



# *Elixirs*

*(Solution Using Mixed Solvent System)*

## *Pharmaceutical Technology I*

*Department of Pharmacy*

*3<sup>rd</sup> Stage\ 2022*

LEC - 6

## Q\ Why using mixed solvent systems?

A\ When substance to be included in liquid dosage form for oral administration **are:**

- 1- Not water soluble
- 2- or when they exhibit chemical instability in water.

one must either prepare suspension or utilize non aqueous solvents alone or with a minimum amount of water.

# Elixirs

- ▶ Elixirs are clear, sweetened **hydroalcoholic** solutions intended **for oral use** and are usually flavored to enhance their palatability.
- ▶ There are two types of elixir:
  - 1- **Non-medicated elixirs** are employed as vehicles.
  - 2- **Medicated elixirs** are used for the therapeutic effect of the medicinal substances they contain.



## Q\ What Are The Differences Between Elixirs And Syrups?

### ► SYRUPS

- 1) Sweet, viscous contain sugar in high proportion.
- 2) Effective taste masking
- 3) Difficulty in dissolve water insoluble substances (not more than 10% alcohol)
- 4) Manufacturer procedure either time consuming or need heat.

### ► ELIXIR

- 1) Less sweet and less viscous because they contain a lower proportion of sugar
- 2) Less effective in masking the taste of medicinal substances
- 3) However, because of their hydroalcoholic character, elixirs are Better able than aqueous syrups to maintain both water-soluble and alcohol soluble components in solution.
- 4) because of their stable characteristics and ease which are prepared (by simple solution), elixirs are preferred to syrups

# Alcohol content in elixir

- ▶ The proportion of alcohol in elixirs varies widely because the individual components of elixir have different water and alcohol solubility characteristics.
- ▶ In the **official elixirs**, the alcohol content varies from 4 to 40 %.
- ▶ Each elixir requires specific blend of alcohol and water to maintain all the components in solution.
- ▶ For elixirs containing agents with poor water solubility ,the proportion of alcohol required is greater than for elixirs prepared from components having good water solubility.
- ▶ In addition to alcohol and water, other **solvents**, such as glycerin and propylene glycol are frequently employed in elixirs as adjunct solvents.

# Sweetening agents in elixirs

- Many elixirs are sweetened with sucrose or with a sucrose syrup, some use sorbitol, glycerin, and/or artificial sweeteners.
- Elixirs having a high alcoholic content usually use an artificial sweetener, such as saccharin, which is required only in small amounts, rather than sucrose, which is only slightly soluble in alcohol and requires greater quantities for equivalent sweetness.

## Other components of elixirs

- All elixirs contain **flavoring materials** to increase their palatability
- Most have **coloring agent** to enhance their appearance.
- Elixirs containing **over 10 to 12%** of alcohol are usually **self preserving** and **do not require** the addition of an antimicrobial agent or their **preservation**.



## *Example formulations for some medicated elixirs:-*

### *Phenobarbital Elixir*

Phenobarbital      4.0 g  
Orange oil          0.25 mL  
Propylene glycol   1.00.0 mL  
Alcohol              200.0 mL  
Sorbitol solution   600.0 mL  
Color q.s.  
Purified water, to make 1,000.0 mL.

### *Theophylline Elixir*

Theophylline      5.3 g  
Citric acid        10.0 g  
Liquid glucose   44.0 g  
Syrup              132.0 mL  
Glycerin          50.0 mL  
Sorbitol solution   324.0 mL  
Alcohol            200.0 mL  
Saccharin sodium. 5.0 g  
Lemon oil.        0.5 g  
FD&C Yellow No. 5 0.1 g  
Purified water, to make      1,000.0 mL



► **Advantage of elixirs :**

Is the flexibility in dosage and ease of dosage administration to patient who have difficulty swallowing solid dosage forms.

► **A disadvantage of elixirs** for children and for adult who choose to avoid alcohol is their alcohol content.

## *FDA recommended Limits on alcohol content for OTC oral products.*

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The U.S. Food and drug administration (FDA) has proposed that insofar as possible manufacturers of over the counter drugs (OTC) restrict the use of alcohol and include appropriate warning in labeling

1. For OTC oral products intended for children **under 6 years** of age, the recommended alcohol limit **is 0.5%**
2. For product intended for **children 6 to 12 years of age** the recommended limit is **5%**
3. For products recommended for **children over 12 year and for adults**, the recommended limit is **10%.**

# Storage of elixir:

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Because of their usual content of volatile oils and alcohol, elixirs should be stored in:-

- ✓ tight, light resistant containers
- ✓ and protect from excessive heat.



# Preparation of Elixirs:

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- Elixirs are usually prepared by simple solution with agitation and/ or by the admixture of two or more liquid ingredients.
- Alcohol-soluble and water-soluble component are generally dissolved separately in alcohol and in purified water.
- Then `The aqueous solution is added to the alcoholic solution, rather than the reverse, in order to maintain the highest possible strength at all times so that minimal separation of the alcohol-soluble components occurs.

## Preparation of Elixirs:

- When the two solutions are completely mixed the mixture is made to volume with the specific solvent or vehicle.
- Frequently the final mixture will not be clear, **but cloudy**, due principally to the separation of some of the flavoring oils by the reduced alcoholic concentration.
- If this occurs, the elixir is usually permitted to stand for prescribed number of hours, to ensure the saturation of the hydroalcoholic solvent and to permit the oil globules to coalesce so that they may be more easily removed by filtration.

# Preparation of Elixirs:

- ▶ **Talc**, a frequent filter aid in the preparation of elixirs, has the ability to absorb the excessive amounts of oils and therefore assist in their removal from the solution.
- ▶ The presence of glycerin, syrup, sorbitol and propylene glycol in elixirs generally contributes to the solvent effect of the hydroalcoholic vehicle, assists in the dissolution of the solute, and enhances the stability of the preparation. However, the presence of these materials adds to the viscosity of the elixir and slow the rate of their filtration.



# *Classification Of Elixirs*

## **1. Non medicated elixirs:-**

**May be useful to the pharmacist (is used as vehicles) in the filling of prescriptions involving:**

1. The addition of a therapeutic agent to a pleasant tasting vehicle
2. The dilution of an existing medicated elixir

✓ **The three most commonly used non medicated elixirs were:**

1. Aromatic elixir
2. Compound benzaldehyde elixir
3. Iso-alcoholic elixir

# Aromatic Elixir, USP

- ▶ Is the most widely used. It is a rather simple preparation.
- ▶ Yet it is a difficult to prepare it in small quantities.
- ▶ It consists of compound orange spirit, syrup, alcohol, water, and talc.
- ▶ The difficulty arises from:
  1. The loss in volume resulting from repeated filtration about 10-20% of volume loss due to this step.
  2. The slowness in filtration result from the syrups being added before preparation is filtered. This ingredient, plus the talc, makes it nearly impossible to get a good rate of filtration.

► **Suggestions for preparation of aromatic elixir rapidly:**

- Dissolving the sugar in the filtrate to increase the rate of filtration
- The use of terpeneless oils (water-soluble) to avoid the difficulty occur (cloudiness) which is due to the insolubility in water of the oils present in compound orange spirit.
- Both of these suggestions make it possible for elixir to be made more rapidly.



## *2. Medicated Elixirs*

- ▶ Medicated elixirs which have therapeutic action, sometimes used as the vehicle for other drug e.g. Phenobarbital elixir.
- ▶ Medicated elixirs can be described by further classifying them according to their therapeutic activity.

*1. Antihistamine elixirs*

*2. Sedatives and Hypnotics elixirs*

*3. Expectorants and cough preparation*

*4. Miscellaneous medicated elixirs*

# *1- Antihistamine Elixirs*

This is the largest group of elixirs having a definite therapeutic action.

Antihistamines are useful primarily in the symptomatic relief of certain allergic disorders. In their action, they suppress symptoms caused by histamine, one of the chemical agents released during the antigen-antibody reaction of the allergic response.  
.e.g.

1. Diphenhydramine HCl Elixir
2. Chlorpheniramine HCl Elixir

## *2- Sedative And Hypnotics Elixirs*

- ▶ This is the second largest group of elixirs e.g. Phenobarbital Elixir .
- ▶ Barbiturate in general used in low dosage as sedatives and in higher dosage as hypnotics. They are either long acting sedation, intermediate sedation or short-acting sedation or duration. Phenobarbital is used for long-acting sedation.
- ▶ In Phenobarbital elixir, the active ingredient first is dissolved in alcohol before adding the other liquids. While phenobarbital dissolves readily in alcohol and will remain in solution when the alcohol content is lowered. Mixture of alcohol, water, and glycerin is used in this elixir. The presence of the glycerin prevents the phenobarbital from precipitating
- ▶ Pentobarbital Elixir; it is used commonly as short-acting barbiturates.
- ▶ Amobarbital Elixir: It is used for intermediate duration.



### *3- Expectorants And Cough Preparations*

1. Terpin Hydrate Elixir, NF.
  2. Terpin hydrate and dextromethorphan Hydrobromide Elixir, NF. (non-narcotic elixir)
  3. Terpin Hydrate and codeine Elixir, NF. (narcotic elixir)
- ✓ These elixirs contain **the highest percentage of alcohol** (39 to 44%) of all elixirs in order to keep the terpin hydrate in solution.



## *4-Miscellaneous Elixirs*

1. Digoxin Elixir USP, is used as a cardiotonic.
2. Acetaminophen Elixir, NF, which is used as analgesic.
3. Dexamethasone Elixir, NF, contains a synthetic adrenocorticosteroid and is used in the treatment of rheumatoid arthritis and other conditions for which corticosteroid therapy is indicated.





Don't wait for the right  
opportunity: create it.

George Bernard Shaw

“ quote fancy



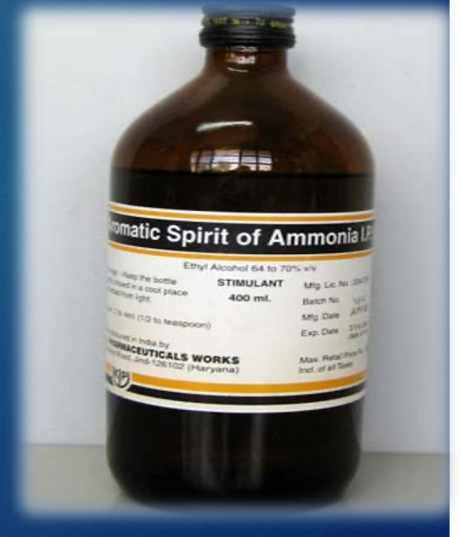
# *Solution Using Mixed Solvent System ( Spirits)*

PHARMACEUTICAL TECHNOLOGY I

Department of Pharmacy

3<sup>rd</sup> Stage\ 2022

LEC - 7





# *Spirits:*

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- **Spirits** are alcoholic or hydroalcoholic solution of volatile substances.
- Generally, the **alcohol concentration** of **spirits** is rather high, usually over 60%.
- Because of the **greater solubility** of aromatic substances in alcohol than in water, spirits can contain a greater concentration of these materials than corresponding aromatic waters.

- ▶ The amount of volatile materials in spirits varies greatly and no fixed percentage can be given. The alcohol content varies.
- ▶ **The lowest percentage** is in Aromatic Ammonia Spirit (62 to 68 percent).
- ▶ **The highest is in Camphor Spirit** (80 to 87 percent).

- ▶ When mixed with water or with an aqueous preparation, the volatile substances present in spirits generally separate from solution and form a milky preparation.
- ▶ In order to avoid this turbidity:
  1. Water except as specified in the formula should be avoided.
  2. Graduates and other equipment used should be dry.
  3. Filter paper should be moistened with alcohol.

# *Methods Used To Prepare Spirits:*

- ▶ The introduction of spirit into pharmacy and medicine was brought about by the development of distillation procedures.
- ▶ Depending on the materials used, spirits may be prepared by:
  1. Simple solution
  2. Solution by maceration
  3. Distillation
  4. Chemical reaction



# *Uses of Spirits:*

➤ Spirits may be used **pharmaceutically as flavoring agent** and **medicinally for the therapeutic value of aromatic solute**.

1- As **flavoring agents** they are used to impart the flavor of their solute to other pharmaceutical preparations.

2- For **medicinal purposes**, spirits may be taken **orally, applied externally**, or **used by inhalation**, depending upon the particular preparation.

➤ When taken orally, they are generally mixed with a portion of water to reduce the pungency of the spirit.

# *Official Spirits:*

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The spirits most recently official in the USP/ NF were:

1. Aromatic ammonia spirit
2. Camphor spirits
3. Compound orange spirit
4. Peppermint spirit

- ▶ There is no classification of spirits because:
  1. There is small number of spirits
  2. Some have therapeutic effect, other are used as flavor.
  3. Each spirit has its own method for preparation.

## Aromatic Ammonia Spirit, NF:

► It acts as :

1. a carminative due to the volatile oils present.
2. antacid.
3. a mild reflex circulatory stimulant due to the liberation of ammonia ( $\text{NH}_3$ ) from the ammonium carbonate which the spirit contains so it is used in cases of fainting (حالات الإغماء).



## Camphor Spirit, NF

- ▶ **Camphor spirit, NF** like aromatic ammonia spirit, is well known to the lay public. It is referred to as Tincture of camphor and also as camphor.
- ▶ This preparation is a simple solution of 10 percent camphor in alcohol.
- ▶ It is rarely used internally, but its external use is very common. Usually it is applied to “cold sores”.

## Compound Orange spirit, USP:

- ▶ **Compound Orange spirit, USP:** It is a blend of several oils and is readily prepared by simple solution.
- ▶ It is an important ingredient of aromatic elixir.

## Peppermint Spirit, NF:

- ▶ *Peppermint Spirit, NF*: It is used as a carminative and flavor.
- ▶ Given orally in small doses, usually 1 ml, this spirit is an effective carminative, and it is used extensively for that purpose.

# preparation of Peppermint Spirit, NF

► Its preparation as follows:

1. The leaves are macerated in water to remove tannins and other water soluble materials.
2. The aqueous extract is discarded, and the leaves are expressed and
3. macerated in alcohol. The alcohol dissolves the chlorophyll giving the product a bright green color.
4. To this alcoholic solution 10% of volatile oil is added.

The leaves used do not impart any medicinal action to the preparation. This action comes from the volatile oil added to the alcohol.

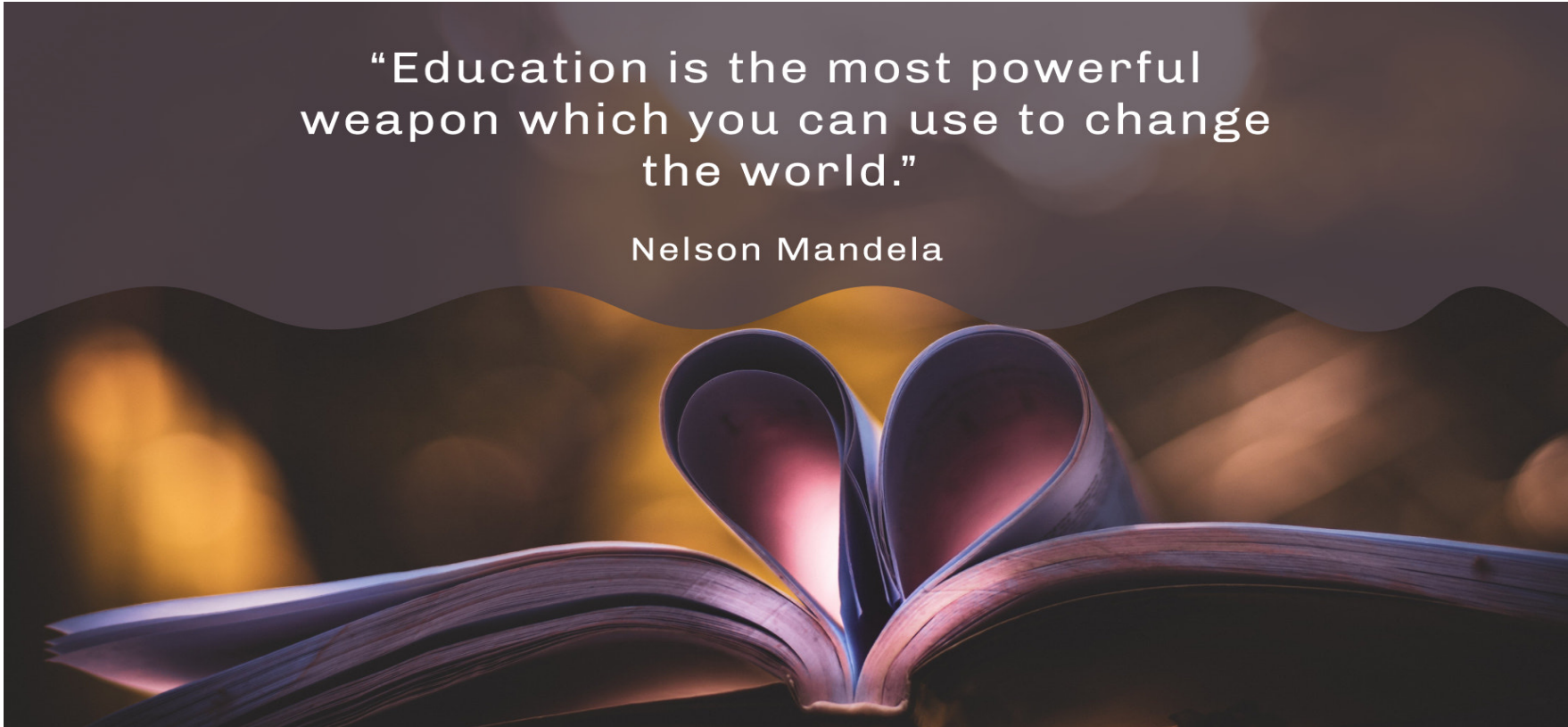


# Home works

- ▶ Compare between spirit and aromatic water
- ▶ Comparison should include general points about composition, uses, methods of preparation, concentration of volatile principles , etc.

“Education is the most powerful  
weapon which you can use to change  
the world.”

Nelson Mandela



# *Syrups*

## *Pharmaceutical Technology I*



*Department of Pharmacy*

*3<sup>rd</sup> Stage\ 2022*

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Lec- 4



- ▶ Syrups are concentrated aqueous preparations of a sugar or sugar substitute with or without flavoring agents and medicinal substances.
- ▶ **Nonmedicated or flavored vehicles (syrups):-** Syrups containing flavoring agents but not medicinal substances are called
- ▶ Due to the inability of some children and elderly people to swallow solid dosage forms, it is fairly common today for a pharmacist to be asked to prepare an oral liquid dosage form of a medication available in the pharmacy only as tablets or capsules.



- ▶ The liquid dosage form selected for compounding may be a solution or a suspension, depending on the chemical and physical characteristics of the particular drug and its solid dosage form.
- ▶ Medicated syrups are commercially prepared from the starting materials, that is, by combining each of the individual components of the syrup, such as sucrose, purified water, flavoring agents, coloring agents, the therapeutic agent, and other necessary and desirable ingredients.

Table 13.6

**EXAMPLES OF NONMEDICATED SYRUPS (VEHICLES)**

<b>SYRUP</b>	<b>COMMENTS</b>
Cherry syrup	Sucrose-based syrup with cherry juice about 47% by volume. Tart fruit flavor is attractive to most patients, and acidic pH makes it useful as a vehicle for drugs requiring an acid medium.
Cocoa syrup	Suspension of cocoa powder in aqueous vehicle sweetened and thickened with sucrose, liquid glucose, glycerin; flavored with vanilla, sodium chloride. Particularly effective in administering bitter-tasting drugs to children
Orange syrup	Sucrose-based syrup uses sweet orange peel tincture, citric acid as the source of flavor and tartness. Resembles orange juice in taste; good vehicle for drugs stable in acidic medium
Syrup	85% sucrose in purified water. Simple syrup may be used as the basis for flavored or medicated syrups.

# 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.

# Classification of syrups

- ▶ Pharmaceutically syrups are classified according to their basic formulas:

1. **Sugar based syrup:** which are concentrated solution of sugar.

2. **Sugar free syrup (Artificial syrup):** which are formulated with artificial sweetening agents and viscosity builders.



- ▶ Although there are many different sugars, sucrose and dextrose have been only used in the preparation of syrup, sucrose is obtained from sugar cane, sugar beet or less commonly sugar maple.
- ▶ Sucrose is one of the purest of commercially available substances and is the preferred carbohydrate for syrup because of purity, degree of sweetness, lack of color & ease of handling.
- ▶ Sucrose is the sugar most frequently employed in syrups, it may be replaced in whole or in part by other sugars or substances such as sorbitol, glycerin, and propylene glycol.

# Formulation of sugar based syrups:

- ▶ Most syrup contain a high proportion of sucrose, usually 60% to 80%, not only because of the desirable sweetness and viscosity of such solutions but also because of their stability in contrast to the unstable character of dilute sucrose solutions.
- ▶ The aqueous sugar medium of dilute sucrose solutions is an efficient nutrient medium for the growth of microorganisms, particularly yeasts and molds.
- ▶ On the other hand, concentrated sugar solutions are quite resistant to microbial growth because of the unavailability of the water required for the growth of microorganisms.

- ▶ **Syrup, NF**, also called **simple syrup**.
- ▶ It is prepared by dissolving 85 g of sucrose in enough purified water to make 100 mL of syrup. The resulting preparation generally requires no additional preservation if it is to be used soon; in the official syrup, preservatives are added if the sucrose concentration is less than 85% or syrup is to be stored. When properly prepared and maintained, the syrup is inherently stable and resistant to the growth of microorganisms
- ▶ Preservative used in syrup include benzoic acid ,butyl paraben ,sorbic acid ,glycerin ,alcohol , etc.
- ▶ benzoates ,butyl paraben ,sorbic acid are most effective in acidic solution ,they ineffective as preservative in alkaline syrups

- ▶ Frequently, alcohol is used in syrups to assist in dissolving the alcohol-soluble ingredients, but normally, it is not present in the final product in amounts that would be considered to be adequate for preservation (15% to 20%).
- ▶ In sealed container vaporization of water from syrup and its subsequent condensation on the syrup result in the formation of dilute solution of sucrose on the surface and this can support mold growth.



# 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: carboxy methyl cellulose (CMC), Sodium alginate.
- ❖ Preservative : benzoic acid, sodium benzoate.
- ❖ Purified water.

# Non nutritive synthetic sweetening agents

## 1- SACCHARIN SODIUM:(SUCARYL SODIUM)

- Is a synthetic sweetener which has significantly **bitter after taste**.
- It is 300 to 400 times as sweet as sucrose. So, its often used in combination with the compound cyclamate sodium solution.

# Non nutritive synthetic sweetening agents

**2- Compound Sodium Cyclamate solution** was the recommended sweetener.

- ▶ It is 30 to 40 times as sweet as sucrose and has significantly less after taste than saccharine.
- ▶ The mixture of 10 parts cyclamate to 1 part saccharin is common and take **advantage of the synergistic sweetening effect that saccharin has on sucaryl, with minimum bitter after taste.**
- ▶ The main disadvantage of cyclamate that it has carcinogenic effect on rat.

# SORBITOL – BASED SYRUPS

- ▶ Sorbitol is a hexahydric alcohol ( $C_6H_{14}O_6$ ) made by hydrogenation of glucose and is used as a substitute for sucrose Syrups.
- ❖ **Sorbitol solution is superior to simple syrup because:**
  1. Sorbitol is not irritating to the mouth and throat.
  2. It does not cause dental caries.
  3. No significant hyperglycemia has been found after its absorption, so it is used as component of non-nutritive vehicles.
  - 4- Sorbitol solution is about 60% as sweet as sucrose and half as viscous as simple syrup but it has **excellent mouth feel** and lacks the acrid characteristics of some polyols (e.g. propylene glycol).



- 5. Sorbitol is added to sucrose-based syrups to reduce the tendency of concentrated sugar solutions to crystallize.
- 6. Sorbitol inhibits the sticking or locking of bottle caps which occurs with high concentrations of sucrose.
- 7. Sorbitol is chemically stable and practically inert, so many drugs are more stable in sorbitol



# Aqueous Solutions Containing Aromatic Principles (Aromatic Waters)

*Department of Pharmacy*  
*3<sup>rd</sup> Stage\ 2022*  
*Lec - 5*



# Content

- Aromatic Waters
- Methods of preparations
- Stability



# *Aromatic Waters (Aqua Aromatica)*

The British Pharmacopoeia (BP) defines **aromatic waters** as clear, saturated aqueous solutions of volatile oils or other aromatic or volatile substances.

- Aromatic water are **not therapeutically potent** because of the very small proportion of active ingredient present in them.

# Aromatic waters were prepared from a number of volatile substances, including:

- Orange oil
- Flower oil,
- Peppermint oil,
- Anise oil,
- Camphor



Anise Oil



## *Description :*

- An odor and taste similar to the substances from which they are prepared.
- They should always be colorless , clear and free from fibers, particles and sediment.
- They should not be used after being stored for more than a few weeks.
- They should be free from foreign odor.

# Rose water



## ■ Peppermint waters.



## ■ Camphor water.

(Reduce itching, Rubefacient, Soothing eye, soothing cough )





# The official aromatic waters

The official aromatic waters are

- 1.Cinnamon water, NF: flavored vehicle
- 2.Orange flower water, NF: flavored vehicle
- 3.Stronger rose water, NF: perfume
- 4.Peppermint water, USP: flavored vehicle, carminative (15 ml dose)
- 5.Camphor water, NF: flavored vehicle
- 6.Chloroform water, NF: flavored vehicle

# Examples of Aromatic waters

1. Aromatic waters prepared from essential oils e.g. peppermint water, have been used as carminative and as vehicle.
2. Chloroform water: was used in expectorant preparations (dose 5-15ml).
3. Others include: Rose water, Hamamelis water and camphor water.

# *Uses of Aromatic Waters:*

1. They provide pleasantly flavored mediums for the administration of water soluble medicinal.
2. They also mask the undesirable tastes in suspensions and emulsions
3. Several aromatic waters are not used as vehicles for oral , include:-

**A.** Rose water used as perfume

**B.** Hamamelis water or witch Hazel, is employed commonly as a rub and also is used as an astringent and perfume in aftershave lotion and other cosmetic products. Hamamelis water is used for temporary relief of eye redness due to minor eye irritations.

**C.** Camphor water: is frequently used in eye drops for its refreshing properties

Other uses of Camphor: it is frequently used as rubefacient, Soothing eye, soothing cough.





## *Methods of preparation of Aromatic waters:*

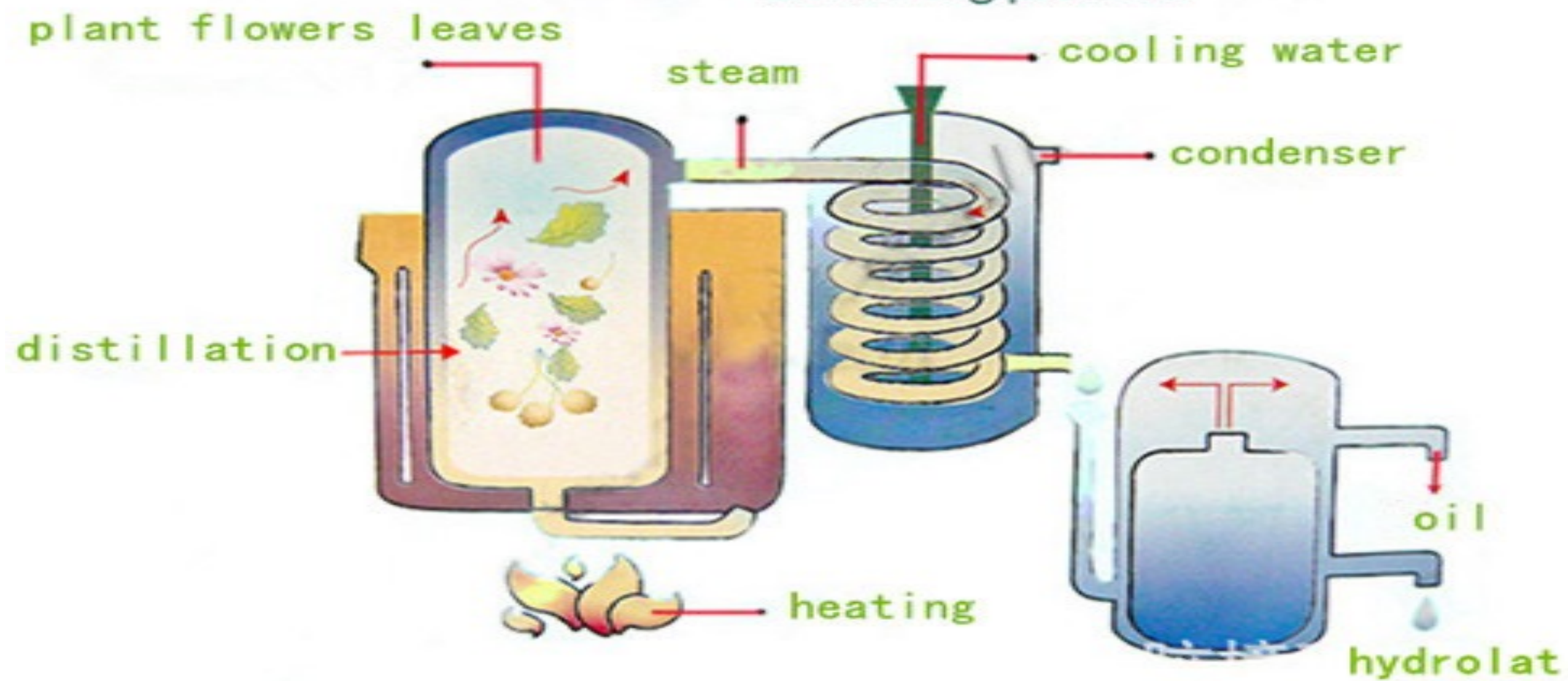
- 1) Distillation Method .*
- 2) Solution Method .*
- 3) Alternative Method*
- 4) Dilution method .*

# 1. Distillation:

Distillation: most of aromatic waters can be prepared by distillation.

- However, it is not practical or economically feasible to use this method in most cases, since other method is of low cost and with simple apparatus required.
- **Note:**  
Rose water, hamamils water, camphor water, peppermint water and orange flower water are prepared by this method because they are prepared directly from fresh plant materials.
- The distillation method consists of placing the odoriferous portion of the plant in a suitable still with sufficient purified water and then distilling most of the water, carefully. The excess oil is separated from the distillate.

## Oil refining process



## 2. *Solution Method*

- The **essential oil** which contains the aromatic material is agitated with purified water (2ml or 2gm of aromatic materials agitated with 1000ml of water ) in a closed container for 15 minutes then the mixture is set aside for at least 12 hour longer to permit the excess oil and solid substance to settle. Then filter through wetted filter paper, Then pass enough purified water through the filter paper to make the product measure 1000 ml.
- **Pass the solution through wetted filter paper in order to:**
  - ✓ Prevent the passage of excess oil into the filtrate
  - ✓ Eliminate absorption of the dissolved aromatic by the filter paper.



# The disadvantage of solution method

- In spite of repeated filtration it is difficult to get clear preparation (the turbidity is related to the presence of fine particles of oil in the filtrate ) and this turbidity may be avoided by using boiling water and it consume time .

# Example on Solution method :

- Chloroform water
- Orange water
- Cinnamon water
- Anise water

# Chloroform water

- Chloroform oil.            2ml
  - D.W                            1000ml
- 
- It is prepared by **solution method** but without filtration .
  - It is prepared by placing excess amount of chloroform in a bottle then add water and shake vigorously.
  - some of chloroform dissolve in water and form aromatic water and excess will settle down on the bottom of the bottle because it is heavier than water (there is no clarification problem).

# Uses of chloroform water:

- It is used as a pharmaceutical aid (preservative, vehicle and general anesthetic).
- Note: chloroform water is stored in light resistant bottle since the light will oxidize the chloroform to a poison gas (phosgene).



### 3. Alternate method:

- This method has been developed to overcome difficulties in the simple solution method; **clarification** and **amount of time consumed**.
- In this method the aromatic water is prepared by mixing 2ml of volatile oil with 15 gm of talc powder then add 1000ml of (p.w) purified water , mix for 10 min then filter .The talc or other inert material functions as both a filter aid and a distribution agent.
- This method offer time saving and clear solution.
- example on this method is **peppermint water**.



# Talc powder

- It is inert insoluble substance used in alternate method because it function as filter aid (it adsorbs the excess amount of oil that cause turbidity ) and as distributing agent (it have the ability to break up aromatic substance into fine particles so the surface area exposed to the solvent increase so the solubility will increase.)



# Disadvantage of alternate solution method

- The purified talc pass through the filter paper because purified talc is subdivided too finely.
- In order to remove finely divided material other material also used purified siliceous earth and pulped filter paper.

# Peppermint water

- Peppermint oil      2ml
  - Talc powder      15gm
  - P.W.      1000ml
- 
- weigh 15 gm of talc powder and put it in a beaker then add 2ml of peppermint oil and triturate well then add 1000ml of p.w. mix the content thoroughly then shake for 10 minutes and filter through wetted filter paper.



## Uses of Peppermint water:

- 1- It is used as antispasmodic and carminative.
- 2- It is one of the most popular aqueous vehicle.
- 3- It is used as ingredient in mouth washes because **menthol** give a pleasant and cool sensation on mucous membrane.

## 4. Dilution method

- 1 volume of concentrated aromatic water is diluted with 39 volume of water to get diluted solution
- Example on this method is : Peppermint water.
- Note: concentrated aromatic waters are 40 times stronger than ordinary aromatic water.



# Stability of aromatic waters

- Aromatic waters are not very stable preparations.
  - Improper storage cause instability, many waters support **mold growth**
  - Excessive exposure to **light** and change in **temperature** cause aromatic waters to lose characteristics (loss of aroma).
1. The solutes are volatile materials, loss of aroma occurs on prolonged exposure to atmosphere, particularly at elevated temperatures.
  2. Aromatic waters are saturated solutions, **lowering the temperature causes** separation of the aromatic component, thus producing **cloudiness**.
  3. The aromatics may be salted out when the aromatic water is used as a vehicle for drugs which are electrolytes. The insoluble material may collect on the top of the liquid, imparting a burning taste to the first dose.

# Stability of aromatic waters

4. Many of the aroma-bearing solutes, as well as the terpenes, are oxidizable compounds. Oxidative degradation, involving dissolved atmospheric oxygen, is likely. This autoxidation can be catalyzed by light and trace quantities of metal ions such as iron (III) and copper (II).

For example chloroform water is stored in light-resistant bottles since light catalyze the oxidation of chloroform to the poisonous gas, phosgene.

Other example, bitter almond water, deposits crystals of benzoic acid which result from the autoxidation of benzaldehyde.



Thank  
you

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