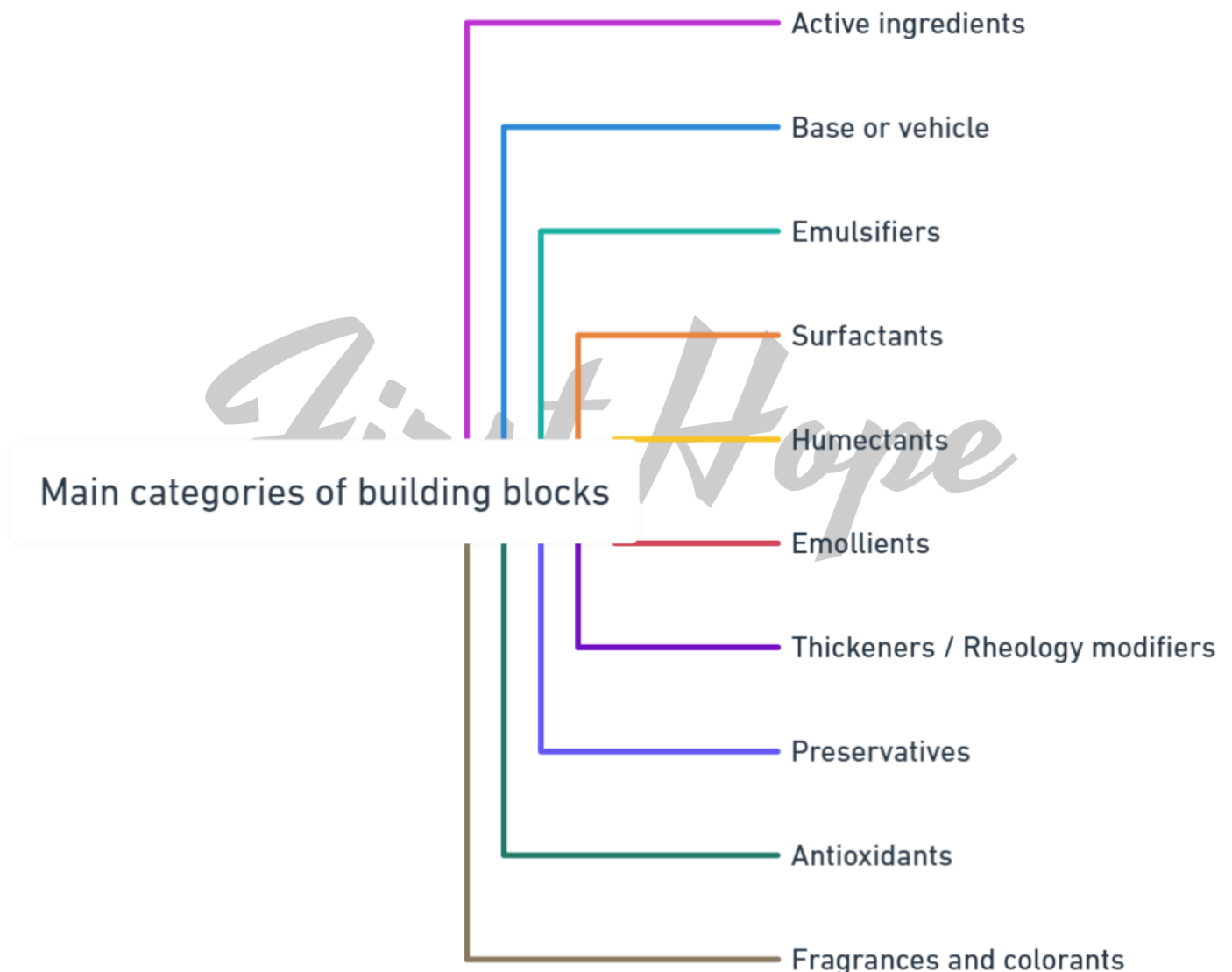


Formulation Building blocks

Formulation Building Blocks (Cosmetics/Cosmeceuticals)

- Formulation building blocks are the basic ingredients used to design and prepare cosmetic and cosmeceutical products such as creams, lotions, gels, serums, shampoos, and ointments.
- Each ingredient has a specific function, and combining them properly gives the product its texture, stability, effectiveness, and safety.

Main categories of building blocks



A. Active ingredients

- These are the key components that provide the intended effect.
- **Examples:**
 - Vitamin C → brightening
 - Retinol → anti-aging
 - Salicylic acid → acne treatment

- In cosmeceuticals, these are biologically active and affect skin function.

B. Base or vehicle

- The medium in which active ingredients are delivered.
- Helps spread the product evenly on the skin or hair.
- **Types:**
 - Water-based (light, non-greasy)
 - Oil-based (rich, moisturizing)
 - Emulsions (mixture of oil and water)

C. Emulsifiers

- Help mix oil and water, which normally separate.
- Essential for creams and lotions.
- Provide stability and smooth texture.

D. Surfactants

- Help in cleansing by removing dirt and oil.
- Also used for foaming and emulsification.

E. Humectants

- Attract water from the environment or deeper skin layers.
- Keep skin hydrated.
- Examples: glycerin, hyaluronic acid.

F. Emollients

- Soften and smooth the skin.
- Form a protective layer to reduce water loss.

G. Thickeners / Rheology modifiers

- Control viscosity (thickness) of the product.
- Make products easy to apply and stable.

H. Preservatives

- Prevent growth of bacteria, fungi, and molds.
- Increase shelf life.

I. Antioxidants

- Prevent oxidation (product spoilage).
- Protect active ingredients from degradation.

J. Fragrances and colorants

- Improve sensory appeal.
- No therapeutic function but important for consumer acceptance.

Importance of proper formulation

- Ensures stability (no separation)
- Enhances effectiveness of actives
- Provides good texture and feel
- Prevents microbial contamination
- Improves shelf life

Surfactants – Classification and Application

- Surfactants (surface-active agents) are substances that **reduce surface tension** between two substances (like oil and water).
- They are widely used for cleansing, foaming, emulsifying, and wetting.

Structure of surfactants

- **Have two parts:**
 - Hydrophilic (water-loving) head
 - Hydrophobic (oil-loving) tail
- This dual nature allows them to interact with both oil and water

Classification of surfactants



1. Anionic surfactants

- Carry a **negative charge**
- Strong cleansing and foaming ability

Examples:

- Sodium lauryl sulfate (SLS)

- Sodium laureth sulfate (SLES)

Applications:

- Shampoos
- Face washes
- Body cleansers

Characteristics:

- Very effective cleaners
- Can be **irritating to skin** if used in high amounts

Advantages:

- Excellent cleansing
- High foam production

Disadvantages:

- Can be harsh and irritating to skin

2. Cationic surfactants

- Carry a **positive charge**

Examples:

- Quaternary ammonium compounds

Applications:

- Hair conditioners
- Fabric softeners

Characteristics:

- Provide **conditioning and smoothing effects**
- Not used for cleansing

Advantages:

- Good for conditioning hair
- Reduce static electricity

Disadvantages:

- Poor cleansing ability
- Can be toxic at high concentrations

3. Non-ionic surfactants

- Have **no charge**

Examples:

- Polysorbates
- Fatty alcohol ethoxylates

Applications:

- Creams and lotions
- Mild cleansers

Characteristics:

- **Mild and less irritating**
- Good for sensitive skin

Advantages:

- Gentle on skin
- Compatible with other ingredients

Disadvantages:

- Lower foaming compared to anionic surfactants

4. Amphoteric (zwitterionic) surfactants

- Can carry **both positive and negative charges** depending on pH

Examples:

- Cocamidopropyl betaine

Applications:

- Baby shampoos
- Gentle cleansers

Characteristics:

- Very mild
- Reduce irritation caused by other surfactants

Advantages:

- Low irritation
- Good compatibility

Disadvantages:

- Moderate cleansing power

Applications of surfactants

1. Cleansing agents

- Remove dirt, oil, and impurities

2. Foaming agents

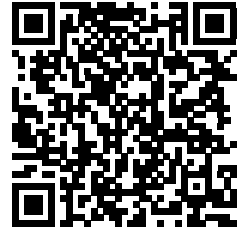


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