syrup was formulated using crude drugs as Pudina & Tulsi or Cinnamon as a main ingredient along with Honey. The extraction of kiwi is added into orange peel it gives flavor to syrup and basil leaves extract is added as antibacterial agent to inhibit the growth of bacteria and sugar and alcohol used as preservative.

**Keywords:** Syrup, Flavouring agent, Sweetening agent, Ailments, Dry cough, Formulation

## Introduction

Syrups is a concentrated solution of sugar in water or other aqueous solutions. Medicinal syrup is a nearly saturated aqueous solution in which the medicinal substance or drug is dissolved. Basically, it is an oral suspension in liquid form. Medical syrup or medicinal syrup is actually used as a carrier for drugs. It is often used as a flavoring agent for medicines. The syrup should be kept tightly in a cool and dry place after use for preservation. Medicinal syrups are widely used as medicines for children, but there are also pharmaceutical syrups for adults.

**The following points are the uses of syrup**

- Appropriate for any patient of different ages
- The most natural and easiest route of administration
- Economic and safe to the patient
- No nursing is required, which means the patient can take it with no help
- The liquid dosage form is expected for certain types of products like cough medicines

**Types of syrup**:

Solutions, suspensions, syrups, elixirs, and emulsions are a few typical varieties. Every kind has unique qualities and applications for giving patients their drugs. Whereas suspensions contain solid particles scattered throughout liquid media, solutions are uniform mixes of a medication in a liquid basis. While elixirs are sweetened hydroalcoholic solutions, syrups are concentrated sugar solutions in water with additional flavoring. Emulsions are mixtures stabilized by an emulsifying agent of two immiscible liquids, such as water and oil. The demands and desires of patients are accommodated by these many liquid dose forms.

**Solution**: Drug mixes that are homogeneous in a liquid base.

**Suspension**: Liquid dose formed with solid particles scattered throughout a liquid.

**Syrup**: Sugar and water solutions that have been concentrated and flavored.

**Elixir**: Hydroalcoholic solutions sweetened with sugar.

**Emulsion:** A mixture stabilized by an emulsifying agent consisting of two immiscible liquids, such as water and oil. This summary provides you with an overview of the various kinds of liquid dosage forms that are frequently used while administering medication.

**Monophasic Liquid**: Monophasic dosage form refers to liquid preparation containing two or more components in one phase system, it is represent by true solution. A true solution is a clear homogenous mixture that is prepared by dissolving solute in a suitable solvent. The component of the solution which is present in a large quantity is known as SOLVENT where as the component present in small quantity is termed as solute.

**Difference between Syrup IP and Syrup USP**

| S. No. | Syrup IP | Syrup USP |
|---|---|---|
| 1. | 66.7 % w/w solution of sugar/sucrose in purified water | 85% w/w solution of sugar/sucrose in purified water |
| 2. | Prepared by hot process | Prepared by cold process |
| 3. | More stable | Less stable |
| 4. | Invert sugar- sucrose is heated during preparation------ Invert sugar | Sucrose |
| 5. | It can be checked during the process by using saccharometer | It cannot be checked during the process |

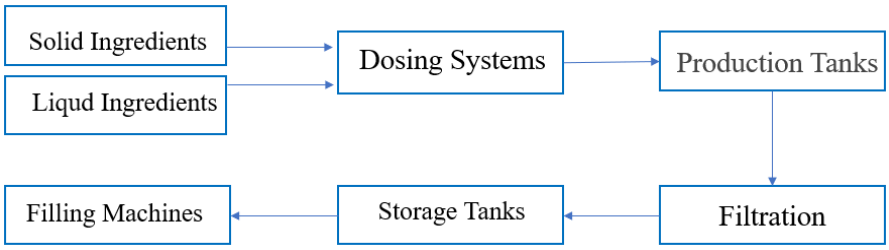
**The Process of Developing Syrups**

Pharmaceutical syrups are produced by mixing purified water, sweeteners, active ingredients (API), aromas, flavors and other ingredients (thickeners) *etc*. There are four methods of preparing syrups. Based on the physical and chemical properties on the ingredients, the choice of the method is selected. I. Solution with heat. II. Agitation without heat. III. Addition of sucrose to liquid medicament. IV. Percolation method.

The manufacturing process must achieve the following factors:

- Dissolving of the sugars to form a syrup
- Hydration of powdered ingredients
- Blending ingredients of widely different viscosity
- Suspension or dissolving of active ingredients
- The end product must be smooth, agglomerate-free and homogeneous

- Equipment should conform to GMP standards




**Components of Syrups:**

Most syrup contains the following components in addition to the purified water and any medicinal agents present:
(a) The sugar, usually sucrose, or sugar substitute used to provide sweetness and viscosity;
(b) Antimicrobial preservatives;
(c) Flavorants; and
(d) Colorants.
Also, many types of syrups, especially those prepared commercially, contain special solvents (including alcohol), solubilizing agents, thickeners, or stabilizers.
Pharmaceutically syrups are classified best according to their basic formulas:
**1. Sugar based syrup**: which are concentrated solution of sugar.
**2. Artificial syrup**: which are formulated with artificial sweetening agents and viscosity builders

**Preparation of Syrup:**

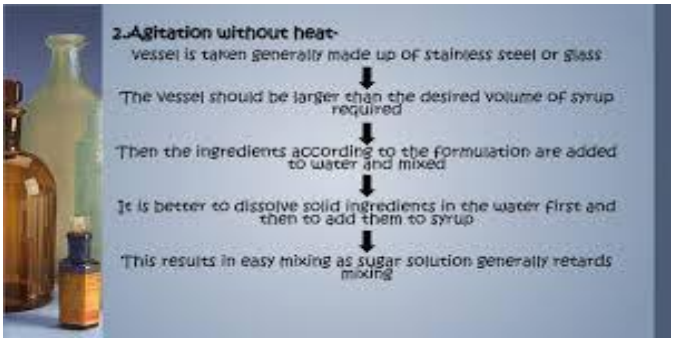
There are four method on the basis of physical and chemical properties of the ingredients, the choice of methods are selected-

- Solution with heat
- Agitation without heat
- Addition of sucrose to liquid medicament
- Percolation method

**Solution with aid of heat**

Syrups are prepared by this method when it is desired to prepare the syrup as quickly as possible and when the syrup's components are not damaged or volatilized by heat. In this method, the sugar is generally added to the purified water, and heat is applied until the sugar is dissolved. Then, other heat-stable components are added to the hot syrup, the mixture is allowed to cool, and its volume is adjusted to the proper level by the addition of purified water.
If heat labile agents or volatile substances, such as volatile flavoring oils and alcohol, are to be added, they are generally added to the syrup after the sugar is dissolved by heat, and the solution is rapidly cooled to room temperature.
The use of heat facilitates rapid solution of the sugar and certain other components of syrups; however, caution must be exercised against becoming impatient and using excessive heat. Sucrose, a disaccharide, may be hydrolyzed into monosaccharides, dextrose (glucose), and fructose (levulose). This hydrolytic reaction is inversion, and the combination of the two monosaccharide products is invert sugar.
When heat is applied in the preparation of sucrose syrup, some inversion of the sucrose is almost certain. The speed of inversion is greatly increased by the presence of acids, the hydrogen ion acting as a catalyst to the reaction.
The sweetness of the syrup is altered because invert sugar is sweeter than sucrose, and the normally colorless syrup darkens because of the effect of heat on the levulose portion of the invert sugar.
When the syrup is greatly overheated, it becomes amber colored as the sucrose caramelizes. Syrups so decomposed are more susceptible to fermentation and to microbial growth than the stable, undecomposed syrups.

**Agitation without heat**




To avoid heat-induced inversion of sucrose, syrup may be prepared without heat by agitation. On a small scale, sucrose and other formulative agents may be dissolved in purified water by placing the ingredients in a vessel larger than the volume of syrup to be prepared, permitting thorough agitation of the mixture. This process is more time consuming than the use of heat, but the product has maximum stability.

Sometimes, simple syrup or some other nonmedicated syrup, rather than sucrose, is employed as the sweetening agent and vehicle. In that case, other liquids that are soluble in the syrup or miscible with it may be added and thoroughly mixed to form a uniform product.

When solid agents are to be added to a syrup, it is best to dissolve them in minimal amount of purified water and incorporate the resulting solution into the syrup. When solid substances are added directly to syrup, they dissolve slowly because the viscous nature of the syrup does not permit the solid substance to distribute readily throughout the syrup to the available solvent and also because a limited amount of available water is present in concentrated syrups.

**Addition of sucrose to liquid medicament-**

Occasionally, a medicated liquid, such as a tincture or fluidextract, is employed as the source of medication in the preparation of syrup. Many such tinctures and fluidextracts contain alcohol-soluble constituents and are prepared with alcoholic or hydroalcoholic vehicles. If the alcohol-soluble components are desired medicinal agents, some means of rendering them water soluble is employed.

However, if the alcohol-soluble components are undesirable or unnecessary components of the corresponding syrup, they are generally removed by mixing the tincture or fluidextract with water, allowing the mixture to stand until separation of the water-insoluble agents is complete, and filtering them from the mixture. The filtrate is the medicated liquid to which the sucrose is added in preparation of the syrup. If the tincture or fluidextract is miscible with aqueous preparations, it may be added directly to simple syrup or to flavored syrup.

**Percolation method-**

In the percolation method, either sucrose may be percolated to prepare the syrup or the source of the medicinal component may be percolated to form an extractive to which sucrose or syrup may be added. This latter method really is two separate procedures: first the preparation of the extractive of the drug and then the preparation of the syrup.

An example of a syrup prepared by percolation is ipecac syrup, which is prepared by adding glycerin and syrup to an extractive of powdered ipecac obtained by percolation. The drug ipecac, which consists of the dried rhizome and roots of Cephaëlis ipecacuanha, contains the medicinally active alkaloids emetine, cephaline, and psychotrine. These alkaloids are extracted from the powdered ipecac by percolation with a hydroalcoholic solvent.

**Evaluation of Syrup:**

**1. Colour examination**:

- 2 ml prepared syrup sample was placed in a watch glass and placed against a white background under a white tube light to test the colour.

- Its colour was assessed using the naked eye

**2. Odour examination**:

- Two ml of the ready syrup were taken and smelled.
- After that, scent was noticed.

**3. Taste examination**: A small amount of the finished syrup was sampled to assess its flavour.

**4. pH examination**:

- Disturbed water was used to clean and wash the glass electrode.
- The electrode was inserted into PH 7 buffer solution, and the PH meter's calibrate knob was turned to 7 to set the value.
- The electrode was taken out, cleaned, and washed with distilled water.
- The electrode's placement was in a solution of PH 4 buffer. Change the value.
- After that, the electrode was inserted into the syrup, and the pH was measured.

**5. Density examination**:

- Cleaned the bottle of specific gravity.
- Distilled water was used to clean the bottle at least twice.
- Calculated the empty dry syrup bottle's weight using the stopper (w1).
- After placing the stopper on the bottle and adding the final amount of syrup, wipe any extra syrup off the exterior of the tube.
- Calculate the syrup's weight in gm(w2).
- Calculate the weight in syrup gm (w3).

**Formula of Density**

Density of liquid under test (syrup)= weight of syrup under test / volume of final syrup under test =W3/V.

**6. Viscosity examination**:

- Used acetone or other suitable organic solvent to thoroughly clean the Ostwald viscometer.
- Set the viscometer on a suitable stand in a vertical position.
- Filled the dry viscometer with water to the G mark.
- The time it took for water to flow from point A to mark B was measured in seconds.
- To get an accurate reading, this step was repeated at least three times.
- After cleaning the viscometer with a sample liquid and filling it to mark A, notice how long it takes for the liquid to reach mark B.

**Formula for viscosity**

Viscosity= Density of the test liquid *time required to flow test liquid/density of water*time required to flow water*100

**7. Procedure to determine Specific gravity**:

- Use chromic or nitric acid to completely clean the specific graveness bottle.
- Wash the bottle with clean water at least doubly or three times.
- If necessary, wash the bottle with an acetone- suchlike organic detergent and let air sot.
- With a capillary tube breach, weigh an empty, dry bottle.
- Place the breach on the bottle after filling it with distilled water and use towel paper to wipe down any fat liquid from the side tube (w2).
- Use an logical balance to weigh a bottle of water and a cork (w2).
- After evacuating and drying as described in way 4 through 6, repeat the process for the liquid under test by substituting the water.
- Put the bottle with the cork on and weigh it along with the liquid being tested (w3).

**Formula for specific gravity**

Specific gravity of liquid under test (syrup) = weight of liquid under test /weight of water = w5 /w4.

**8. Stability testing**:

- The synthesized syrup underwent stability testing while samples were kept under. accelerated temperature conditions.
- Culture tubes were used to receive the finished syrup.
- After that, the temperature was maintained at accelerated levels of 4, 16, and 47 degrees Celsius, respectively.

The samples were examined for all physicochemical characteristics (colour, aroma, and taste), as well as turbidity, at intervals of 24 hours, 48 hours, and 72 hours to look for changes.

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