

What are active Methylene Groups?

Active Methylene Compounds

The class of compounds which contain a methylene group ($-\text{CH}_2-$) directly bonded to two electron withdrawing groups such as $-\text{COCH}_3$, $-\text{COOC}_2\text{H}_5$, $-\text{CN}$, are called **Active Methylene Compounds**. This is so because the $-\text{CH}_2-$ group in them is acidic and reactive. Ethyl acetoacetate (*Acetoacetic ester*) and Diethyl malonate (*Malonic ester*) belong to this class.

Ex (1)

$$\text{CH}_3-\text{C}(=\text{O})-\text{CH}_2-\text{C}(=\text{O})-\text{OC}_2\text{H}_5$$

Ethyl acetoacetate
(Acetoacetic ester)

Active Methylene Groups

(2)

$$\text{H}_5\text{C}_2\text{O}-\text{C}(=\text{O})-\text{CH}_2-\text{C}(=\text{O})-\text{OC}_2\text{H}_5$$

Diethyl malonate
(Malonic ester)

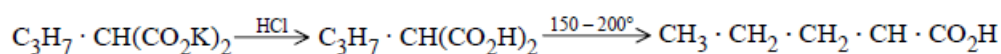
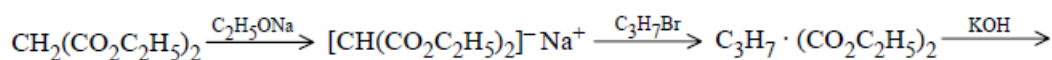
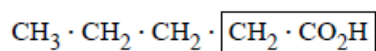
How will you obtain from Malonic Acid?

- Saturated Acids
- Ketone
- Unsaturated Acid
- Cyclic Acid
- Saturated Hydrocarbon

Saturated Acids

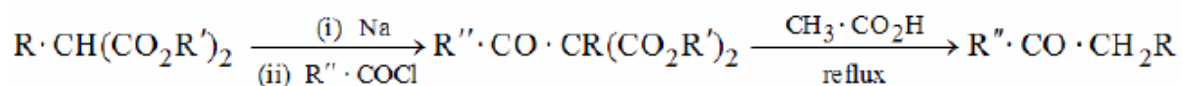
For preparing Saturated Acids from Malonic Ester, the required alkyl groups introduced into sodio-malonic ester. The substituted ester is then refluxed with potassium hydroxide solution, acidified with hydrochloric acid, and the precipitated acid dried and then heated just above its melting point. Alternatively, the potassium salt may be refluxed with sulphuric acid.

i. n – Valeric acid



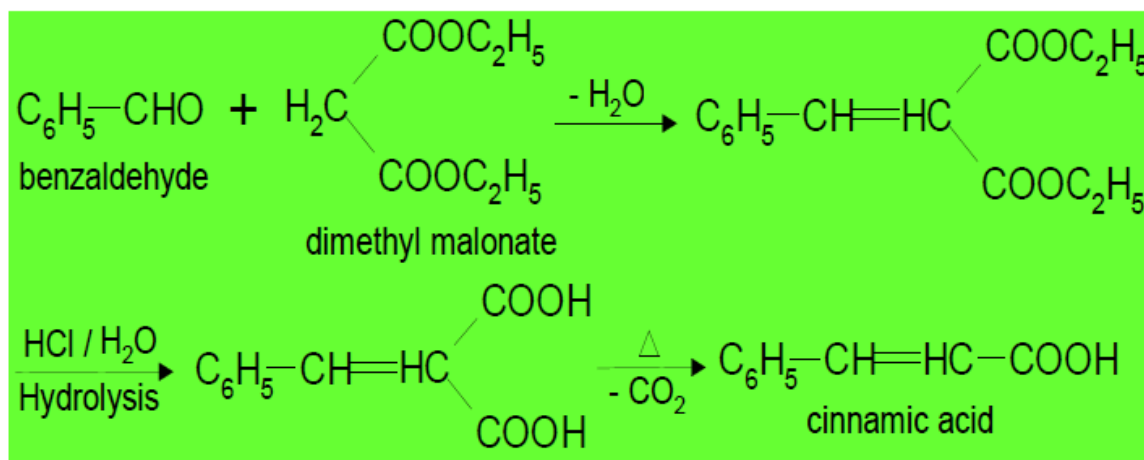
Ketone:

Ketones can be formed by the reaction of Acyl Chloride ($R'' \text{ COCl}$) with Malonic Ester.



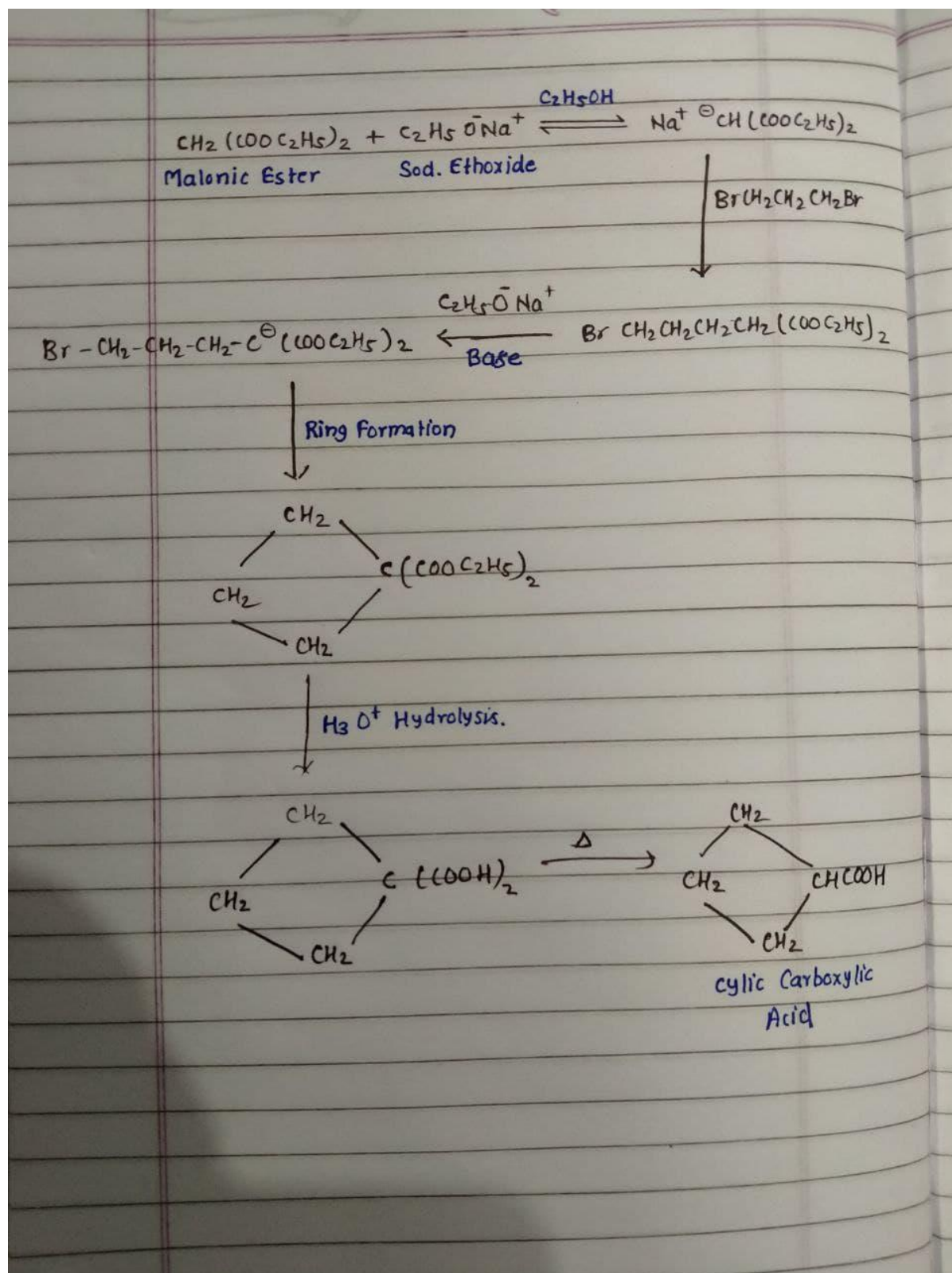
Unsaturated Acids:

- Diethyl malonate on condensation with benzaldehyde gives condensed product which on further hydrolysis followed by decarboxylation gives α, β -unsaturated acid (cinnamic acid).



Cyclic Acid:

By treating Malonic Acid with $\text{Br}(\text{CH}_2)_3\text{Br}$.



Saturated Hydrocarbon:

Saturated Hydrocarbons can be made from malonic ester by converting them into mono carboxylic acids.

