

# Aerosol cosmetic



# INTRODUCTION

• Pharmaceutical Aerosol is defined as aerosol product containing active ingredients dissolved, suspended or emulsified in a propellant or a mixture of solvent and propellant and intended for oral or topical administration.

## ADVANTAGES OF AEROSOLS

- A dose can be removed without contamination of materials.
- Stability is enhanced for these substances adversely affected by oxygen and or moisture.
- When sterility is an important factor, it can be maintained while a dose is being dispensed.

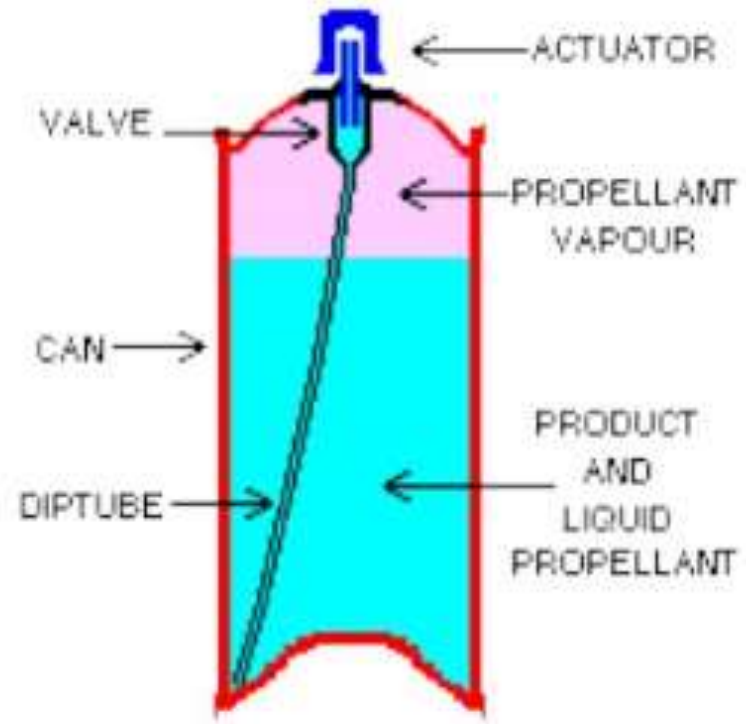
- The medication can be delivered directly to the affected area in a desired form. (localized action)
- Irritation produced by the mechanical application of topical medication is reduced or eliminated.
- Ease and convenience of application.
- Application of medication in thin layer .
- Rapid response to the medicament .

## DISADVANTAGES OF AEROSOLS

- Expensive.
- Chlorofluorocarbon propellants cause Ozone layer depletion.
- Inflammability
- Toxicity
- Explosivity

# COMPONENTS OF AEROSOLS

- Propellant
- Container
- Valve and actuator
- Product concentrate



# PROPELLANTS

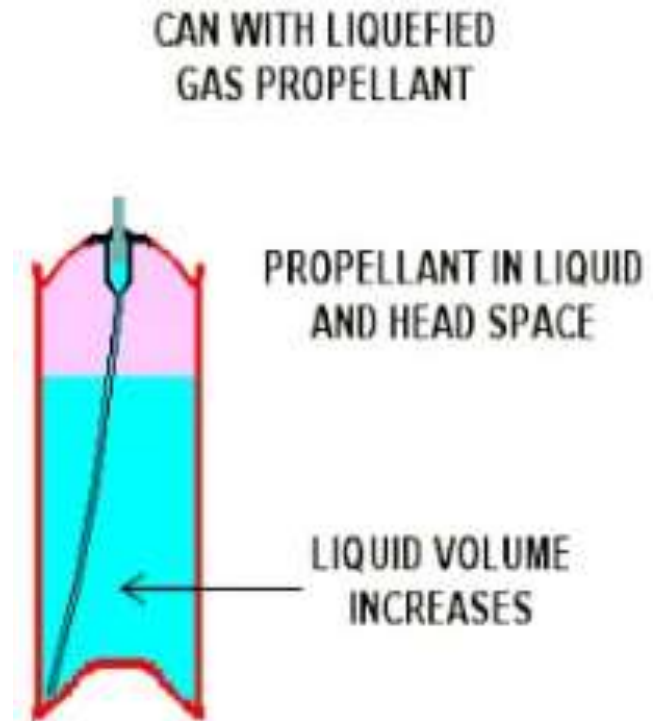
- Responsible for developing proper pressure within the container.
- Provide driving force to expel the product from the container.

## TYPES OF PROPELLANTS

- ❖ Two types
  - liquified gas  
include CFC, hydrocarbons, dimethyl ether
  - compressible gas  
carbon dioxide, nitrous oxide

# LIQUEFIED GAS PROPELLANTS

- Liquefied propellants are gases that exist as liquids under pressure.
- Because the aerosol is under pressure propellant exists mainly as a liquid, but it will also be in the head space as a gas.
- The product is used up as the valve is opened, some of the liquid propellant turns to gas and keeps the head space full of gas.



# CHLORO FLUORO CARBONS

- Propellant of choice for oral and inhalation .

## Advantages

- Chemical inertness
- Lack of toxicity
- Non flammability.
- Lack of explosiveness.

## Disadvantages

- High cost
- It depletes the ozone layer

**Examples:** Trichloromonofluoromethane - Propellant 11  
Dichlorodifluoromethane - Propellant 12  
Dichlorotetrafluoroethane - Propellant 114

# HYDROCARBONS

- Can be used for water based aerosols and topical use.

## Advantages

- Inexpensive
- Excellent solvents
- It does not cause ozone depletion

## Disadvantages

- Inflammable
- Unknown toxicity produced

Ex: Propane - Propellant A-108  
Isobutane - Propellant A-31  
Butane - Propellant A-17



## HYDROFLUORO CARBONS AND HYDRO CHLORO FLUORO CARBONS

- These compounds break down in the atmosphere at faster rate than CFCs.
- Lower ozone destroying effect.

### Advantages

- Low inhalation toxicity
- High chemical stability
- High purity
- Not ozone depleting

### Disadvantages

- Poor solvent
- High cost

**Examples:** Heptafluoro propane (HFA-227)

Tetrafluoroethane (HFA-134a)

Difluoroethane - Propellant 152a

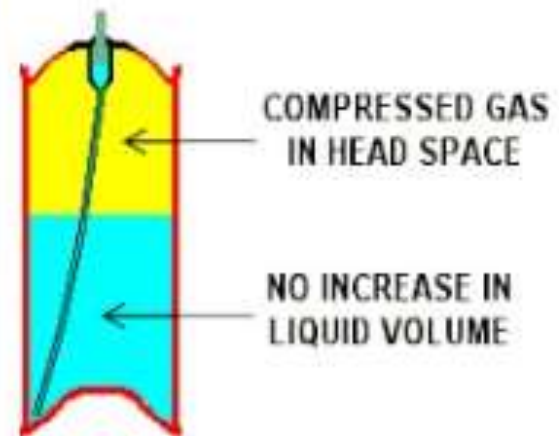
Chlorodifluoromethane - Propellant 22

Chlorodifluoroethane - Propellant 142 b

# COMPRESSED GAS PROPELLANTS

- Compressed gas propellants occupy the head space above the liquid in the can.
- When the aerosol valve is opened the gas 'pushes' the liquid out of the can.
- The amount of gas in the headspace remains the same but it has more space, and as a result the pressure will drop during the life of the can.
- Spray performance is maintained however by careful choice of the aerosol valve and actuator.

AEROSOL WITH COMPRESSED GAS PROPELLANT



Examples: Carbon dioxide, Nitrous oxide and Nitrogen

# Aerosol products

- Hair spray
- Deodorants
- Fragrances
- Shaving cream

# Hair spray

Ingredients	%
Bleached dewaxed shellac	2
Castor oil	0.2
Polyethylene glycol	0.1
Lanolin esters	0.1
alcohol	32.6
Propellants	65.0
Perfumes	q.s

# Deodorants

Concentrate	%
Diethyl phthalate	1.4
Isopropyl myristate	2.6
Chlorhexidine diacetate	0.5
alcohol	100
Perfume	q.s
Aerosol formulation	%
Concentrate	40
Propellent	60

# Fragrances

Concentrate	%
Perfume oil	0.5
Isopropyl myrisate	1.0
Dipropylene glycol	2.0
Alcohol	66.5
Propellent 12	30.0

# Shaving Cream

Concentrate	%
Stearic acid	4
Coconut fatty acid	2
Glyceryl monostearate	5
Glycerin	10
Triethanolamine	4
Water	100
Perfume	q.s

# Evaluation Parameters of Pharmaceutical Aerosols

## A. Flammability and combustibility

- Flash point
- Flame extension, including flashback

## B. Physiochemical characteristics

- Vapor pressure, Density, Moisture content

Identification of propellant(s) Concentrate-propellant ratio

## C. Performance

- Aerosol valve discharge rate
- Spray pattern
- Dosage with metered valves
- Net contents
- Foam stability
- Particle size determination
- Leakage

## D. Biologic characteristics

## E. Therapeutic activity