

SOURCES OF DRUGS & DOSAGE FORMS

Drug Sources

- Natural sources.
- Semi-synthetic
- Synthetic
- Biosynthetic.

Natural sources

↳ Plants, Animals, microbiological, minerals.

Plants

- oldest source of drugs.
- many plants contain biologically active substances.
- chemically the active ingredients of plants fall in several categories:
Alkaloids, glycosides, oils.

Alkaloids

- Atropa belladonna* → Atropine.
- Papaverum somniferum* → Morphine.
- Tobacco → Nicotine.
- Rauwolfia serpentina* → Reserpine.
(antihypertensive).

- Alkaline nitrogenous bases.
- potent activity.
- used as their water soluble hydrochloride/sulfate salts.

Glycosides

Digitalis Fox glove
Digitalis lanata.

- Heterocyclic non-sugar moiety (aglycone) linked to a sugar moiety through ether linkage.
- Cardiac glycosides - digoxin, ouabain.
- Anthraquinone glycosides - senna, plant purgatives.
- glycosides from microorganisms. Aminoglycosides (gentamicin).

Oils

- olive oil, castor oil, cotton oil, peanut oil.
- viscous inflammable liquids, insoluble in water.
- Fixed (non volatile) oils - calorie yielding triglycerides of higher fatty acids;
- Used for food and as emollients, eg: groundnut oil, coconut oil, sesame oil etc.
- Castor oil (stimulant purgative)
- olive oil, peppermint oil, eucalyptus oil, ginger oil.
- Essential (volatile) oils - obtained from flowers or leaves by steam distillation;
- (1). Aromatic terpene hydrocarbons

used as flavouring agents,
carminatives, counterirritants
and astringent.

eg. clove oil (dental pain)

Menthol, Eucalyptol, camphor are
volatile oils that are solids
at room temperature.

Other plant products

gum acacia, psyllium seeds,
gum tragacanth?

→ Tannins are astringents.

Animals

Insulin, vaccines.

→ Adrenaline, thyroxine,
insulin, liver extract
(vit B₁₂), Antiserum,
vaccines.

Equine (horse) → estrogen

Microbes

→ Many life-saving drugs
are obtained from fungi,
moulds and bacteria.
eg. penicillin from penicillium
mould.

→ obtained from fungi,
actinomycetes and bacteria
eg. penicillin, gentamicin,

tetracycline, erythromycin

Minerals

→ Iron salts, calcium salts,
lithium, carbonate magnesium/
aluminium hydroxide, iodine.

Lithium → DOC of mania.

Semisynthetic sources

→ used to prepare drugs when
the synthesis of drugs (complex
molecules) may be difficult,
expensive and uneconomical or
when the natural sources may
yield impure compounds.

→ Some examples are semisynthetic
human insulin.

Synthetic source

→ Largest source of medicines.

Advantages:

→ purity & uniformity of the product
→ Manufactured in any quantity
as per need.
→ Greater selectivity of action.
→ Target specific biomolecules.

Benzodiazepines, thiazides,
benzimidazoles, fluoroquinolones

Biotechnology

Techniques.

cell culture → drugs developed

(2)

→ skin care,
human kidney
cells.

rDNA technology → Erythropoietin,
Hep B vaccine.
Insulin.

Hybridoma technique → Monoclonal antibodies
Abciximab

Dosage Forms

Dosage form is a product suitable for administration of a drug to a patient.

Every active ingredient (drug) has to be formulated by adding other substances all to a specific size & packaged to a specific dosage form.

Divisions.

- ↳ Liquid
- ↳ Solid.
- ↳ Semisolid
- ↳ Inhalational.

I. Liquid Forms:

Aqueous preparations

1. Solutions.
2. Syrups.
3. Emulsions.
4. Suspensions.
5. Infusions.
6. Decoction.
7. Lotions.

Alcoholic preparations.

1. Elixirs.
2. Spirits (Essences).
3. Tinctures.

Aqueous preparations.

Solutions.

- Drug dissolved in water.
- Oral (sweetening & flavouring agents), topical / parenteral administration.
- Preservatives mostly added short shelf-life of watery solutions.

Syrups

- higher conc. of sugars, thicker in consistency.

'Dry syrups' - Drugs that deteriorate in aqueous medium. reconstituted by adding water.

Aqueous preparations.

Suspensions

- Dispersion of insoluble drugs in water with the help of a suspending agent.

- Both suspensions & emulsions tend to settle down. Should be shaken.

Emulsions

Uniform mixture of 2 immiscible liquids

Injections & Infusions.

→ Sterile solⁿ / suspensions in aqueous or oily medium - subcutaneous (or) intramuscular administration

→ Only aqueous solution (not suspensions) - intravenous (iv) infusion

→ Injections supplied in sealed glass ampoules or air tight rubber capped vials

Drops.

→ Conc. solⁿ of medicaments meant for oral ingestion / external application to eye, nose or ear canal.

→ Oral drops - preferred dosage form for infants & young children.

Lotions.

→ solⁿ, suspensions or emulsions meant for external application to skin without rubbing

→ Soothing, cooling, protective or emollient property

→ Better for hairy skin

Liniments.

→ certain counter irritants

Class.

→ emulsified, flavoured.

Spirits

eg: peppermint spirit, lemon spirit.

tonic → belladonna

Solid dosage forms.

→ powders.

→ tablets.

→ pills.

→ lozenges.

→ capsules.

→ suppositories.

Inhalationist.

→ Rotahaler.
Spinhaler.