

Types of pharmaceutical incompatibilities

- ① physical incompatibility
- ② chemical incompatibility
- ③ Therapeutic incompatibility.

Physical incompatibility:-

- when two or more than 2 substances are combined together a physical change takes place and an unacceptable product is formed
- Interaction between 2 or more substances which may leads to change in colour
odour
taste and
morphology

physical incompatibility → visible & easily corrected by applying pharmaceutical skill.

Physical incompatibility can be corrected by

- 1) changing the Order of mixing
- 2) Emulsification
- 3) Addition of suspending agent
- 4) change in form of ingredient
- 5) Addition or substitution of a therapeutically inactive substance

Examples of physical incompatibility

- ① Immiscibility
- ② Insolubility
- ③ precipitation
- ④ Liquefaction

Immiscibility :-

- oil and water are immiscible with each other.
- This phenomenon is called as immiscibility
- This can be made miscible by emulsification.

Ex: Castor oil - 15 ml
water - 60 ml } make an emulsion

In the above prescription Castor oil is immiscible with water to overcome the incompatibility an emulsifying agent is used to make a good emulsion

Insolubility :-

- Insolubility takes place when a drug is insoluble in a particular solvent

Ex: Ephedrine sulphate - 0.25 gms
menthol - 0.2 ml
liquid paraffin - 30 ml

Reason :-

Ephedrine sulphate is not soluble in liquid paraffin but anhydrous Ephedrine is soluble

in it.

- Hence Ephedrine Sulphate is substituted with anhydrous Ephedrine in the above prescription to make a clear solution.

Precipitation:

- A drug in a solution may be precipitated, if it is insoluble in the solvent in which it is added.

Ex:

- Resins are insoluble in water.
- When it is added in the water it gets precipitated.
- It can be prevented by adding a suitable thickening agent.

Liquefaction:

- When 2 or more solids, having low melting point are mixed then get converted in to liquid.

Example:

- If medicament containing menthol, thymol, camphor, phenol etc., are mixed together, they get converted in to liquid.
- To prevent liquefaction light magnesium carbonate (adsorbant) was added to the

above mixture thoroughly to make free flowing powder.

Chemical Incompatibility :-

- Chemical Incompatibility results due to chemical interaction between ingredients from toxic or inactive product
- chemical reaction between ingredients takes place immediately called as immediate incompatibilities
- Chemical reactions takes place over a period of time then it is termed as delayed incompatibilities

Chemical Reactions often occurs due to

① Oxidation - Reduction

② Acid - base hydrolysis

③ Combination Reaction

④ pH change

- These reactions can be noticed by precipitation, decomposition, colour change, explosion

Types of chemical Incompatibilities :-

Tolerated :-

- In tolerated incompatibilities, we change the order of mixing or diluted the substances

→ To overcome the chemical reaction between ingredients

Adjusted:

→ In adjusted incompatibilities, we directly add or remove a substance to overcome the chemical reaction between ingredients

Ex: Caffeine citrate - 1.0 gms

Sodium salicylate - 3.0 gms

water up to - 90 ml

Citric acid of caffeine citrate react with sodium salicylate to yield precipitated salicylic acid

Ex: Alkaloid incompatibility:

→ Alkaloidal salts with alkaloid substances

→ Alkaloidal salts with soluble iodides

→ Alkaloidal salts with Tannins

→ Alkaloidal salts with salicylates

soluble salicylates incompatibilities

→ Soluble salicylates with ferric salts

→ Soluble salicylates with alkali bicarbonates

→ Soluble salicylates and benzoates with acids

Soluble Iodide incompatibility

Oxidation of iodides with potassium chlorate

Oxidation of iodides with quinine sulphates

Chemical incompatibility causing evolution of CO_2

- NaHCO_3 with soluble calcium or magnesium salts
- Bismuth subnitrate and sodium bicarbonate
- Borax with sodium bicarbonate and glycerin

Miscellaneous incompatibilities

- Incompatibility of emulsifying agent
- Colour stability of dyes

Therapeutic Incompatibilities

→ Therapeutic incompatibility may be as a result of prescribing certain drugs to a patient with the intention to produce a specific degree of pharmacological action.

→ But the nature or intensity of the action produced is different from that intended by the prescriber.

Occurs due to

Errors in dosage

wrong dose or dosage form

Contra indicated drugs

Synergistic & antagonistic drugs

Drug Interactions

① Error in dosage:

- many therapeutic incompatibilities results from errors in writing the prescription order
- The most serious type of the dosage error in the dispensing is overdose of a medication

Ex:- Atropine sulphate capsules

Atropine sulphate - 0.006 G

phenobarbitone - 0.015 G

Aspirin - 0.300 G

Causes: In this prescription the quantity of the atropine sulphate in each capsule is more than its recommended dose

Remedy:

The prescription is referred back to the prescriber to correct the overdose of the atropine sulphate

② wrong dose or dosage form

- There are certain drugs which have quite similar names and sounds like the same

Ex:- prednisone and prednisolone

Digoxin and digitoxin

- Sometimes many drugs are available in the different dosage forms

- If the dosage form is not clearly mentioned on the prescription it becomes necessary to seek clarification from the prescriber.

Contra indicated Drugs

- There are certain drugs which may be contraindicated in a particular disease or a particular patient who is allergic to it.

Ex: Corticosteroids are contraindicated in patients having peptic ulcers.

penicillin and sulphur drugs are contraindicated in the patients who are allergic.

- Vasodilators are contraindicated in hypertensive patients.
- Barbiturates and morphine should not be given to the asthmatic patients.

Synergistic or Antagonistic drugs

Synergism :-

- when 2 drugs are prescribed together they tend to rise the activity of each other which is known as synergism.

Antagonism :-

when two drugs are prescribed together they

tend to ↓ the activity of each other which is known as Antagonism

Ex:-

① Combination of Aspirin + paracetamol

↓

↑ analgesic activity

② Combination of penicillin + streptomycin

↓

↑ antibacterial activity

Drug Interactions

- The effect of one drug is altered by the administration of another drug.
- The drug interaction can usually be corrected by the proper adjustment of dosage.

Ex:- Tetracycline HCl - 250 mg

direction :- Take one capsule every 6 hours with milk

Cause :- Tetracycline is inactivated by calcium present in milk. So, it should not be taken with milk.

Remedy :-

In this prescription the therapeutic incompatibility is unintentional

- So, the prescription is referred back to the prescriber to change the direction.