

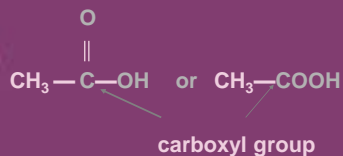
Carboxylic Acids, Esters

v.1.7



Carboxyl Group

Carboxylic acids contain the carboxyl group on carbon 1.

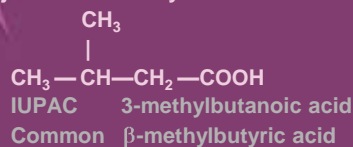


Naming Carboxylic Acids

Formula	IUPAC alkan -oic acid	Common prefix - ic acid
HCOOH	methanoic acid	formic acid
CH ₃ COOH	ethanoic acid	acetic acid
CH ₃ CH ₂ COOH	propanoic acid	propionic acid
CH ₃ CH ₂ CH ₂ COOH	butanoic acid	butyric acid

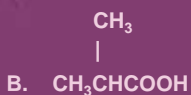
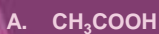
Naming Rules

- Identify longest chain
- (IUPAC) Number carboxyl carbon as 1
- (Common) Assign α , β , γ to carbon atoms adjacent to carboxyl carbon



Learning Check

Give IUPAC and common names:



Properties

- Carboxylic acids are weak acids

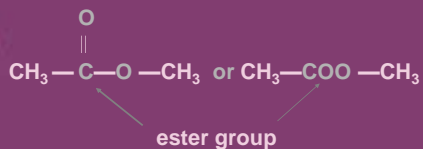


- Neutralized by a base



Esters

In an ester, the H in the carboxyl group is replaced with an alkyl group



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Esters in Plants

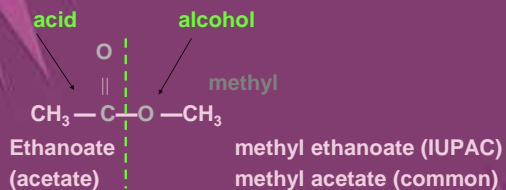
Esters give flowers and fruits their pleasant fragrances and flavours.



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Naming Esters

- Name the alkyl from the alcohol -O-
- Name the acid with the C=O with -oate

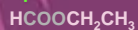


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Some Esters and Their Names

Flavor/Odor

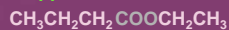
Raspberries



ethyl methanoate (IUPAC)

ethyl formate (common)

Pineapples



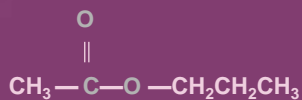
ethyl butanoate (IUPAC)

ethyl butyrate (common)

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Learning Check

Give the IUPAC and common names of the following compound, which is responsible for the flavor and odor of pears.



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Learning Check

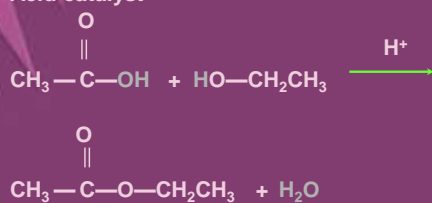
Draw the structure of the following compounds:

- 3-bromobutanoic acid
- Ethyl propionate

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Esterification

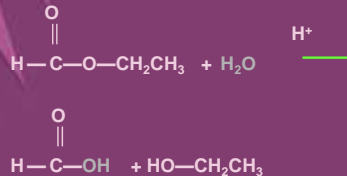
- Reaction of a carboxylic acid and alcohol
- Acid catalyst



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Hydrolysis

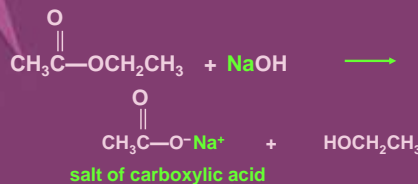
- Esters react with water and acid catalyst
- Split into carboxylic acid and alcohol



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Saponification

- Esters react with a bases
- Produce the salt of the carboxylic acid and alcohol



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Learning Check

Write the equation for the reaction of propionic acid and methyl alcohol in the presence of an acid catalyst.

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Learning Check

What are the organic products when methylacetate reacts with

- Water and an acid catalyst?
- KOH?

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