

Unit-3

Herbal Drug Technology

B.Pharma 6th Sem Notes

Unit: 3

Herbal Cosmetics

- Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.

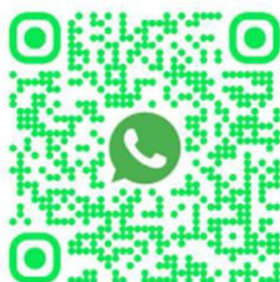
Herbal excipients:

- Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes.

Herbal formulations:

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

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Herbal Cosmetics

Herbal cosmetics are formulations prepared using **plant-based raw materials** such as **fixed oils, waxes, gums, colours, perfumes, protective agents, bleaching agents and antioxidants**. These natural ingredients improve safety, biocompatibility, and effectiveness of cosmetic products.

Raw Materials of Herbal Origin Used in Cosmetic Formulations

A. Fixed Oils

Natural triglycerides obtained from seeds/fruits.

Functions: Emollients, moisturizers, conditioners, cleansing agents.

Oil	Botanical Source	Pharmacognostic Features / Uses
Coconut oil	<i>Cocos nucifera</i>	Solid at room temp, rich in lauric acid; used in hair oils, moisturizers.
Castor oil	<i>Ricinus communis</i>	Thick oil; used in lip balms, hair conditioners.
Almond oil	<i>Prunus amygdalus</i>	Light, non-greasy emollient; used in massage oils, creams.
Olive oil	<i>Olea europaea</i>	Contains oleic acid; used in lotions, soaps.
Jojoba oil	<i>Simmondsia chinensis</i>	Liquid wax ester; regulates sebum; used in anti-acne, shampoos.

B. Waxes

Solid lipids used to provide consistency and stability.

Wax	Source	Pharmacognostic Importance / Uses
Beeswax	Honeycomb of <i>Apis mellifera</i>	Natural emulsifier; in lip balms, cold creams.
Carnauba wax	Leaves of <i>Copernicia prunifera</i>	Hard wax; used in lipsticks, polishes.
Candelilla wax	<i>Euphorbia cerifera</i>	Thickening agent in lipsticks, mascara.
Lanolin (wool wax)	Sheep wool secretion	Skin protectant in creams and ointments.



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C. Gums and Mucilages

Plant hydrocolloids used as **binders, stabilizers, thickeners**.

Gum	Source	Uses
Gum acacia	<i>Acacia senegal</i>	Emulsifier in lotions, face masks.
Guar gum	<i>Cyamopsis tetragonoloba</i>	Thickener in shampoos, conditioners.
Tragacanth	<i>Astragalus gummifer</i>	Stabilizer in toothpaste and gels.
Xanthan gum	Fermentation product	In gels, mouthwashes, creams.

D. Natural Colours (Pigments)

Provide safe colouring to cosmetic products.

Colour	Plant Source	Use
Henna (lawsone)	<i>Lawsonia inermis</i>	Hair dye, conditioning agent.
Turmeric (curcumin)	<i>Curcuma longa</i>	Yellow colouring; anti-inflammatory in skin packs.
Beet root pigment	<i>Beta vulgaris</i>	Pink/red colour in lip balms.
Indigo	<i>Indigofera tinctoria</i>	Natural blue/black hair dye.

E. Natural Perfumes / Essential Oils

Provide fragrance and therapeutic properties.

Oil	Source	Uses
Rose oil	<i>Rosa damascena</i>	Fragrance in skin creams.
Lavender oil	<i>Lavandula officinalis</i>	Aromatic, calming; in soaps, gels.
Sandalwood oil	<i>Santalum album</i>	Base note fragrance; antiseptic.
Peppermint oil	<i>Mentha piperita</i>	Flavouring agent in toothpaste, mouthwash.



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F. Protective Agents / Skin Healing Agents

Used for soothing, healing, antimicrobial effects.

Agent	Botanical Source	Cosmetics Use
Aloe vera gel	<i>Aloe barbadensis</i>	Moisturizer, soothing agent.
Neem extract	<i>Azadirachta indica</i>	Antimicrobial; in anti-acne creams, oral care.
Calendula	<i>Calendula officinalis</i>	Anti-inflammatory; healing creams.
Tea tree oil	<i>Melaleuca alternifolia</i>	Antiseptic; in anti-dandruff and skin products.

G. Natural Bleaching Agents

Used for skin lightening, exfoliation, and brightening.

Agent	Source	Function
Lemon extract (citric acid)	<i>Citrus limon</i>	Skin lightening, astringent.
Papaya extract (papain)	<i>Carica papaya</i>	Enzyme exfoliation; removes dead cells.
Yogurt (lactic acid)	Fermented milk	Gentle bleaching and exfoliation.
Strawberry extract	<i>Fragaria vesca</i>	Whitening, stain removal (teeth).

H. Natural Antioxidants

Prevent oxidation, delay aging, and preserve formulations.

Antioxidant	Source	Uses
Vitamin E (tocopherol)	Wheat germ, sunflower oils	Anti-aging creams, hair serums.
Green tea polyphenols	<i>Camellia sinensis</i>	Anti-wrinkle, UV protection.
Grapeseed extract	<i>Vitis vinifera</i>	Antioxidant in skin creams.
Rosemary extract	<i>Rosmarinus officinalis</i>	Natural preservative.

Applications of Herbal Cosmetics

A. Skin Care

- Face creams, moisturizers, acne treatments
- Anti-aging formulations
- Sunscreens, bleaching agents
- Face packs containing multani mitti, neem, turmeric



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B. Hair Care

- Herbal hair oils, shampoos, conditioners
- Anti-dandruff preparations containing neem, tea tree oil
- Herbal hair dyes (henna + indigo)

C. Oral Hygiene

- Toothpaste with clove, neem, peppermint, triphala
- Mouthwashes with mint, tulsi, aloe vera
- Natural whitening agents (strawberry, charcoal)

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Herbal Excipients –

Introduction

Herbal excipients are **pharmaceutical additives of natural plant origin** used in the formulation of tablets, capsules, liquids, semisolids, and cosmetic preparations. These substances do not have therapeutic activity but help in **processing, stability, palatability, appearance, disintegration, and overall performance** of formulations.

Herbal excipients are preferred because they are

- ✓ biodegradable
- ✓ non-toxic
- ✓ biocompatible
- ✓ economical
- ✓ easily available
- ✓ suitable for natural/herbal formulations

Significance of Herbal Excipients

Substances of natural origin are increasingly used because:

1. **Safety** – Lower risk of toxicity and hypersensitivity compared to synthetic excipients.
2. **Biocompatibility** – Derived from natural plant tissues; easily accepted by biological systems.
3. **Environmental friendliness** – Biodegradable and sustainable.
4. **Regulatory acceptance** – Many herbal excipients are listed in pharmacopeias (e.g., acacia, tragacanth).
5. **Functional versatility** – Herbs can act as binders, disintegrants, emulsifiers, colorants, etc.
6. **Consumer preference** – Demand for natural-label products in pharmaceuticals, nutraceuticals and cosmetics.

1. Natural Colorants

Used to provide **colour** to pharmaceutical and cosmetic formulations.

Colorant	Source	Application
Curcumin	<i>Curcuma longa</i>	Yellow colouring in capsules, syrups.
Carmine/Beetroot red	<i>Beta vulgaris</i>	Red colour in cosmetics, nutraceuticals.
Chlorophyll	Green leaves	Green colour in toothpaste, gels.
Henna (Lawsonia)	<i>Lawsonia inermis</i>	Colouring agent for herbal cosmetics.

2. Natural Sweeteners



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Improve **taste and palatability** of oral formulations.

Sweetener	Source	Notes
Stevia glycosides	<i>Stevia rebaudiana</i>	High-intensity sweetener; used in syrups.
Honey	<i>Apis mellifera</i>	Sweetener and demulcent in syrups, lozenges.
Glycyrrhizin	<i>Glycyrrhiza glabra</i> (Licorice)	Sweet, used in pediatric formulations.

3. Herbal Binders

Help **hold ingredients together** in tablets and granules.

Binder	Source	Properties
Gum acacia	<i>Acacia senegal</i>	Strong binder for tablets.
Tragacanth	<i>Astragalus gummifer</i>	Mucilage binder with good stability.
Guar gum	<i>Cyamopsis tetragonoloba</i>	Swells, provides binding and viscosity.
Pectin	Citrus fruits, apple pomace	Used in chewable tablets.
Starch mucilage	Maize, potato	Widely used binder/disintegrant.

4. Herbal Diluents / Fillers

Add **bulk** to tablets or capsules.

Diluent	Source	Uses
Microcrystalline cellulose (from plant pulp)	Wood pulp	Excellent compressibility; widely used.
Starch	Maize/potato	Diluent and disintegrant.
Calcium carbonate (mineral, natural)	Natural mineral	Used in antacid tablets, powders.

5. Natural Viscosity Builders / Thickeners

Used in syrups, gels, suspensions, and creams.

Viscosity Builder	Source	Properties
Xanthan gum	Fermentation of <i>Xanthomonas</i>	High viscosity; stable in wide pH.



Guar gum	<i>Cyamopsis tetragonoloba</i>	Thickening agent in semisolids.
Agar	Seaweed (<i>Gelidium</i> , <i>Gracilaria</i>)	Gelling agent in suppositories, gels.
Carrageenan	Red algae	Thickener in dental gels, syrups.
Aloe mucilage	<i>Aloe barbadensis</i>	Used in gels and skin-care products.

6. Natural Disintegrants

Promote **breakdown of tablets** in GI fluids.

Disintegrant	Source	Function
Starch	Maize/potato	Swells on hydration → breaks tablet.
Cross-linked starch derivatives	Modified natural starch	Super-disintegrant.
Plantago ovata (Isapgul husk)	<i>Plantago ovata</i>	High swelling index; effective disintegrant.
Gum karaya	<i>Sterculia urens</i>	Swells and facilitates disintegration.

7. Natural Flavors & Perfumes

Improve **taste, aroma, and patient acceptability**.

Flavor/Perfume	Source	Use
Peppermint oil	<i>Mentha piperita</i>	Flavor in toothpaste, syrups.
Clove oil	<i>Syzygium aromaticum</i>	Flavoring in dental products.
Cinnamon oil	<i>Cinnamomum zeylanicum</i>	Flavor in mouthwashes, syrups.
Vanilla	<i>Vanilla planifolia</i>	Flavor in pediatric formulations.
Citrus oils (lemon, orange)	<i>Citrus spp.</i>	Flavoring and fragrance.



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Herbal Formulations – Detailed Note (Pharmacognosy)

Introduction

Herbal formulations are pharmaceutical preparations containing **active plant extracts or herbal drugs** designed to deliver therapeutic benefits in a suitable dosage form. They can be conventional (traditional) or novel (advanced delivery systems).

Conventional Herbal Formulations

Conventional formulations are the **traditional dosage forms** widely used in Ayurveda, Siddha, Unani, and modern herbal pharmacy. These include:

A. Herbal Syrups

Definition:

A *syrup* is a **concentrated aqueous solution of sugar containing herbal extracts**, juices, or active constituents.

Examples:

- Tulsi cough syrup
- Ginger–honey syrup
- Ashwagandha health tonic

Characteristics:

- Sweet and palatable
- Easily administered to children and elderly
- Provides soothing, demulcent action
- Useful for cough, cold, digestive disorders, immunity boosting

Excipients:

Sugar, honey, herbal flavors, preservatives (from natural origin).

B. Herbal Mixtures

Definition:

A *mixture* is a **liquid preparation containing two or more medicinal herbal ingredients**, either in solution or suspension.

Examples:

- Triphala mixture



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- Arjuna bark mixture (cardiac)
- Aloe juice mixtures

Features:

- May contain solids suspended in liquid → shaken before use
- Used for gastroprotective, hepatoprotective, and detoxifying actions
- Quick onset of action

C. Herbal Tablets

Definition:

Herbal tablets are **compressed solid dosage forms** containing powdered herbs or standardized extracts along with natural excipients (binders, disintegrants, diluents).

Examples:

- Neem tablets
- Amla tablets
- Giloy (Guduchi) tablets

Characteristics:

- Accurate dosing
- Longer shelf-life
- Easy administration
- Made using natural binders like gum acacia, starch, pectin

Uses:

Immunity boosting, digestion, liver protection, anti-diabetic activity.

2. Novel Herbal Dosage Forms – Phytosomes

A. Need for Novel Herbal Delivery Systems

Many herbal drugs have limitations such as:

- Poor absorption
- Low solubility
- Poor permeability
- Rapid metabolism



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To overcome these issues, **novel herbal formulations** have been developed.

B. Phytosomes

Definition:

A **phytosome** (phyto = plant, some = cell-like structure) is a **phospholipid-herb complex** formed by reacting plant extracts with **phosphatidylcholine** to enhance their absorption and bioavailability.

Unlike conventional herbal extracts that dissolve poorly in lipids, **phytosomes make plant molecules lipid-compatible**, allowing better absorption through biological membranes.

C. Structure

A phytosome consists of:

- **Phytoconstituent** (flavonoid, tannin, polyphenol)
 - **Phospholipid** (usually phosphatidylcholine)
- The two form a *molecular complex*, not just a mixture.

D. Advantages of Phytosomes

- ✓ Improved absorption and bioavailability
- ✓ Better stability and protection from gastric degradation
- ✓ Enhanced therapeutic efficacy
- ✓ Suitable for oral, topical, and cosmetic applications

Examples of Phytosome Herbs

Herbal Extract	Uses	Benefit of Phytosome Form
Green tea phytosome	Antioxidant, anti-aging	Better skin absorption
Ginkgo biloba phytosome	Memory, cognition	Enhanced brain uptake
Silymarin phytosome (from Milk thistle)	Hepatoprotective	High bioavailability
Ginseng phytosome	Adaptogenic	Better systemic absorption



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