PHARM.D • YEAR 1

Pharmaceutics

CHAPTER 11

# Incompatibilities

PPT CHAPTER COVER



DOCTOR OF PHARMACY

# PHARMACEUTICAL INCOMPATIBILITIES

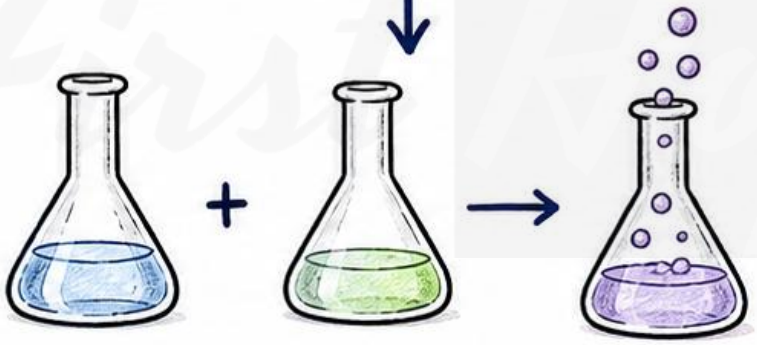
An incompatibility is an undesirable interaction affecting product quality, stability, safety or therapeutic effect.
It may occur during formulation, storage, mixing or administration.

## INCOMPATIBILITY



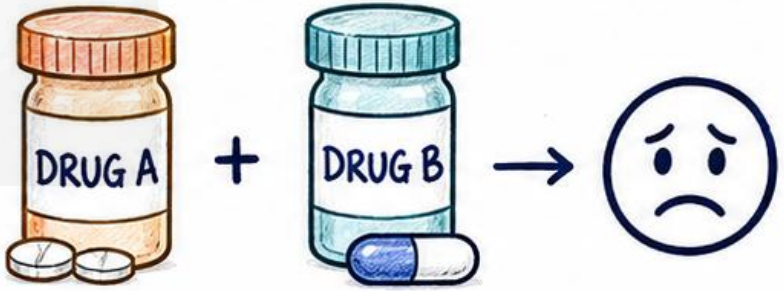
### PHYSICAL:

undesirable change in physical state or dispersion.



### CHEMICAL:

reaction changes chemical identity or integrity.



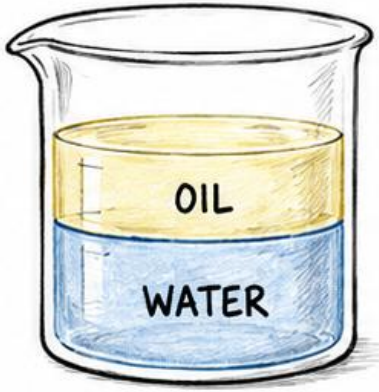

### THERAPEUTIC:

drug combinations produce an unwanted clinical effect.

The categories can overlap.
A visible change does not, by itself, identify the mechanism.

# PHYSICAL INCOMPATIBILITY

## IMMISCIBILITY



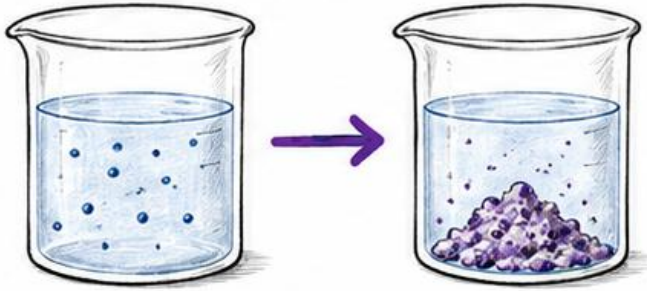

Liquids fail to form the intended uniform system; oil and water can separate.

## INSOLUBILITY



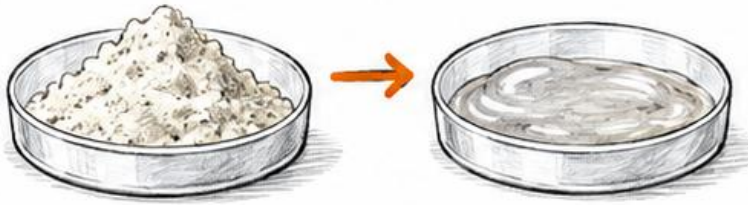
The intended drug concentration exceeds its solubility in the selected vehicle.

## PRECIPITATION



Dissolved material separates as a solid after a solvent or other condition changes.

## LIQUEFACTION



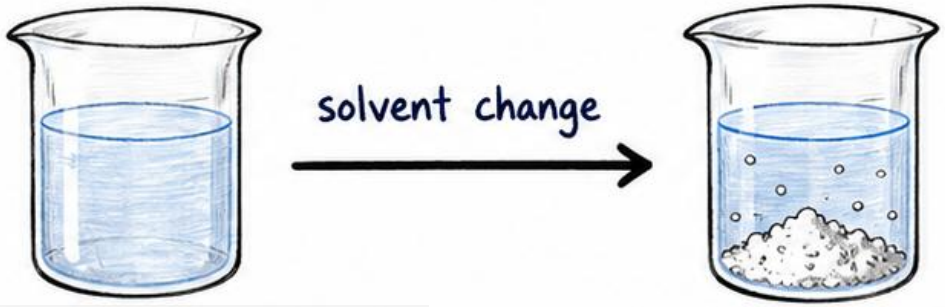
A powder mixture becomes wet or liquid.

☑ An intentionally formulated suspension or emulsion is not automatically an incompatibility.

# PRECIPITATION: FIND THE CAUSE

## SOLVENT CHANGE

Dilution may reduce the solvent's ability to keep a drug dissolved.




## pH CHANGE

Ionization changes may decrease solubility.




## CHEMICAL REACTION

Two soluble substances may form a poorly soluble new compound.

Example: $Ag^+ + Cl^- \rightarrow AgCl_{(s)}$.

$$Ag^+ + Cl^- \rightarrow AgCl_{(s)}$$



The silver chloride example is chemical precipitation, not purely physical mixing.

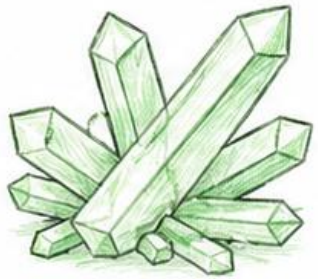
Identify the mechanism before considering a formulation change.

# EUTECTIC LIQUEFACTION

Some solid mixtures melt at a lower temperature than their individual components.

Example: menthol with camphor can form a eutectic mixture.

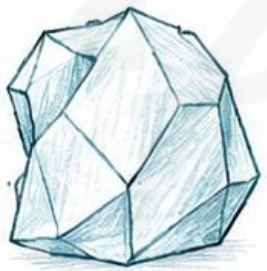
Menthol



(solid, higher melting)

+

Camphor



(solid, higher melting)

→

Eutectic mixture



(melts at lower temperature than either component)

This is not the same as absorbing moisture from the air.

Humidity / Moist air



Air contains water. It may settle on a powder.

Hygroscopic powder



Powder attracts and absorbs water from the air.

## POSSIBLE FORMULATION APPROACHES

- Separate ingredients where appropriate, use a compatible adsorbent, or redesign the dosage form.
- Check dose, uniformity and compatibility after any change.
- Do not treat every damp powder as a eutectic.

First Hope

FREE PREVIEW

Click here to visit our website

PHARMACY PREMIUM NOTES

# Complete subject and semesters are available on FirstHope app only.

Scan or click here

Click here to get the app >

Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

## Join our Telegram channel

Click here to join Telegram >

Scan or click here

@FirstHopeNotes

### Instagram

@firsthope.official

Click here to follow >

### YouTube channel

FirstHope-Pharmacy / Live streams

Click here to watch >

### WhatsApp channel

Follow FirstHope on WhatsApp

Click here to join >

### FirstHope website

firsthope.co.in

Click here to visit >

**B.Pharm / D.Pharm / M.Pharm / Pharm.D**

Preview notes. Complete subjects and semesters in the FirstHope app.