

# LIQUID DOSAGE FORM

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# Liquid dosage forms

Dosage forms are pharmaceutical products that contain a mixture of active drug components and excipients. They can be in various forms, including liquids,<sup>f</sup> intended for administration or consumption as medication.

Liquid dosage forms can be prepared by dissolving the active drug substance in an aqueous or non-aqueous solvent such as alcohol, ether, or glycerin, suspending the drug in an appropriate medium, or incorporating the drug substance into an oil or water phase.

# Advantages of LDF

Liquid dosage forms have several advantages over other forms, such as being better for patients who have trouble swallowing, faster absorption than solids, more flexibility in achieving the proper dosage of medication, being palatable, and being the best choice for children and elderly patients.

## Disadvantages of LDF

- a. Shorter shelf life than other dosage forms.
- b. Measuring accuracy may be more difficult.
- c. May require special storage conditions.
- d. May be less stable compared to other forms.
- e. Susceptible to microbial contamination.
- f. May be bulky and inconvenient to carry around.
- g. Containers may break easily, leading to loss of the product.
- h. Measuring the dose accurately may be necessary.

# Administration of LDF

Liquid dosage forms can be administered topically as lotions or suspensions applied to the skin, as well as in the form of nasal drops, ear drops, and eye solutions. They can also be administered orally in the form of solutions, suspensions, or emulsions. Parenteral administration is another route, which includes subcutaneous injection, intramuscular injection, and intravenous administration.

## Types of LDF

- Syrup
- Otic Preparation
- Collodion
- Nasal Preparation
- Aromatic Water
- Spirit/Essences
- Elixir
- Mouthwash
- Tinctures
- Gargle
- Fluid Extract
- Astringent
- Douche
- Antibacterial
- Enema topical solution
- Liniment

# Some familiar LDF

## Syrups:

Syrups are concentrated aqueous preparations that contain sugar or sugar substitutes along with flavoring agents and medicinal substances.

## Types of syrup:

### a. Medicated syrups:

Syrups that contain medicinal substances along with flavoring agents are known as medicated syrups.

### b. Flavored Syrups:

Flavored syrups are utilized as a vehicle for medications with an unpleasant taste, leading to the production of medicated syrups.

# Syrups

Advantages of syrups include their ability to mask the unpleasant taste of medication, the soothing effect of their thick consistency on irritated throat tissues, their low alcohol content, and their ease of dose adjustment based on a child's weight.



# Elixir

Elixirs are clear, sweetened hydro-alcoholic solutions intended for oral use, usually flavored to enhance palatability. They are typically less sweet and less viscous than syrups.

They are classified into two classes,

- a. Non medicated elixirs – vehicles,
- b. Medicated elixir – used for therapeutic effects

# Elixir

## Advantages of Elixirs:

Advantages of Elixirs include their ability to maintain both water-soluble and alcohol-soluble components in solution, their stable characteristics, and ease of preparation by simple solution

## Disadvantages of Elixirs:

Disadvantages of Elixirs include being less effective than syrups in masking the taste of medicated substances, and containing alcohol which accentuates the saline taste of bromides.

# Tincture

A tincture is a liquid preparation that is produced by soaking prepared plant material in a mixture of alcohol and water at room temperature for a prescribed period of time. The mixture is then pressed and filtered to yield a fluid in which the active constituents of the herb have dissolved. The process typically involves soaking plant or animal material in alcohol for approximately 72 hours. The most commonly used solvent for tinctures is ethanol, although vinegar, glycerine, and distilled water may also be used.

# Otic Preparations

Otic preparations are designed for application to the ear to treat conditions affecting the external and middle ear. They are used to address issues such as ear infections, cerumen (earwax) build-up, and dermatitis of the ear.

Nasal preparations refer to liquid, semi-solid, or solid pharmaceutical products used to achieve a systemic or local effect when applied to the nasal cavities. These preparations are formulated to be non-irritating and must not impair the functions of the mucosa and its cilia.

# Suspension

A suspension is a heterogeneous mixture that contains solid particles of a size that allows for sedimentation. It is composed of a dispersion of relatively coarse particles in an aqueous vehicle.

Suspensions are administered through both oral and topical routes. Similar to solutions, oral suspensions are ideal for children and individuals who cannot consume solid dosage forms.

# Emulsion

Emulsions are liquid preparations that consist of two or more normally immiscible liquids. They are two-phase systems that often contain liquid drug substances and are classified into various types, including oil-in-water (O/W), water-in-oil (W/O), and multiple emulsions. Emulsions can be used for both oral and topical administration and are particularly useful in cases where the drug substance is poorly soluble in water or requires slow release over time.

Emulsions can be administered

- topically, orally, and I.M.

# Liniment

Liniment, also known as embrocation or balm, is a medicated topical preparation applied to the skin. It is similar in viscosity to lotions, but is rubbed into the skin to provide relief from pain and stiffness, often caused by sore muscles or arthritis.

# Infusions and decoctions

Infusion is a type of herbal tea made from the soft parts of plants that contain readily soluble constituents. Fresh infusions are prepared by macerating the plants for a short period of time (typically 15 minutes) with boiling water. Decoction, on the other hand, is an extract of the water-soluble and heat-stable constituents of crude drugs that come from the hard parts of plants, which are boiled in water for 30 minutes and then cooled. Both infusions and decoctions are commonly used in traditional medicine to treat various ailments and conditions, and are typically consumed for short periods of time (no more than 3 days).



# Collodion

Collodion is a solution of pyroxylin ether and alcohol that can form a flexible or non-flexible film when applied to the skin. The flexible type is used for surgical dressings and to hold them in place. Non-flexible collodion is used in theatrical make-up. These solutions can be used as topical protectants to close small wounds, abrasions, and cuts, to keep medications in contact with the skin, and to hold surgical dressings in place. Although initially colorless, collodion discolors over time.

## Additives used in LDF

Additives are utilized in liquid dosage forms for various purposes, including protecting against microbes, improving stability, enhancing organoleptic properties, masking taste, increasing the total volume of the preparation, and ensuring dose uniformity.

## Example of additives

- a. Antimicrobial agents,
- b. Buffering agent,
- c. Flavoring agent,
- d. Coloring agent,
- e. Suspending agent,
- f. Emulsifying agent,
- g. Stabilizing agent,
- h. Diluent.
- i. Others.