



# LAB 2

# PHARMACEUTICAL TECHNOLOGY

# SYRUPS

**Stage: 3/ 1st course**

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**Syrups:** Are **sweet**, **viscous aqueous** liquids, they are concentrated aqueous preparations of sugar or sugar substitute with or without flavoring agents and medicinal substances.

Medically they are divided into two types:-

1. **Non medicated syrups**:- (flavoring syrups): These syrups are intended to serve as pleasant -tasting vehicles for medicinal substances (example cherry syrup, orange syrup, simple syrup.)

2. **Medicated syrups**:- These contain ingredients giving them therapeutic value. (E.g. Antitussive , antihistamines).

# Pharmaceutical classification of syrups according to their basic (sugar) formulation

## 1. Sugar based syrups:

These are concentrated solutions of sugar (e.g. Sucrose ,dextrose).

## 2. Sugar free syrups:

These are formulated with artificial sweetening agents.(e.g. sorbitol)

The use of sucrose is preferred in the pharmaceutical preparation due to :

- A. It's purity
- B. Degree of sweetness
- C. Lack of color
- D. Ease of handling
- E. It's inertness.



# Problems :

Sucrose subject to two degradative pathways:

❖ **Fermentation**

❖ **Hydrolysis**

## 1. **Fermentation of sucrose :**

\* Sucrose as carbohydrate in dilute solution provide nutrient media for the growth of micro-organisms.(Mold, yeasts)

\* The steps of M.O. growth include: turbidity (change in colour) ,(change in odour) ,(change in taste).

\* The concentration of sucrose is an important factor in inhibition of mold growth, the saturated solution of sucrose if stored properly will be self preserving (contain no free water, thus they behave as anhydrous media with respect to growth of M.O and **this will lead to shrinkage and lyses of M.O.**).

\* **Preservatives** which are suitable for use in syrups: benzoate, parabens, sorbic acid, mixture of methyl paraben and alcohols.

\* In some syrups **alcohol** present in small amount (not more than 10%) which serve as **solubilizing agent** for alcohol soluble ingredient, also alcohol concentrated by evaporation above the syrup and prevent the growth of surface molds.



## Simple syrup **B.P**

Rx

Sucrose		667 g
D.W	Q.S	1000 g

### Method :

1. Weigh the beaker empty and weigh the sucrose in it
2. Add small quantity of water with stirring to dissolve the sucrose on gentle heating (using water bath).
3. Weigh again to complete the weigh by hot water

## Simple syrup **U.S.P.**

Rx

Sucrose		850 g
D.W	Q.S	1000 ml

### Methods :

Prepare by using boiled water

### H.W.

Is the concentration of sucrose (w/v) in both BP and USP approximately same?

# Ipecac syrup

Rx

Ipecac fluid extracts		70 ml
Glycerin		100 ml
Simple syrup	Q.S	1000 ml
Sig	f $\bar{3}$ ss	t.i.d p.c



## Method:

Mix the fluid extract with glycerin then add enough syrup to make the product measure 1000 ml and mix thoroughly.

## Note :

Ipecac used as an expectorant in small dose (25 -100 mg), at larger dose it is used as an emetic agent (vomiting occur within 30 min) due to irritation of GIT. Emetic dose in adult 10-30 ml ,in children 10 -15 ml.



# Tolu balsam syrup U.S.P

Rx

Tr. of tolu balsam		50 ml
Mg carbonate		10 g
Sucrose		820 g
D.W	Q.S	1000 ml
Sig	f $\bar{3}$ ss	p.r.n



## Method:

1. Mix tolu balsam tr. with 10 gm Mg carbonate and sucrose 60 g in a mortar.
2. Gradually add **430 ml** D.W with trituration and filter
3. Dissolve the remainder of sucrose (760 g) in the clear filtrate with gentle heating (**not over 50 c**)
4. Strain the syrup while warm and add D.W through strainer to make product, then mix thoroughly .

## \*Uses and directions

- ✓ Tolu balsam syrup used as **expectorant** , **flavouring agent** .
- ✓ Tolu balsam is soluble in alcohol , ether, chloroform but it is insoluble in water because it contain resins.
- ✓ Mg carbonate is very soluble in water and partially soluble in alcohol.
- ✓ **Mg carbonate used as distributing agent for tolu balsam tr.**  
Because it is alkaline and this help in dissolving the resinous content of the tolu balsam .

# Mist diuretic (acidic)

Rx

Potassium citrate		300 g
Citric acid		50 g
Lemon spirit		5 ml
Quillaia tr.		10 ml
Syrup		250 ml
Chloroform water double strength		300 ml
Water	Q.S	1000 ml

## Method

1. Dissolve the solids in a mixture of the CHCl<sub>3</sub> water and syrup by shaking or vigorous stirring
2. Add quillaia tr.
3. Add lemon spirit in small amounts, shake after each addition
4. Complete the volume and mix.

## Note :

- Double strength chloroform water is twice the concentration of ordinary aromatic water
- Acidic mist . diuretic used for hypertensive patient.

# Mist diuretic (alkaline)

Rx

Pot. citrate		20 g
Na bicarb.		20 g
Conce. infusion of buchu		20 ml
Syrup of orange		40 ml
Chloroform water	Q.S	300 ml

## Method

1. Weigh the solids and dissolve them in the mixture of chloroform and syrup by shaking
2. Add conc. Infusion of bucha
3. Complete the volume and mix.

# Dextrose based syrup

Dextrose is used instead of sucrose in syrups containing **strong acids to prevent caramelization**.

## Differences between sucrose and dextrose

1. The saturated solution of **dextrose is 70% (less viscous)**, so the dextrose based syrup is susceptible to the growth of micro-organisms, therefore glycerin (30-45%v/v) is used as a preservative, to increase the viscosity and also give additional sweetness to the preparation.
2. Dextrose **dissolve more slowly** than sucrose.
3. The **sweetness** of dextrose is less than the sweetness of sucrose.

**Note :-**

**We prefer using glycerin as preservative in dextrose based syrup why?**

# Sugar-free syrup (non-nutritive syrup)

**Sugar free syrup:** it is called artificial syrup ,this type of syrup given to patients suffering from diabetes mellitus.

**General formula of non-nutritive syrups.**

- ❖ **Sweetening agent** : sorbitol , saccharine , aspartame.
- ❖ **Viscosity builder**: carboxymethyl cellulose (CMC), Sodium alginate.
- ❖ **Preservative** : benzoic acid, sodium benzoate.
- ❖ **Purified water.**

# Sorbitol-based syrup

Sorbitol has the following properties:

- ✓ Used for diabetic patient (not cause hyperglycemia).
- ✓ Not cause **dental carries**.
- ✓ Sorbitol is 60 % as **sweet** as sucrose.
- ✓ Have a good taste.
- ✓ Chemically **stable**.
- ✓ Not absorbed from **GIT** as rapid as sucrose.
- ✓ **Not irritating** to the mouth and throat membrane.
- ✓ Has a laxative effect if ingested in large quantity (why?).
- ✓ Has half the viscosity of simple syrup.

# Sorbitol syrup USP

Rx

Sorbitol		70 g
D.W	QS	100 g

Method by simple solution method

# Chloral hydrate syrup (U.S.P) official

Rx

Chloral hydrate		0.5 g
Simple syrup	Q.S	100 ml

Ft. mist

Sig.  $f_3$  ss o.n

Method :

Dissolve chloral hydrate in 75 ml of simple syrup, stir well, filter, then complete the volume of filtrate to 100 ml by simple syrup.



# Chloral hydrate syrup (non-official )

Chloral hydrate		0.5 g
Sorbitol		70 g
D.W	Q.S	100 ml

## Method :

1. Dissolve chloral hydrate and sorbitol in 75 ml of water .
2. Stir well to enhance solubility.
3. Strain by cotton.
4. Complete the volume to 100 ml by D.W.

# Preparation of medicated syrup

Drug		300mg
Alcohol		2ml
Sucrose		10g
Glycerin		1ml
Flavor		1ml
Coloring agent		1ml
Purified water	QS	100ml

## Method

- 1- 70 water + drug + sucrose (gentle heat and mix)
- 2- add alcohol + coloring agent + glycerin + flavor
- 3- complete the volume
- 4- store in bottle



**THANK YOU**