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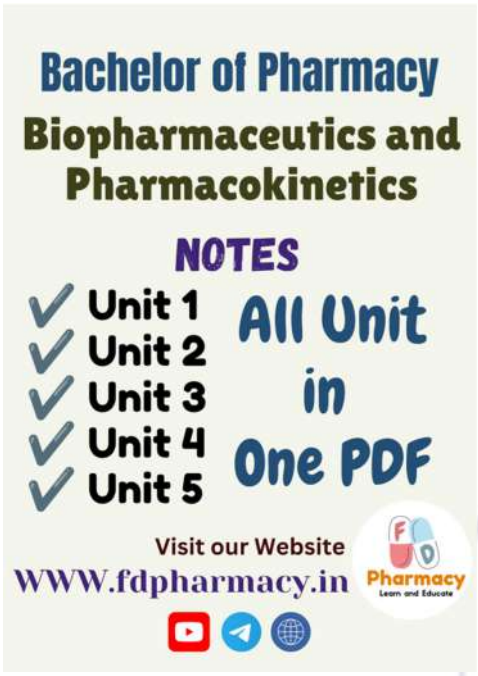
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HERBAL DRUG TECHNOLOGY

UNIT 3

TOPIC :

- **Herbal formulations :**

  Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes

Herbal Formulations

→ Herbal formulations are pharmaceutical preparations made from one or more medicinal herbs or processed herbal materials in definite quantities.

→ They are used for prevention, diagnosis, treatment, and relief of diseases and may also provide nutritional and cosmetic benefits.

Characteristics

- Prepared from natural herbal ingredients
- Possess therapeutic activity
- Safer with fewer side effects
- Used in traditional and modern medicine systems
- Available in different dosage forms

Advantages

1. Natural and safe
2. Fewer side effects
3. Economical and easily available
4. Better patient acceptability
5. Suitable for long-term therapy
6. Possess multiple therapeutic actions

Disadvantages

1. Slower onset of action
2. Variability in composition
3. Shorter shelf life
4. Risk of microbial contamination
5. Difficult standardization

Types of Herbal Formulations

Herbal formulations are mainly classified into:

1. Herbal syrups
2. Herbal mixtures
3. Herbal tablets
4. Novel herbal dosage forms
5. Herbal creams

1. Herbal Syrups

→ Herbal syrups are concentrated aqueous preparations having sweet taste and viscous consistency containing herbal extracts or herbal medicaments.
→ They are prepared using herbal infusions, decoctions, tinctures, or juices along with sugar, honey, or sweetening agents.

Composition

1. Herbal extract (infusion/decoction/tincture)
2. Sugar or honey
3. Glycerin or sorbitol
4. Purified water
5. Preservatives or antimicrobial agents (if required)
6. Flavouring agents

Methods of Preparation

Step 1 – Preparation of Herbal Extract

- Herbal infusion is prepared by soaking herbs in hot water for about 15 minutes.
- Herbal decoction is prepared by boiling herbs in water for about 30 minutes.

Step 2 – Filtration

- The liquid is strained and pressed to obtain maximum extract.

Step 3 – Addition of Sweetening Agent

- Equal proportion of herbal extract and sugar/honey is mixed.

Step 4 – Heating

- The mixture is gently heated until syrupy consistency is obtained.

Step 5 – Addition of Tincture or Preservative

- Tinctures may be added to increase effectiveness.
- Preservatives may be added for stability.

Advantages

1. Mask unpleasant taste of drugs
2. Suitable for pediatric and geriatric patients
3. Easy to swallow
4. Soothing effect on irritated tissues
5. Better patient compliance

Disadvantages

1. Risk of microbial growth
2. High sugar content may not be suitable for diabetics
3. Bulky for storage and transport

Storage and Preservation

- Stored in well-closed dark glass bottles
- Temperature should be below 30°C
- Protect from light and moisture

Preservatives Used

- Glycerin
- Sodium benzoate
- Methyl paraben

Examples

Herbal Syrup	Uses
Raspberry syrup	Flavouring and soothing agent
Cherry syrup	Cough preparations
Compound sarsaparilla syrup	Blood purifier and tonic

Uses

- Used in cough and cold preparations
- Used as tonics and appetite stimulants
- Used in pediatric formulations

2. HERBAL MIXTURES

→ Herbal mixtures are liquid pharmaceutical preparations containing one or more herbal ingredients dissolved or suspended in a suitable vehicle for internal use.

→ They are usually prepared from herbal extracts, infusions, decoctions, tinctures, or powders and are administered orally.

Characteristics

- Contain one or more herbal drugs
- Liquid dosage form for oral administration
- May be solutions, suspensions, or emulsions
- Easily administered and rapidly absorbed
- Suitable for pediatric and geriatric patients

Composition

1. Herbal extracts or herbal powders
2. Vehicle (water or aromatic water)
3. Sweetening agents
4. Flavouring agents
5. Preservatives (if required)
6. Stabilizers or suspending agents

Types of Herbal Mixtures

1. Simple Herbal Mixtures

Contain only one herbal ingredient.

Example

Ginger mixture

2. Compound Herbal Mixtures

Contain more than one herbal ingredient.

Example

Cough mixtures containing tulsi, liquorice, and ginger.

Methods of Preparation

Step 1 – Preparation of Herbal Extract
- Herbal infusion or decoction is prepared.
- Tinctures or extracts may also be used.

Step 2 – Filtration
- The preparation is filtered to remove insoluble materials.

Step 3 – Addition of Excipients
- Sweetening agents, flavours, and preservatives are added.

Step 4 – Volume Adjustment
- Final volume is adjusted using purified water or suitable vehicle.

Step 5 – Packaging
- Filled in well-closed containers and labelled properly.

Advantages of Herbal Mixtures

1. Easy to administer
2. Rapid absorption and action
3. Suitable for children and elderly patients
4. Can combine multiple herbs
5. Pleasant taste with flavouring agents

Disadvantages of Herbal Mixtures

1. Shorter shelf life
2. Risk of microbial contamination
3. Sedimentation may occur in suspensions
4. Bulky to transport and store

Storage of Herbal Mixtures

- Stored in airtight containers
- Protected from light and moisture
- Kept in cool place below 30°C
- Shake well before use if suspension is present

3.Herbal Tablets

→ Herbal tablets are solid pharmaceutical dosage forms prepared by compressing herbal powders, extracts, or granules with suitable excipients into tablet form.
→ They contain one or more herbal ingredients and are used for therapeutic, nutritional, or preventive purposes.

Characteristics of Herbal Tablets

- Solid dosage form
- Accurate dose of herbal drugs
- Convenient to use and carry
- Longer shelf life compared to liquid preparations
- May be coated or uncoated

Composition of Herbal Tablets

1. Herbal powder or herbal extract
2. Binders
3. Diluents
4. Disintegrants
5. Lubricants
6. Flavouring and colouring agents

Types of Herbal Tablets

1. Compressed Tablets
- Prepared by direct compression of herbal granules.

2. Coated Tablets
- Tablets coated with sugar or film to improve appearance and taste.

3. Chewable Tablets
- Designed to be chewed before swallowing.

4. Effervescent Tablets
- Contain ingredients that release carbon dioxide in water.

5. Sustained Release Herbal Tablets
- Release herbal drug slowly over a long period.

Methods of Preparation

Step 1 – Preparation of Herbal Powder
- Herbal drugs are dried and powdered.

Step 2 – Granulation
- Powders are mixed with binders to prepare granules.

Step 3 – Drying
- Granules are dried to remove moisture.

Step 4 – Compression
- Granules are compressed using tablet machines.

Step 5 – Coating and Packaging
- Tablets may be coated and packed in suitable containers.

Advantages of Herbal Tablets

1. Accurate dosage
2. Easy to handle and transport
3. Better stability and shelf life
4. Convenient administration
5. Mask unpleasant taste
6. Economical for large-scale production

Disadvantages of Herbal Tablets

1. Difficult to swallow for some patients
2. Slower onset than liquid dosage forms
3. Herbal powders may show poor compressibility
4. Moisture may affect tablet stability

Storage of Herbal Tablets

- Store in airtight containers
- Protect from moisture and light
- Store at room temperature

4.Herbal Creams

→ Herbal creams are semisolid cosmetic or pharmaceutical preparations containing one or more herbal ingredients incorporated in a suitable base for external application on the skin.

→ They are used for cleansing, moisturizing, protection, healing, and beautification of skin.

Characteristics of Herbal Creams

- Semisolid dosage form
- Applied externally on skin
- Contain herbal extracts or oils
- Provide local therapeutic and cosmetic effects
- Easy to spread on skin

Composition of Herbal Creams

1. Herbal extracts or herbal oils
2. Cream base
3. Emulsifying agents
4. Preservatives
5. Perfumes and colouring agents
6. Water or oily phase

Types of Herbal Creams

1. Oil in Water (O/W) Creams

- Water is external phase
- Non-greasy and easily washable

Uses

- Moisturizing creams
- Vanishing creams

2. Water in Oil (W/O) Creams

- Oil is external phase
- Greasy and protective in nature

Uses

- Cold creams
- Protective creams

Methods of Preparation

Step 1 – Preparation of Oil Phase

- Oils, waxes, and oil-soluble ingredients are heated together.

Step 2 – Preparation of Aqueous Phase

- Water-soluble ingredients are dissolved in water and heated separately.

Step 3 – Mixing

- Oil phase and aqueous phase are mixed with continuous stirring.

Step 4 – Addition of Herbal Ingredients

- Herbal extracts, perfumes, and preservatives are added after cooling.

Step 5 – Packaging

- Cream is filled into suitable containers or tubes.

Advantages of Herbal Creams

1. Natural and safe
2. Fewer side effects
3. Suitable for sensitive skin
4. Nourish and protect skin
5. Possess therapeutic and cosmetic benefits
6. Easy to apply and remove

Disadvantages of Herbal Creams

1. Shorter shelf life
2. Risk of microbial contamination
3. Stability may be affected by temperature
4. Some herbal ingredients may cause allergy

Storage of Herbal Creams

- Store in airtight containers
- Protect from direct sunlight
- Store in cool and dry place

5.Novel Herbal Dosage Forms

→ Novel herbal dosage forms are advanced drug delivery systems developed to improve the stability, absorption, bioavailability, effectiveness, and patient compliance of herbal drugs.
→ These systems help deliver herbal medicines more efficiently compared to conventional dosage forms.

Need for Novel Herbal Dosage Forms

Novel dosage forms are developed because many herbal drugs:

- Have poor water solubility
- Show low bioavailability
- Are unstable in gastrointestinal fluids
- Require controlled and targeted delivery
- Need improved patient compliance

Advantages of Novel Herbal Dosage Forms

1. Improved bioavailability
2. Better absorption of herbal constituents
3. Controlled and targeted drug release
4. Reduced dose and side effects
5. Improved stability of herbal drugs
6. Better patient compliance

Types of Novel Herbal Dosage Forms

1. Phytosomes
2. Liposomes
3. Nanoparticles
4. Microspheres
5. Transdermal patches
6. Herbal gels and emulsions

1. Phytosomes

→ Phytosomes are novel herbal formulations in which herbal active constituents are complexed with phospholipids to improve absorption and bioavailability.

→ The term "Phyto" means plant and "some" means cell-like structure.

Composition of Phytosomes

1. Herbal extract or phytoconstituent
2. Phospholipids (mainly phosphatidylcholine)
3. Suitable solvent

Method of Preparation

1. Herbal extract and phospholipid are dissolved in suitable solvent.
2. The mixture is refluxed and reacted to form complex.
3. Solvent is removed by evaporation.
4. Phytosome complex is collected and dried.

Mechanism of Action

- Phospholipids surround herbal constituents.
- Improve lipid solubility and membrane penetration.
- Enhance absorption through biological membranes.

Advantages of Phytosomes

1. Improved bioavailability
2. Better absorption
3. Increased stability
4. Enhanced therapeutic effect
5. Reduced dose requirement

Disadvantages of Phytosomes

1. Expensive preparation
2. Complex manufacturing process
3. Stability issues during storage

Examples of Phytosomes

Herbal Drug	Use
Curcumin phytosome	Anti-inflammatory
Silymarin phytosome	Liver protection
Green Tea phytosome	Antioxidant