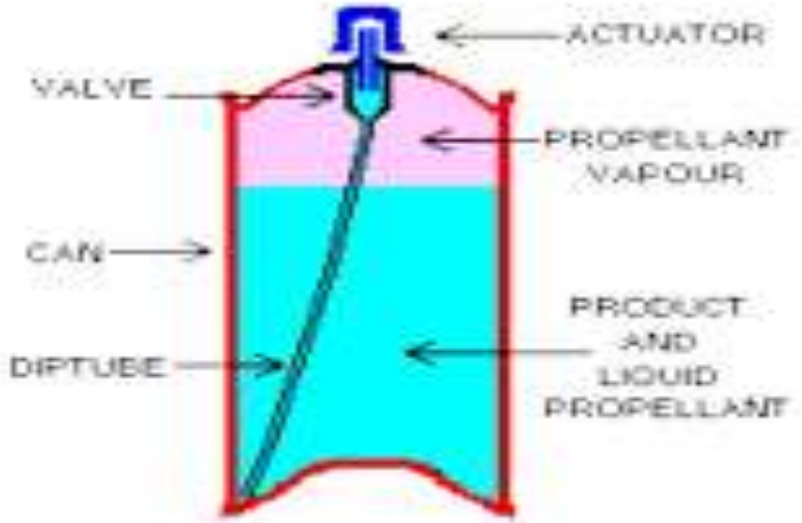
MODULE 5: Aerosols
Lecture 4

DISCLAIMER

All the content material provided here is only for teaching purpose

AEROSOL

“ Aerosol is a pressurized dosage forms containing one or more therapeutic active ingredients which upon actuation emit a fine dispersion of liquid and/or solid materials in a gaseous medium".



Advantages

- Easily withdrawn of drug
- Easy and convenient to apply.
- Faster Onset of action.
- No manual/ direct contact with the medicament.
- Avoid the first pass metabolism.
- A specific amount of dose or drug can be removed.
- No microorganism can enter.
- Release the contents in Controlled and Uniformly.
- Irritation can be reduced.

Disadvantages

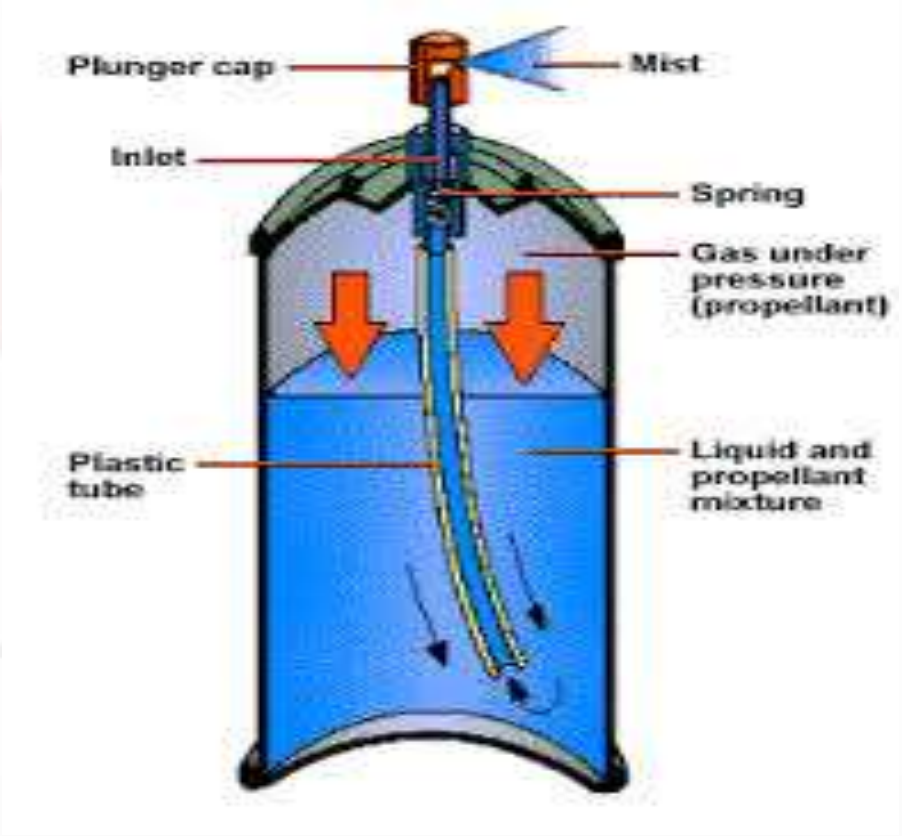
- Costly.
- Difficult disposal of empty aerosol containers.
- Allergic in some cases.
- Explosive.
- Some formulation is difficult.
- Sometimes propellants may cause toxic reactions.

Desired Characteristics

- Less explosive.
- Uniform and constant dose delivery.
- Non allergic.
- Economic/Low cost.
- Easy to handle.
- Non Breakable.
- Eco-friendly

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

(a) Liquefied gases Propellants

(b) Compressed gases Propellants

PROPELLANTS - TYPES

Depending on the route of administration and use,

I) Type-I Propellant A- Liquefied Gas

1) For oral and inhalation (Fluorinated hydrocarbons)

- Tri-chloro-mono-flouro methane (propellant 11)
- Di-chloro di-fluro methane (propellant 12)

2) Topical Pharmaceutical aerosols (Hydrocarbons)

- Propane
- Butane

II) Type-II Propellant B - Compressed Gas Propellants

1) Compound gases

- Nitrogen
- Carbon di-oxide

LIQUEFIED GAS PROPELLANTS

- 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.
- In this way the pressure in the can remains essentially constant and the spray performance is maintained.
- Exist as liquids under pressure.

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

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

References

- The Theory & Practice Of Industrial Pharmacy” by Leon Lachman , H.A.Lieberman.
- Remington’s “The Science & Practice Of Pharmacy” 21st Edition, Volume-I.

https://www.slideshare.net/revathireddypharma/aerosol-13798952