

Instab. / Decomp. of drug / Causes of Instab. & their Prevention.



[DEPTH OF BIOLOGY]

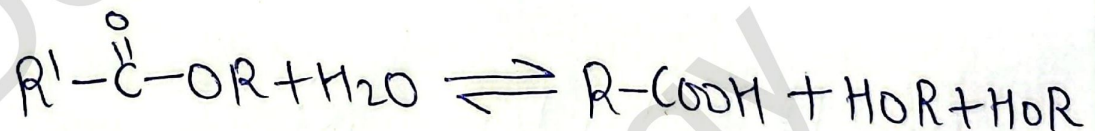
① Hydrolysis $\Rightarrow$ It is one of the Main problem in System Containing Water. (Syrup, Emulsion, Suspension).

★ Also for drug which are affected by traces of Moisture.

★ Main Classes of drug that Undergo Hydrolysis $\rightarrow$ Ester
 $\rightarrow$ Amide.

② Ester Hydrolysis $\Rightarrow$

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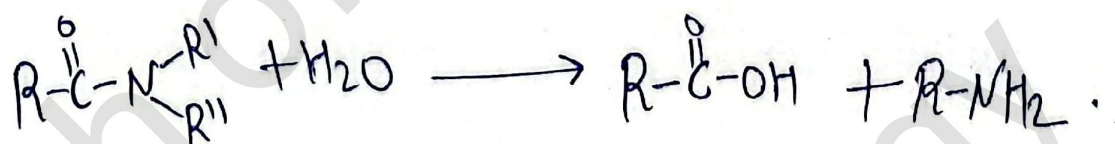


Eg of drugs $\Rightarrow$ Procaine, Tetracaine, Aspirine.

③ Amide Hydrolysis $\Rightarrow$

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Cleavage of Amide into $\rightarrow$ Amine



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Eg $\rightarrow$ Barbiturates.

② Ring Hydrolysis $\Rightarrow$ [DEPTH OF BIOLOGY]

Ring Cleavage by attack of Hydrogen

Eg $\rightarrow$ Barbiturates, Penicillin.

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Protection against Hydrolysis $\Rightarrow$

① Hydrolytic reaction in solid drug product $\Rightarrow$

avoid moisture & Pack in suitable moisture resistant pack.

* Stored in Control Humidity. [DEPTH OF BIOLOGY]

② In case of Liq. dosage form $\Rightarrow$

$\because$ Hydrolysis is Acid or base Catalysed $\Rightarrow$ So, we have to maintain pH for Maximum stability.

③ By Altering the Dielectric Constant of a system $\Rightarrow$

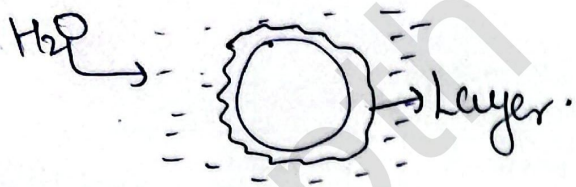
Partial/complete replacement of H_2O with Non-aq. solvent like Alcohol.

④ Hydrolysis of drug like Procaine, Benzoic acid (used by the addition of specific complex agent (like Caffeine). [DEPTH OF BIOLOGY]

⑤ Portion of drug $\xrightarrow{\text{More Soluble}}$ Less Soluble $\rightarrow$ Hydrolysis

⑥ By adding of Surfactant. $\Rightarrow$

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⑦ Refrigeration of drug/drug soln. We retard hydrolysis.

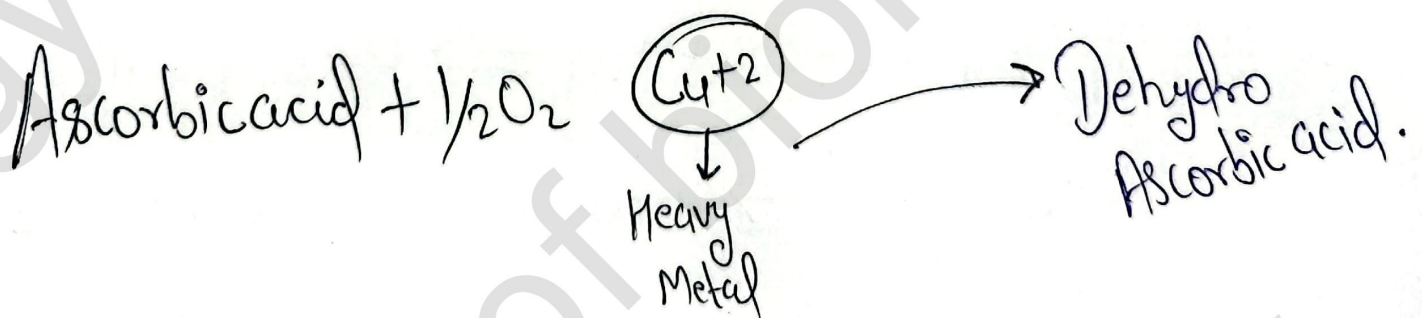
[DEPTH OF BIOLOGY]

⑥ Oxidation [O₂ add & H₂ remove].

In the presence of atm. O₂ Our Pharmaceutical preparation Undergo Oxidation. (Oxidative degradation). [DEPTH OF BIOLOGY]

$\Rightarrow$ Heavy Metal [Co, Ni] Catalyse Oxidative degradation of drug.

eg $\rightarrow$ Morphine, Epinephrine, Vitamin A, D, K.



Prevention from Oxidation $\Rightarrow$

- ① Antioxidant add.
- ② Oxygen replace by N & CO_2 .
- ③ Store at reduce Temp.
- ④ Avoid Heavy Metal.
- ⑤ Use reducing agent to prevent Oxidation.
- ⑥ Oxidation of fats & Oil retarded by Hydrogenation.