SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai
Approved by Pharmacy Council of India, New Delhi.
Coimbatore -641035

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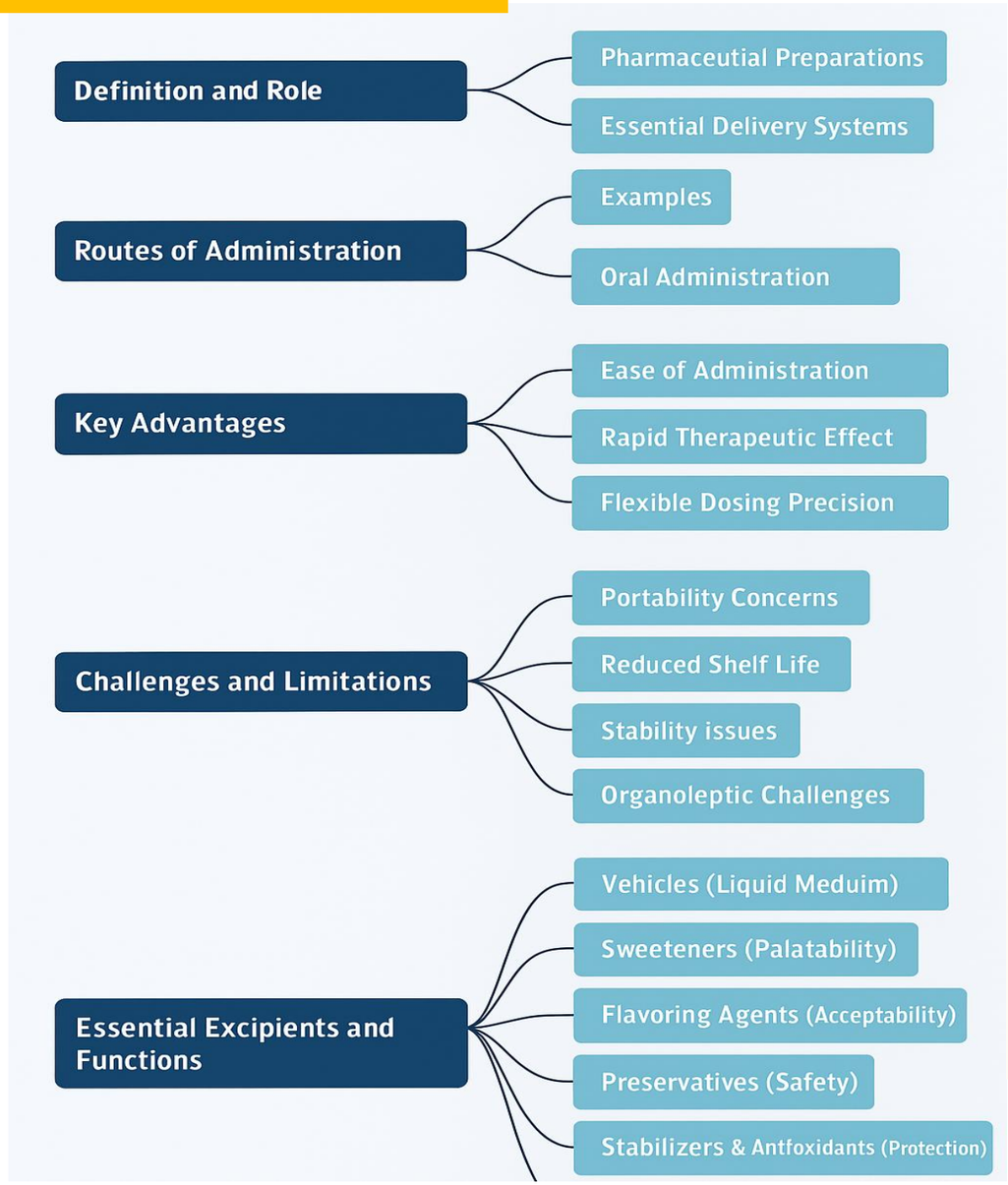
COURSE NAME: PHARMACEUTICS I

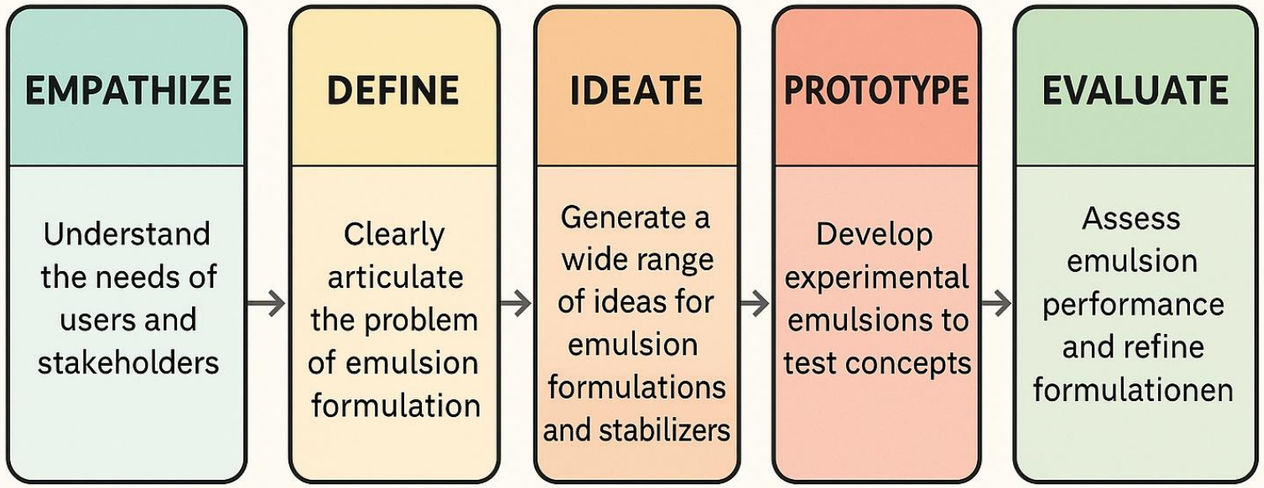
(BP 103 T) I YEAR / I SEM

TOPIC: EMULSIONS

MIND MAP

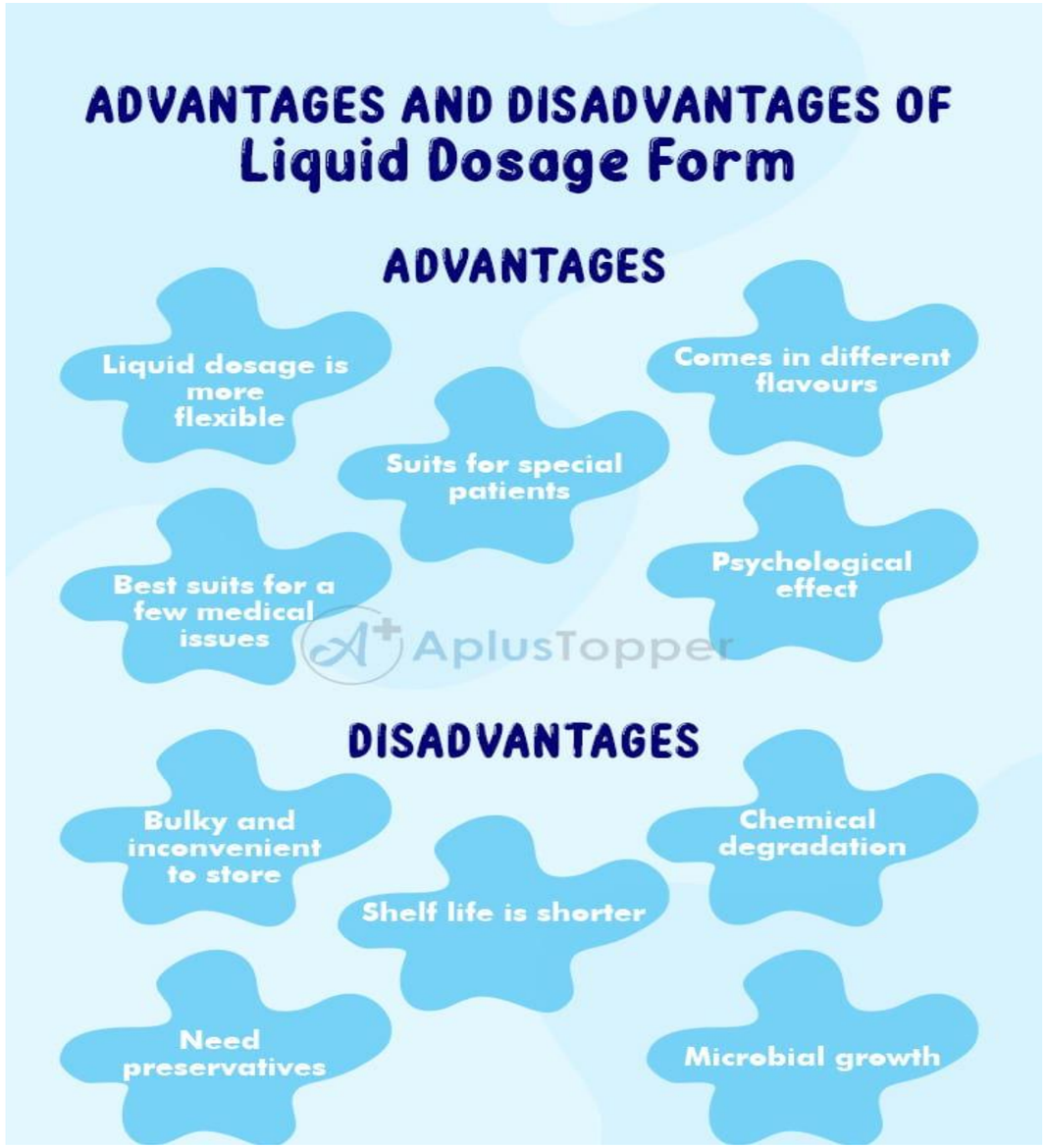


EMULSIONS



- LIQUID DOSAGE FORMS
  - MONOPHASIC LIQUID DOSAGE FORMS
    - INTERNAL
      - Syrups, Elixirs
    - EXTERNAL
      - Gargles, Enemas
  - BIPHASIC LIQUID DOSAGE FORMS
    - Suspension, Emulsion

KEY ADVANTAGES OF LIQUID FORMULATIONS



WHAT DO YOU MEAN BY AN EMULSION?

Emulsion

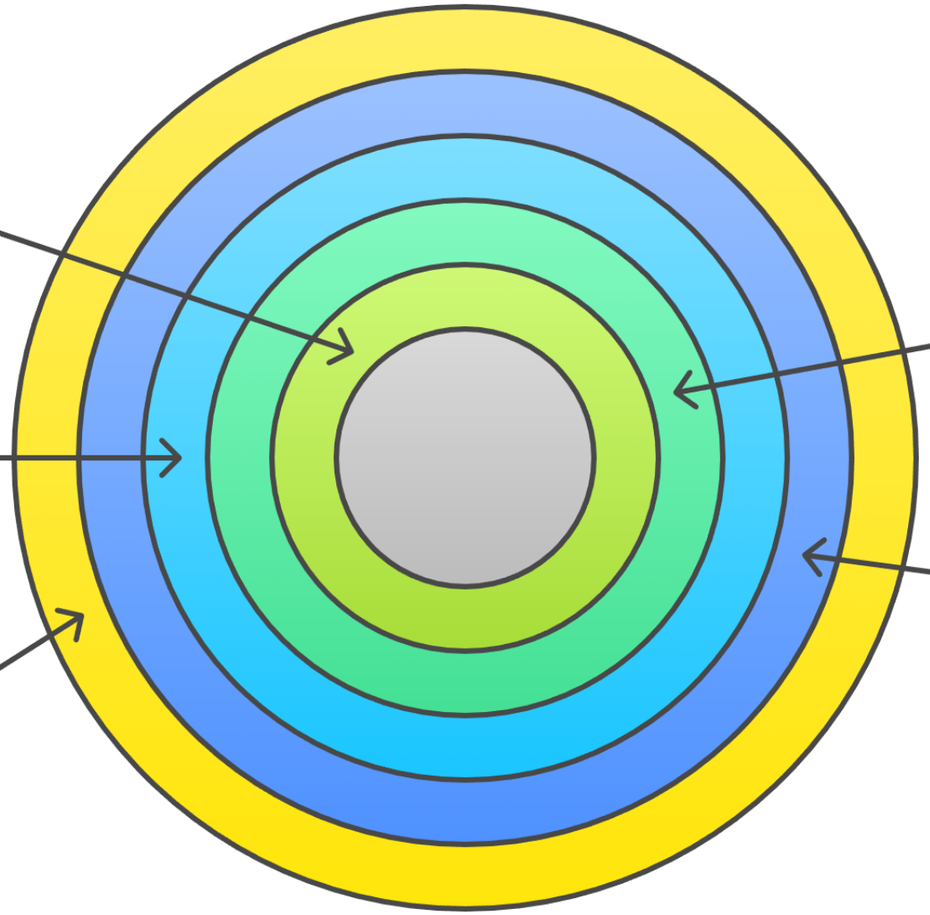
Stable mixture of immiscible liquids

Continuous Phase

Liquid surrounding the dispersed phase

Mechanical Energy

Facilitates the initial mixing of phases



Dispersed Phase

Liquid droplets distributed in the continuous phase

Emulsifying Agent

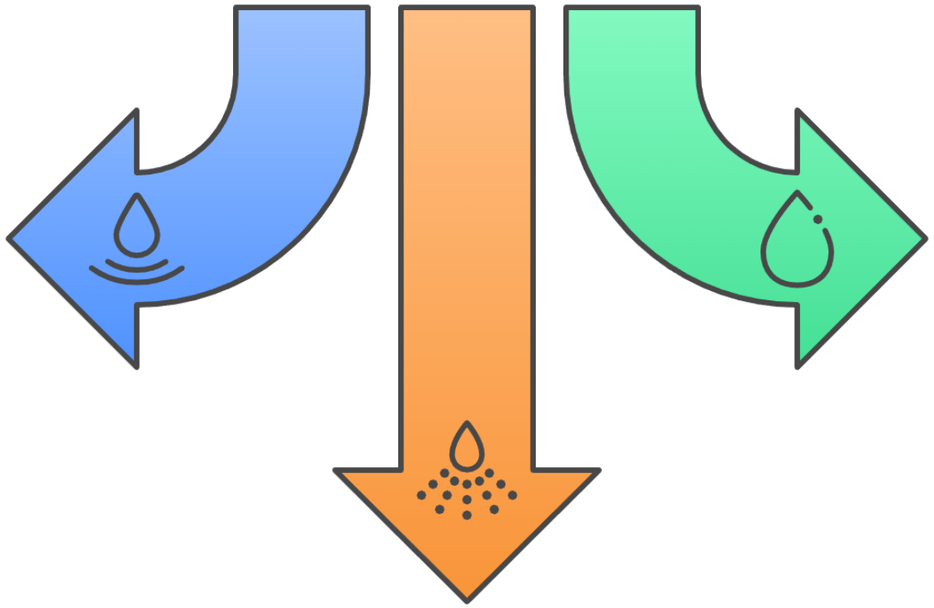
Stabilizes the emulsion by reducing surface tension

Made with Napkin

What type of emulsion should be formulated based on the dispersed phase?

Oil in Water (O/W)

Oil droplets dispersed in water, suitable for hydrophilic drugs.



Water in Oil (W/O)

Water droplets dispersed in oil, ideal for hydrophobic drugs.

Multiple Emulsions

Complex emulsions like w/o/w, used for specific drug delivery systems.

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Which emulsion type is best for specific pharmaceutical applications?

VS

Oil in Water (o/w)

Best for internal use and cooling effect

Water in Oil (w/o)

Best for external use and skin hydration

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Essential Pharmaceutical Components

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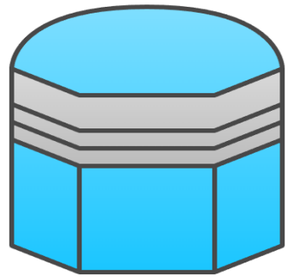
Preservatives

Prevent microbial growth and extend shelf life



Stabilizers

Protect drugs from degradation and maintain potency

Antioxidants

Prevent oxidation and maintain drug integrity

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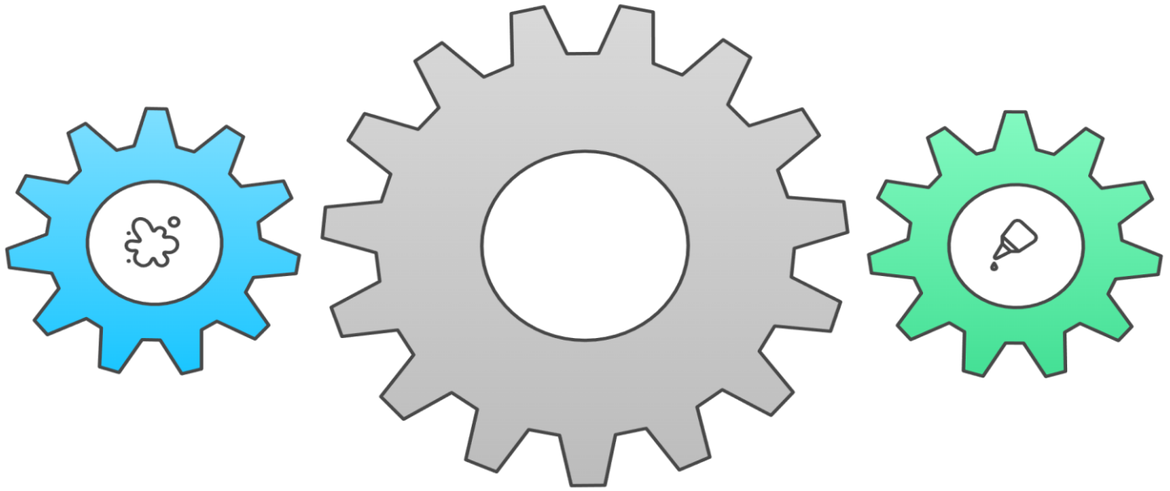
Pharmaceutical Excipient Functions

Buffers

Maintain pH for stability and efficacy



Emulsifying Agents

Ensure uniform dispersion and stability

Viscosity Enhancers

Improve texture and particle suspension

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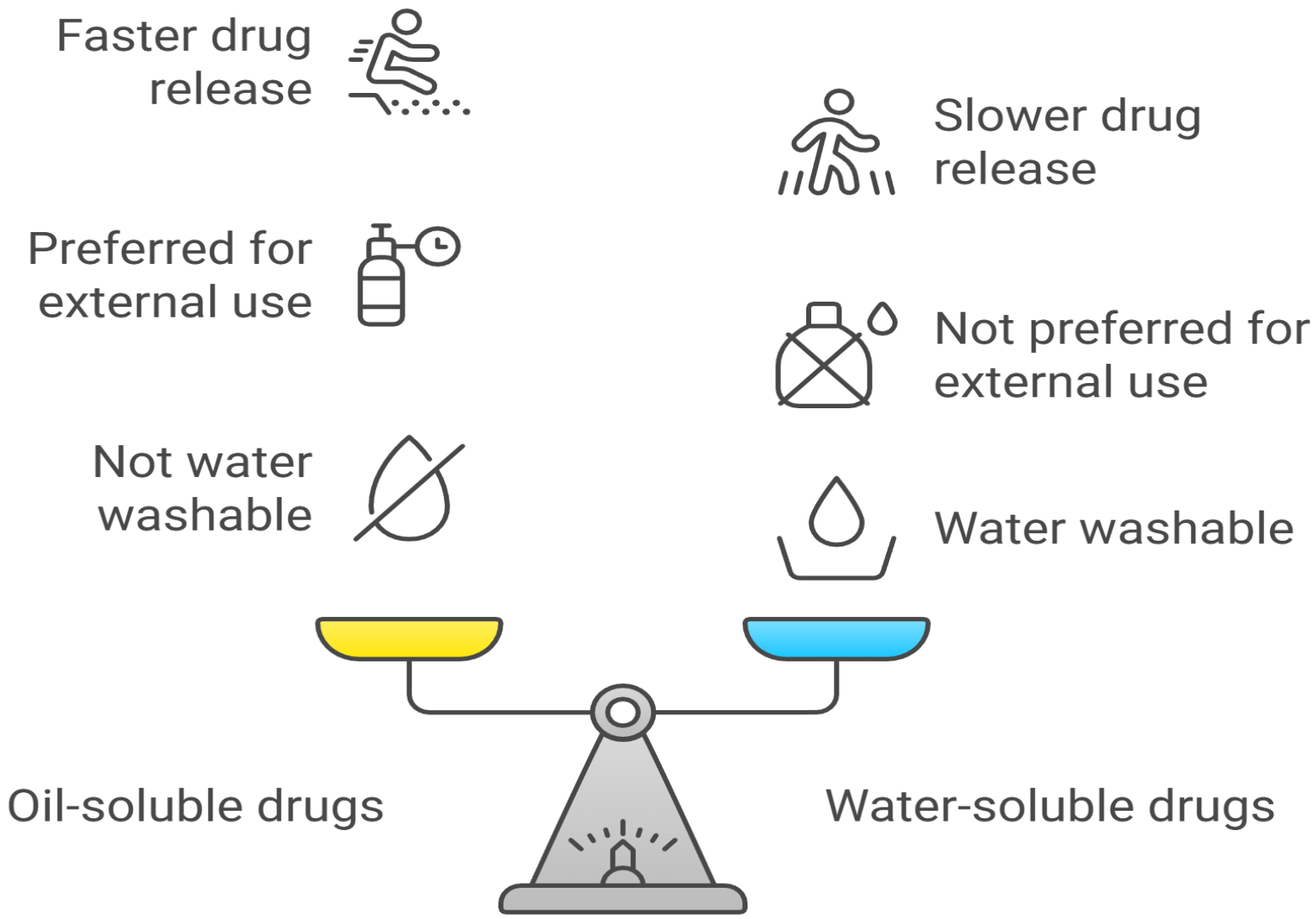
Comparing Drug Release and Washability in Emulsions



Pharmaceutical Applications of Emulsions

Oral Administration

Emulsions facilitate the intake of oil-soluble drugs

Taste Masking

Emulsification hides unpleasant tastes and odors

Absorption Enhancement

Emulsions improve drug absorption and penetration

Slow Release

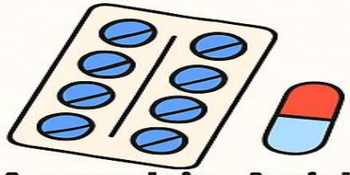
Emulsions provide sustained drug release over time

Nutritional Support

Emulsions deliver essential nutrients intravenously

Stabilizers, Viscosity Modifiers & Functional Agents

Stabilizers / Antioxidants



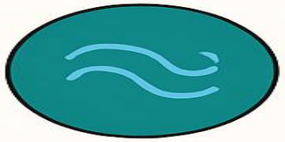
Ascorbic Acid (Vitamin C)

Powerful water-soluble antioxidant that prevents oxidation of active compounds. Effective against phenolic compounds.

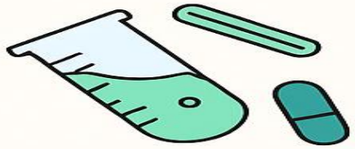
Tween 80

(Hgl valu/e: 1.15%)

HLB value: 15. Typical concentration: 0.1-5%.



Viscosity Enhancers



Hydroxypropyl Methylcellullose

Strong-synthetic polymer that controls viscoscity and act as suspending agents.

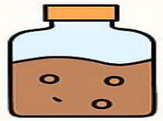
Tween 80 (Polysorbate 80)

HLB value: 15. Typical concentration: 0.1-5%. Maintains pH in range of 3.5--5 for optimal drug stability and solubility.

Emulsifying & Suspending Agents

Acacia & Tragacanth

Natural plant gum that increase viscosity and act as suspending agents. Acacia has a mucoadhesive effect and Tragacant.



Bentonite

Natural clay mineral with excellent suspend-ing properties. Swel-lls in water to form thixotropic gel-like

Which emulsifying agent should be selected for emulsion formulation?

Which test should be used to identify the emulsion type?

Dilution Test

Determines miscibility, indicating emulsion type based on how it mixes with water or oil.

Staining Test

Uses dye solubility to identify the emulsion type based on where the dye dissolves.

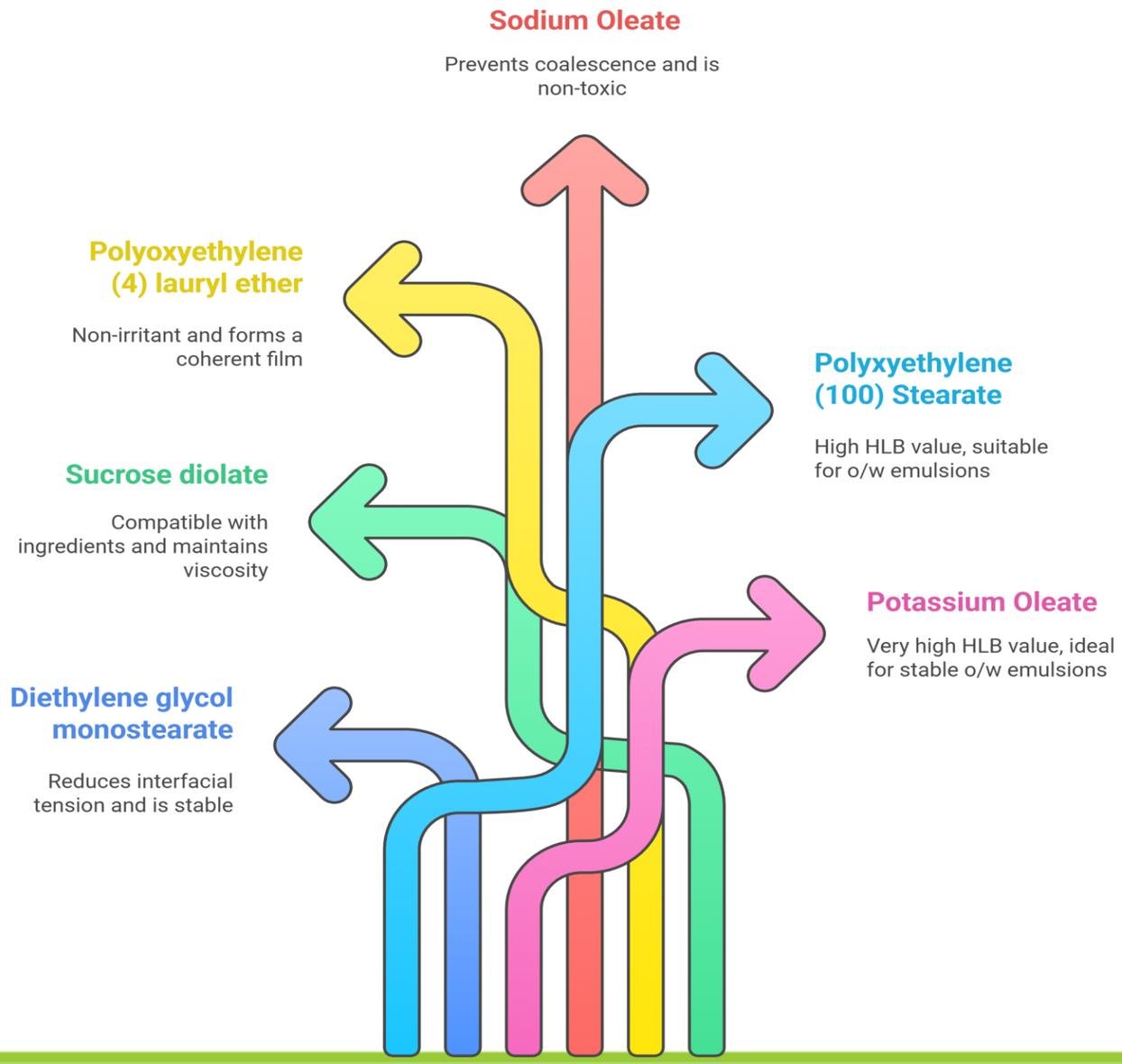
Conductivity Measurement

Measures electrical conductivity to differentiate between o/w and w/o emulsions.

Fluorescence Test

Observes fluorescence patterns to identify emulsion type based on how light interacts.

Which emulsifying agent should be used for the emulsion?



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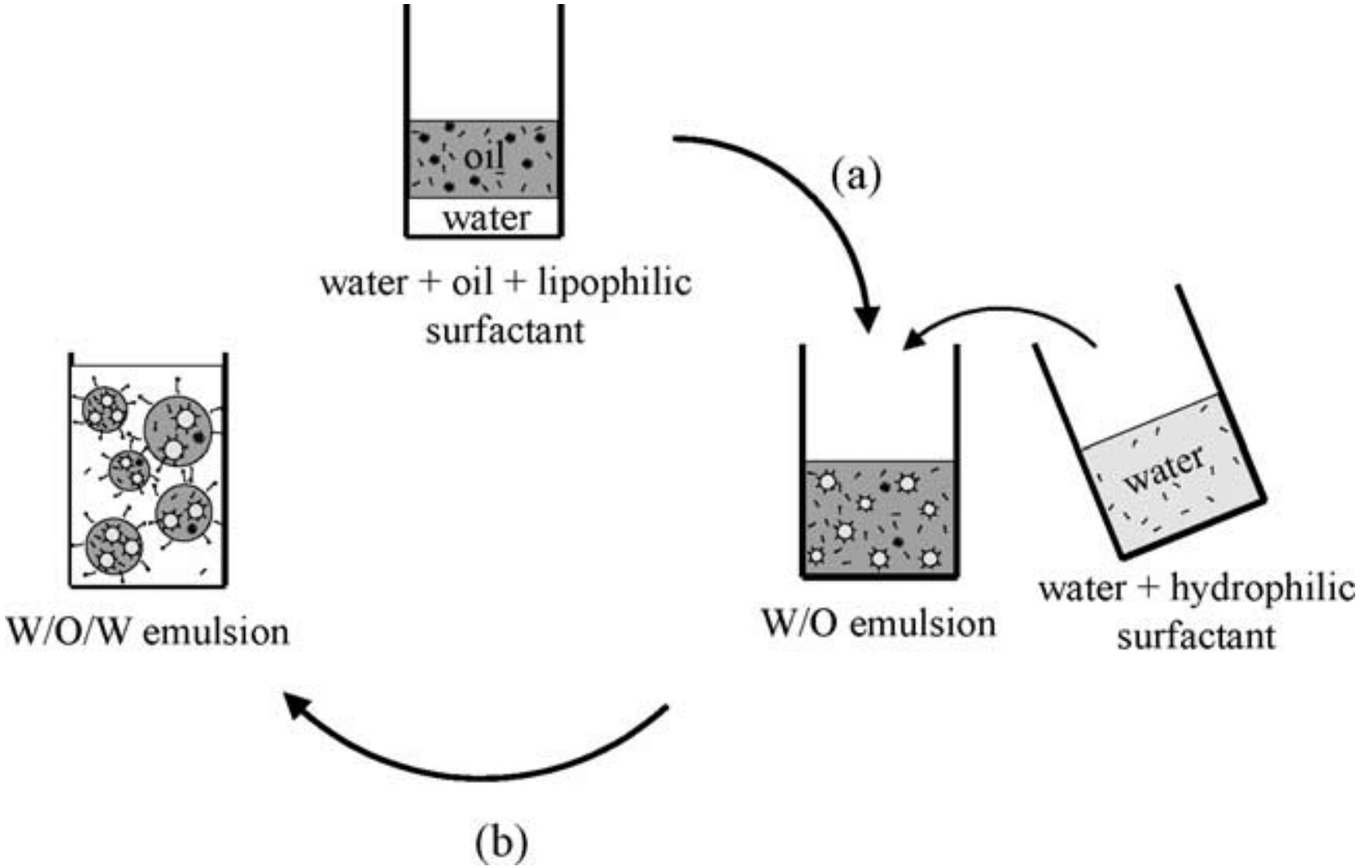
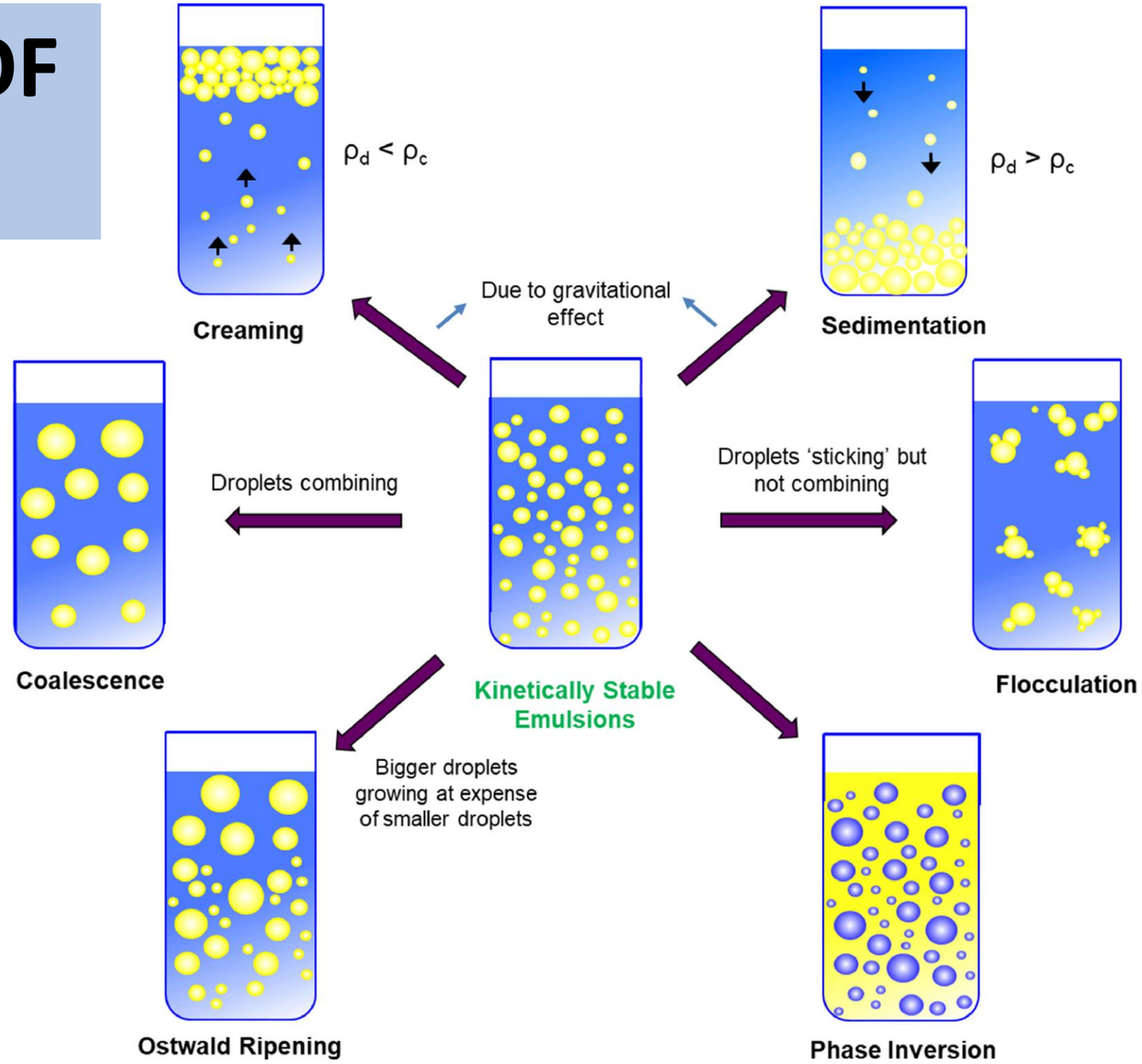
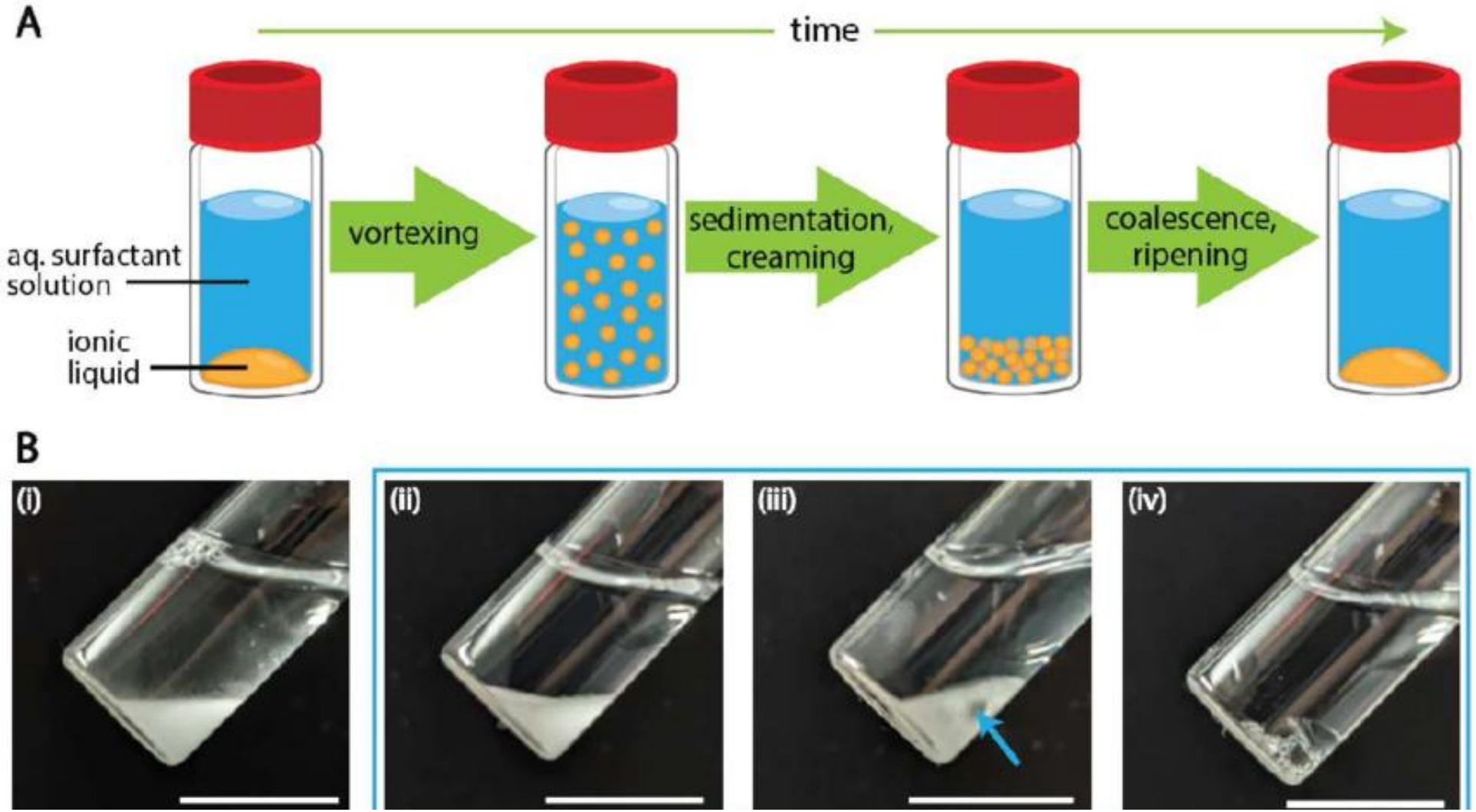
PREPARATION OF EMULSION



STABILITY OF EMULSION




A
time
aq. surfactant solution
ionic liquid
vortexing
sedimentation, creaming
coalescence, ripening
B
(i)
(ii)
(iii)
(iv)

ASSESSMENT: EMULSIONS

1. Define an emulsion and list its two primary phases.

ASSESSMENT: EMULSIONS

2. Differentiate between O/W and W/O emulsion example each.

ASSESSMENT: EMULSIONS

3. What is the role of emulsifying agents? Give two examples.

ASSESSMENT: EMULSIONS

4. Explain creaming and cracking in emulsions. Which of these is reversible?

ASSESSMENT: EMULSIONS

5. A patient reports that a topical emulsion-based formulation separated after storage. Suggest two methods to improve its stability.

REFERENCES

•Remington: *The Science and Practice of Pharmacy*, 22nd Edition, Pharmaceutical Press.

•Kokate C.K., Purohit A.P., Gokhale S.B. – *Textbook of Pharmacy*.

•B. Suresh, S. B. Gokhale – *Pharmacy Education in India*.

•Lachman L., Lieberman H.A., Kanig J.L. – *The Theory and Practice of Industrial Pharmacy*

•Sharma, B.D. *Pharmacy Education in India: Past, Present and Future*. Indian Journal of Pharmaceutical Education and Research (IJPER).

•Rao, N. R. (2518). *Evolution of Pharmacy Profession in India*. International Journal of Pharmaceutical Sciences.

•Indian Journal of History of Science – Special issues on Ayurveda and traditional medicine.

THANK YOU