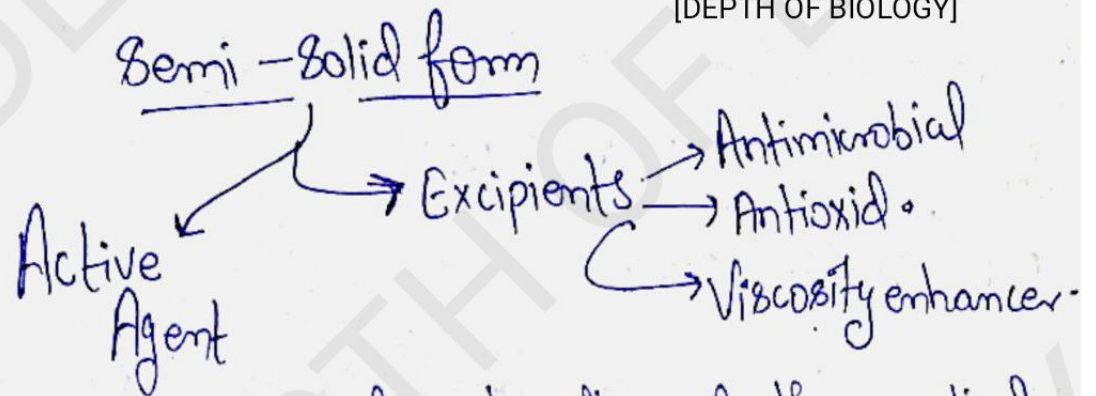


Semi - Solid Dosage forms

→ Applied externally. (Ointment, Creams, Jellies).

→ These are dermatological preparations.

[DEPTH OF BIOLOGY]



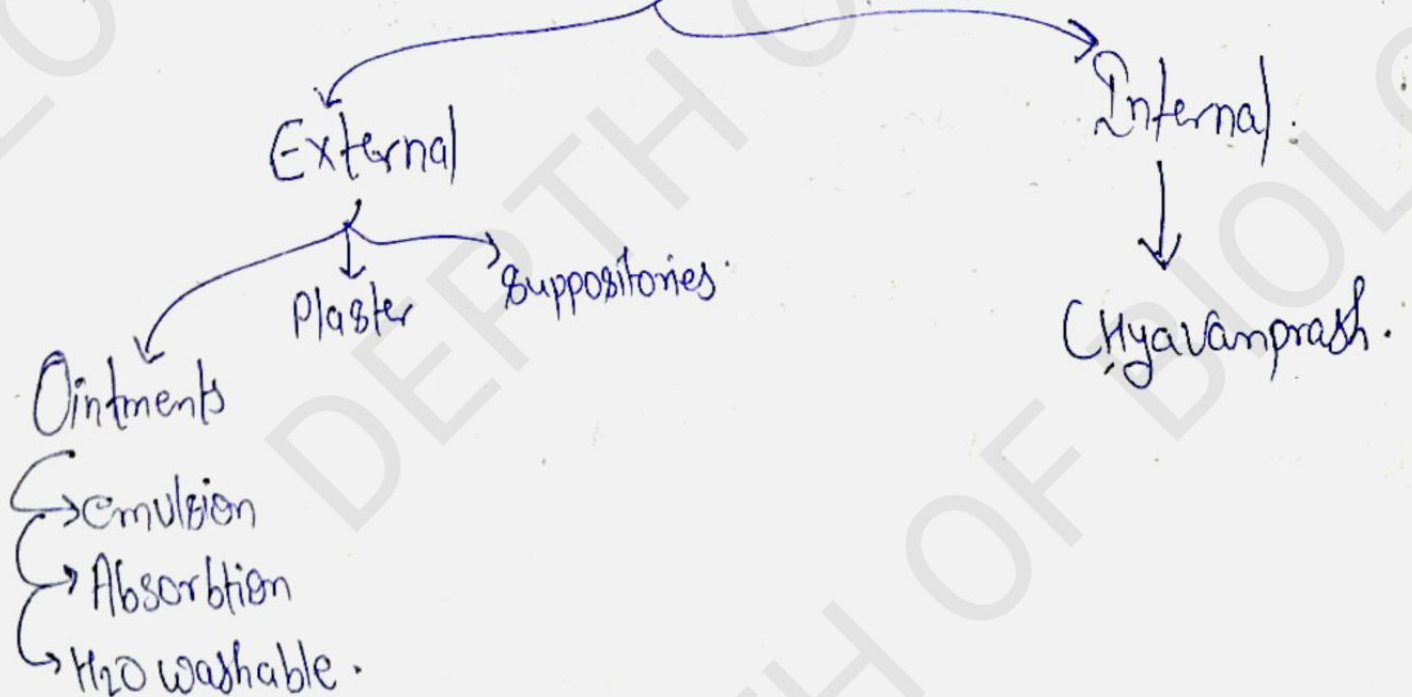
→ Semi-solid dosage forms are designed to adhere to the applied surface for some time period before they wash.

⇒ This adherence property is due to their plastic rheological behaviour.

Eg → Ointment, Gels, Creams, Suppositories, Plasters.

Classification

[DEPTH OF BIOLOGY]



Advantages →

- ① Easy to apply.
- ② Fast Action
- ③ Avoid first pass metabolism.
- ④ Best option for unconscious patient
- ⑤ Best option for those who facing difficulty in taking Oral medication.

[DEPTH OF BIOLOGY]

Disadvantage →

- ① May Cause Skin Irritation.
- ② may get Contaminated when we applied by Using fingers.
- ③ Less stable the solid dosage form.
- ④ may cause face Allergy in some patient.

Mechanism & factor Influencing Dermal

Penetration of Drug.

The drug Initially Penetrates through the Stratum Corneum → passes through deeper epidermis

[DEPTH OF BIOLOGY]

↓
Dermis.

(without drug accumulation in Dermal layer).

When drug reaches dermal layer. It become available for Systemic Absorption Via dermal Circulation.

[DEPTH OF BIOLOGY]

Factor Influencing dermal penetration of drug →

① Skin Condition → Age, disease, Climate, Injury affect Or alter the skin permeability.

② Skin Age → Young & elders → more permeable skin
Adult → Less permeable.

③ Blood flow → Change in Peripheral Circulation affect the transdermal absorption.

④ Regional Skin Sites → Different region of skin have different permeability.

⑤ Skin Metabolism → Skin metabolised about 5% of the topically applied drugs.

⑥ Species differences → Human Skin → Sweat Gland.
Hair follicle densities.

→ Laboratory Animal

→ capillary blood supply.

→ Sweating ability are different.

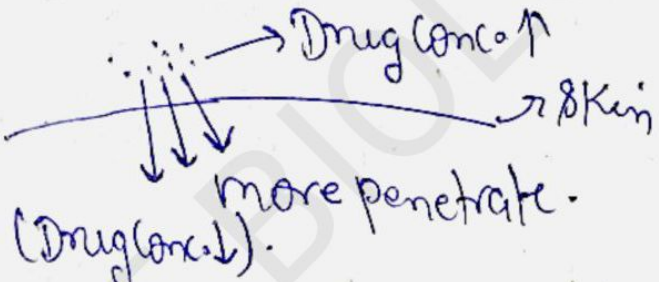
[DEPTH OF BIOLOGY]

[DEPTH OF BIOLOGY]

(J) Skin Hydration $\rightarrow$ More Hydrated Skin
 $\downarrow$
 Hydration of Stratum Corneum enhance the Absorption/Penetration.
 $\downarrow$
 more permeability of drug.

(h) Temp. & pH $\rightarrow$ Variation in Temp. Alter Absorption rate.
 $\swarrow$
 Temp. $\uparrow$ $\rightarrow$ Absorption $\uparrow$.

Unionised [Absorb.] $\xrightarrow{\text{[DEPTH OF BIOLOGY]}}$ Skin $\xleftarrow{\text{Ionised (Partially Absorb.)}}$

(i) Drug Concentration $\rightarrow$ 

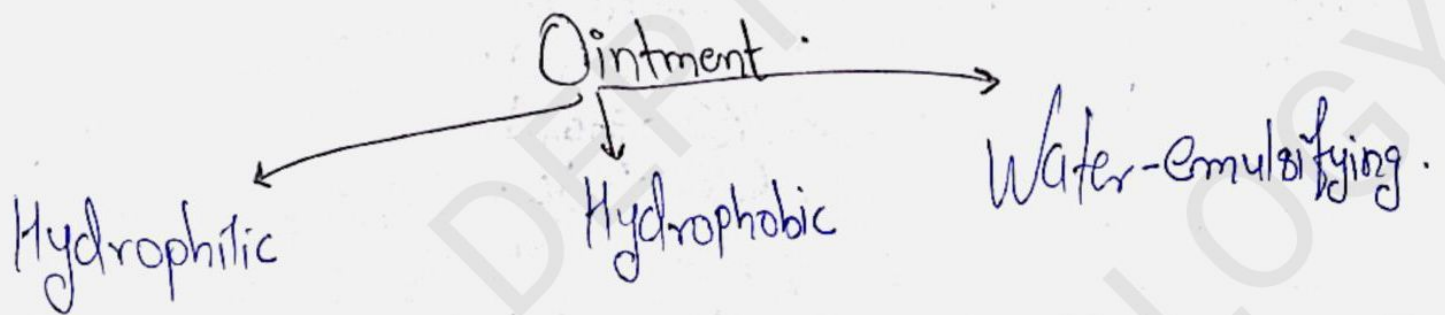
(J) Molecular size & Shape $\rightarrow$

[Absorption $\uparrow$ of Drug] $\rightarrow$ size $\downarrow$ of drug. [Mol. wt. $\downarrow$ $\rightarrow$ Absorption $\uparrow$ of Drug.]

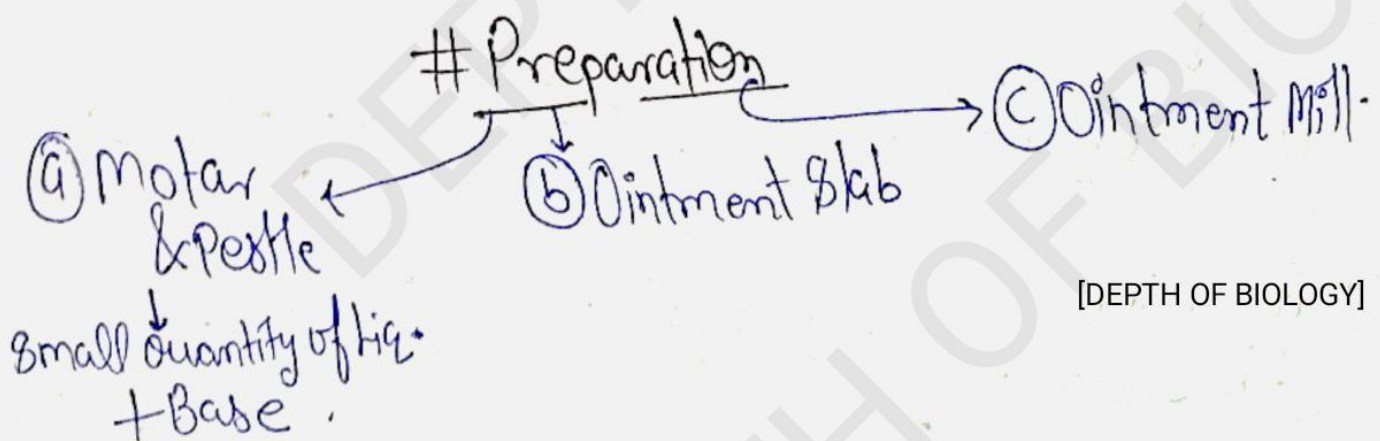
(K) Percutaneous Enhancer $\rightarrow$ [DEPTH OF BIOLOGY]
 Used to enhance the Absorption of drug.

Preparation of Ointment, Paste, Cream & Gels.

- ① Ointment → Semisolid formulation
- must have ↓
Prop. Easily Rub On skin
- Topically applied.
- Ointment at present time do not contain any oleaginous bases.
- [DEPTH OF BIOLOGY]



- Advantage →
- ① easy to Handle (compare to liq.)
- ② Chemically more stable
- ③ ~~Patient~~ ~~Oral~~ prefer ointment 😊
- Disad. → ① more bulky & less stable as compared to solid dosage form
- [DEPTH OF BIOLOGY]



[DEPTH OF BIOLOGY]

eg $\Rightarrow$ Simple Ointment L.P.

Wool fat $\rightarrow$ 50gm.

Ceosteryl Alcohol $\rightarrow$ 50gm.

Hard paraffin $\rightarrow$ 50gm

White Soft Paraffin $\rightarrow$ 850gm

[DEPTH OF BIOLOGY]

② Pastes $\Rightarrow$ Semi-solid preparation.

$\rightarrow$ externally Used on skin. (in Order to provide Protective Covering).

Whiff & Thick Consistency

due to High Powder.

$\rightarrow$ CaCO_3 .

$\rightarrow$ ZnO .

$\rightarrow$ starch.

$\rightarrow$ Talc.

$\Rightarrow$ Less Greasy.

Preparation.

Trituration method.

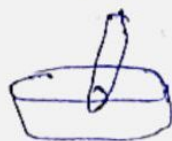
[DEPTH OF BIOLOGY]

Fusion Method.

Used when active drug
Not soluble in Base.

① Solid Ingredient (req. quantity) ② Bases are weighed.

③ make fine powder



& Triturate with base.
(small quantity)

④ Then remaining
amount base is add.

⑤ Liq. Medicament is added.

& form Homogenous Mixture.

[DEPTH OF BIOLOGY]

Creams → Pharmaceutical Cream

↓
Contain One or More Medicament.

Either in dissolved form. Or Dispersed in O/W & W/O emulsion.

⇒ Cream are semi-solid in Nature. [DEPTH OF BIOLOGY]

⇒ Topical / Rectal & Vaginal skin product comes in the form of Creams.

⇒ Creams are preferred over ointment due to their ease of spreading & removal. [DEPTH OF BIOLOGY]

Advantage → ① Remain in contact with application site for longer duration.
② Non-sticky Washable. ③ Economic ④ Non-Irritant.

Disadv. → ① High risk of contamination (bcz more hydrophobic).
→ ② Less Viscous as compared to other semi-solid dosage forms.

[DEPTH OF BIOLOGY]

Example → 50 gm of Aq. Cream B.P.

Ingredients	Master formula	for 55 gm.
1. Emulsifying Ointment.	300 gm	16.5 gm
2. Phenoxyethanol.	10 gm	0.55 gm
3. Purified Water	690 gm	37.95 gm

[DEPTH OF BIOLOGY]

Gels → Also known as Jellies.

- Semi-Rigid structure of 3-D Network of Particle.
- They are preferred for Cutaneous & per-Cutaneous drug delivery.

Advantages → ① Slow & Prolonged Absorption.

② Minimum Side effect. [DEPTH OF BIOLOGY]

③  ^{Drug} Not oral administrate Then Given in Gel form.

Disadv. → ④ Allergic Reaction in Some Individual.

→ ⑤ Large Size drug particle in gel not absorbed in skin.

Eg $\Rightarrow$ Clear aq. Gel with Dimethicone.

Water $\rightarrow$ 59.8%.

Carbomer $\rightarrow$ 0.5%.

Triethanolamine $\rightarrow$ 1.2

Glycerine $\rightarrow$ 34.2

Propylene Glycol 2.0

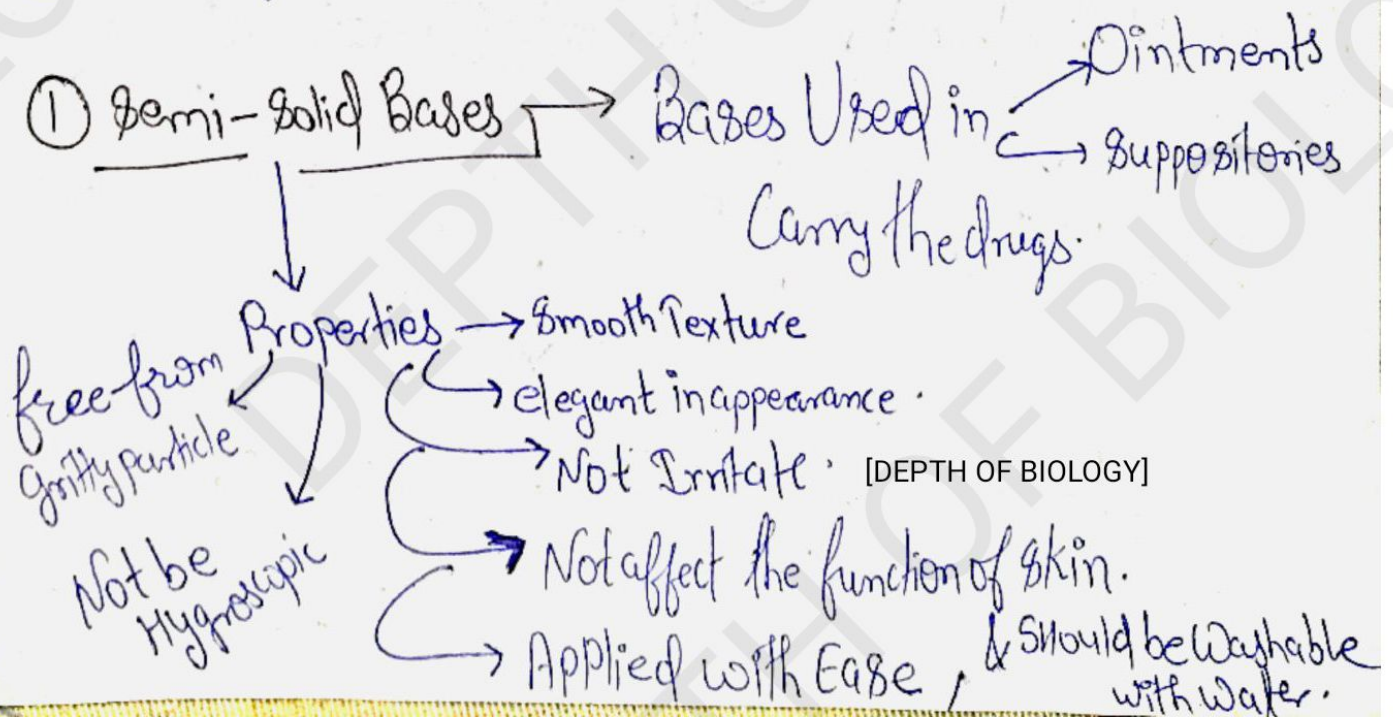
Dimethicone Copolyol 2.3

[DEPTH OF BIOLOGY]

Excipient Used in Semi-solid Dosage forms.

- ① Semi-solid Bases.
- ② Anti-oxid.
- ③ Chelating Agents.
- ④ Vehicles
- ⑤ Micellar Solubilisers
- ⑥ Buffers
- ⑦ Preservatives
- ⑧ Humectants
- ⑨ Gelling Agents
- ⑩ Emulsifiers
- ⑪ Permeation enhancer.

[DEPTH OF BIOLOGY]



Classification → Hydrocarbon bases.
→ Emulsifiable Base.
O/W → W/O.

② Anti-Oxidant →

[DEPTH OF BIOLOGY]

Add in foods, Cosmetics & drug to prevent Oxidation.

To, prevent Oxidation, Antioxidants are Use.

Butylated Hydroxy Toluene (BHT) → Butylated Hydroxy Anisole (BHA).

• Ascorbic acid → H₂O soluble (Antioxidant).

↓
Itself Oxidised & prevent from Oxidation.

[DEPTH OF BIOLOGY]

③ Chelating Agent → Prevent Oxidation of product.

↓
Like EDTA → form Complex With Heavy Metal.
↓

Unavailability of Metal ion to Catalyse the Oxidation.

[DEPTH OF BIOLOGY]

④ Vehicles → H_2O = Universal Solvent.

Solvent Instead of Water is given to stabilise the drugs.

⑤ Surfactant → Possessing both → Hydrophilic Group.
→ Hydrophobic

Due to Hydrophilic functional Group.

It, enhance the solubility of poor H_2O soluble drugs.

⑥ Buffer → eg ⇒ Sodium Citrate.

[DEPTH OF BIOLOGY]

→ Drug solub. is aided by Buffer system.

→ buffer of suitable pH maintain Max. Stab. of drug.

⑦ Preservatives ⇒ Bases Have High Water Content but Capable for tolerating Microbial attack due to Presence of Preservatives
eg → methyl Hydroxy Benzoate.

⑧ Humectants → Hygroscopic In Nature.

[DEPTH OF BIOLOGY]

Used in Creams to prevent it from getting dried.

⑨ Gelling Agent → (eg → Tragacanth, Pectin).

→ Used to produce a Gel like consistency.

Evaluation Of Semi-Solid Dosage Form

Semi-Solid preparation are evaluated as follows →

I. Physical method →

(a) Test of Rate of Absorption →

In this test Ointment is rubbed on skin
& at regular time interval we collect Serum & Urine
Sample
& then estimate the amount of drug Absorbed.



(b) Test of Non-Irritancy →

Select 24 Human Volunteers.

→ Applied ointment for 21 days.

& check Pharmacological action.

~~Odour~~, ~~Skin redness~~, ~~Itching~~.

Then → Good Ointment Base.

© Test of Rate of Penetration →

[DEPTH OF BIOLOGY]

- # More penetration → More Absorb. → More Action.
- # Check diffusion ∴ ∴ → ∴ (High to low).

© Test of Rate of drug Release →

Internal Surface of Test tube

⑤ Saline/serum

Thinly Coated with Preparation ⑥



Drug Release rate. [Then check drug release over a time period]

© Test of Rheological Properties →

[DEPTH OF BIOLOGY]

→ flow property.

→ easily withdrawal from container.

→ ease in apply for skin.

→ Test of viscosity done by → Cone plate Viscometer.

© Test of Content Uniformity ⇒ 10 filled ointment container

Result obtain must be

match with labelled quantity

↓
Weigh.

[DEPTH OF BIOLOGY]

Microbiological Method.

① Test of Microbial Content. → min. the Good semi-solid.

② Test of Preservative efficacy. ⇒ Quality.

Packaging → Non-reactive, Inert.

[DEPTH OF BIOLOGY]

Glass or Plastic Used.

for Medium bulk quantities (2kg).

preferred for
Cream
Ointment.

→ effectively protect the Ingredients.

⇒ Metal Used (Stainless Steel)

for bulk.
(25-50kg).

→ Chemical resistance.

[DEPTH OF BIOLOGY]