

The logo of Galgotias University is a circular emblem with a stylized 'G' shape in the center. The 'G' is composed of several curved, overlapping bands in shades of yellow, orange, and blue. The background of the emblem is a light, textured grey.

MODULE 1: Preformulation Studies

Lecture 4

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DISCLAIMER

All the content material provided here is only for teaching purpose

The logo of Galgotias University is a stylized, circular emblem. It features a central white swirl that transitions into a blue swirl, which then transitions into a yellow swirl, and finally into a red swirl. The entire emblem is set against a light brown background.

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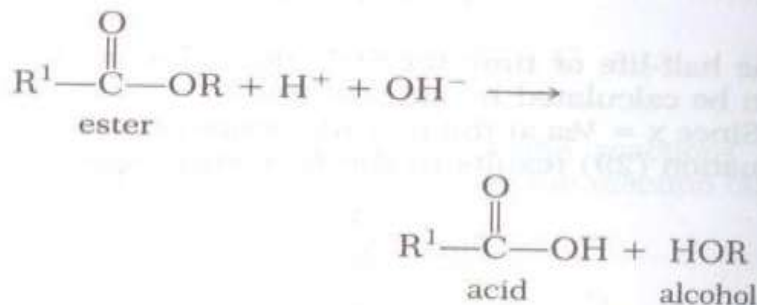
Chemical Stability

Hydrolysis: interact with water molecule to yield breakdown product.

- Susceptible to the hydrolytic process: esters, substituted amides, lactones, and lactams.
- Eg: Anesthetics, antibiotics, vitamins and barbiturates
- 1. Ester hydrolysis:

Ester hydrolysed into Acid + Alcohol

Acid or alkali catalysed hydrolysis



Factors to be considered in Hydrolysis

- pH
- Type of solvent : solvent lower dielectric constant
 - Eg.: ethanol, glycols, mannitol etc.
- Complexation : steric or polar effects. Eg.: caffeine with benzocaine – electronic influence of complexing agent – alters affinity
- Surfactants: nonionic , cationic , anionic stabilizes drug against base catalysis. Eg: 5% SLS – 18folds increase in $t_{1/2}$ of benzocaine
- Modification of chemical structure
- Salts and esters

Oxidation - reduction

Second most common way.

Eg.: vitamins ,antibiotics etc

Mediated by free radicals or by molecular oxygen

Sensitive towards trace metal and other impurities

Redox reactions involve either transfer of oxygen
or hydrogen atoms or transfer of electrons

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Oxidation - reduction

Oxidation – presence of oxygen generates free radicals
These radicals propagate the oxidation reaction ,
which proceeds until inhibitors destroy the radicals or
until side reactions eventually break the chain

Eg. Dopamine

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Photolysis

- Photochemical
- Photosensitizer
- UV- violet portions – more active
(shorter wavelength, more energy)

Racemizationn

- Racemization – compound changes optical activity without changing the chemical composition.
- Levo and dextro form
 - Eg: l-adrenaline is 15-20times more active than dextro form
 - Racemic mixture
- Effects: Stability and therapeutic activity

References

- Lachman L Lieberman H.A, Kanig J.L, The Theory and Practice of Industrial Pharmacy, 3rd edition
- Michael E.Aulton. Pharmaceutics, The science of Dosage form design.

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