(3) Synthesis of α, β- Unsaturated acids :

The product is obtained by the condensatio
A·A·E· with an aldehyde or ketones gives an α, β- Un
rated acid on acid hydrolysis.

$$CH_3-CH=O + H_2C\begin{matrix}COCH_3\\COOC_2H_5\end{matrix} \xrightarrow[-H_2O]{\Delta} CH_3-CH=C\begin{matrix}COC\\COO\end{matrix}$$

$$CH_3-CH=C\begin{matrix}COCH_3\\COOC_2H_5\end{matrix} + 2H-O-H \xrightarrow[\text{hydrolysis}]{\text{Acid}} CH_3CH=CH-$$

Crotonic ac

$$+ C_2H_5OH + CH$$

(4) Synthesis of β-ketonic acids :

The product is obtained by the condens
of sodio derivatives of ester with propionyl (Acyl halic
When subjected to acid hydrolysis forms β-Ketonic

$$CH_3\underset{\underset{O}{\|}}{C}-CH_2-\underset{\underset{O}{\|}}{C}-OC_2H_5 \xrightarrow[-C_2H_5OH]{C_2H_5ONa} CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{Na^+}{|}}{CH}-\underset{\underset{O}{\|}}{C}-OC_2H$$

$$CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{Na^+}{|}}{CH}-\underset{\underset{O}{\|}}{C}-OC_2H_5 \xrightarrow{C_2H_5COCl} CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{COC_2H_5}{|}}{CH}-COOC_2$$

$$CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{COC_2H_5}{|}}{CH}-COOC_2H_5 + 2H-O-H \xrightarrow[\text{Acid hydrolysis}]{\text{Alc. KOH}} CH_3$$

$$+ C_2H_5$$

$$+ C_2H_5CO\,CH_2\,COOH$$

β- Keto pentanoic acid.

Synthesis of γ-Ketonic acids :

aceto γ-Ketonic acids are prepared by t
g sodio^acetic esters with α-chloro carbonylic aci
ter. The product aceto succinic esters gives γ-Ke
cid when subjected to Ketonic hydrolysis.

$CH_3-\underset{\underset{O}{\|}}{C}-CH_2-COOC_2H_5 \xrightarrow[-C_2H_5OH]{C_2H_5Na} CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{Na^+}{|}}{CH}-COOC_2H_5$

$CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{Na^+}{|}}{CH}-COOC_2H_5 \xrightarrow[-NaCl]{ClCH_2COOC_2H_5} CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{CH_2-COOC_2H_5}{|}}{CH}-COOC_2H_5$

$CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{CH_2COOC_2H_5}{|}}{CH}-COOC_2H_5 + 2H-O-H \xrightarrow[\text{hydrolysis}]{\text{Ketonic}} CH_3-\underset{\underset{O}{\|}}{C}-CH_2CH_2-COOH$

Aceto Succinic ester

V-Ketonic acid

(V-Ketovaleric acid)

$+ CO_2 + 2\,C_2H_5OH$

## Synthesis of Methyl Ketones:

Mono and dialkyl desivatives of A.A.E. on ketonic hydrolysis form higher methyl ketones.

$CH_3-\underset{\underset{O}{\|}}{C}-CH_2-COOC_2H_5 + H-O-H \xrightarrow[\text{hydrolysis}]{\text{Ketonic}} CH_3-\underset{\underset{O}{\|}}{C}-CH_2-C_2H_5$

Methyl propyl Ketone

$+ CO_2 + C_2H_5OH.$

$CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{C_2H_5}{|}}{\overset{\overset{C_2H_5}{|}}{C}}-COOC_2H_5 + H-O-H \xrightarrow[\text{hydrolysis}]{\text{Ketonic}} CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{C_2H_5}{|}}{\overset{\overset{H}{|}}{C}}-C_2H_5$

Methyl $\alpha$-ethyl propyl ketone.

$+ CO_2 + C_2H_5OH$

## Synthesis of 1,3-diketones:

The product is obtained by the condensation of dio desivatives of ester with acyl halide forms 1,3-ketones on ketonic hydrolysis.

$CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{Na+ClCOCH_3}{|}}{CH}-COOC_2H_5 \xrightarrow{-NaCl} CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{COCH_3}{|}}{CH}-COOC_2H_5$

$CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{COCH_3}{|}}{CH}-COOC_2H_5 \xrightarrow[\text{Ket. hydrolysis}]{H-O-H} CH_3-\underset{\underset{O}{\|}}{C}-CH_2-\underset{\underset{O}{\|}}{C}-CH_3$

Acetyl acetone

$+ CO_2 + C_2H_5OH$