Esters can be cleaved back into a carboxylic acid and an alcohol by reaction with water and a catalytic amount of acid.

**General Reaction**

\[
\text{Ester} + \text{H}_2\text{O} \rightarrow \text{Carboxylic Acid} + \text{Alcohol}
\]

**Example 1:**

\[
\text{PhCOOCH}_2\text{CH}_3 + \text{H}_2\text{O} \rightarrow \text{PhCOOH} + \text{HOCH}_2\text{CH}_3
\]

**Mechanism**

1) Protonation of the Carbonyl

2) Nucleophilic attack by water

3) Proton transfer
Esters can be cleaved back into a carboxylic acid and an alcohol by reaction with water and a base.

The reaction is called a saponification from the Latin sapo which means soap. The name comes from the fact that soap used to be made by the ester hydrolysis of fats. Due to the basic conditions a carboxylate ion is made rather than a carboxylic acid.

**General reaction**

\[
\text{Ester} + \text{H}_2\text{O} + \text{NaOH} \rightarrow \text{Carboxylate} + \text{Alcohol}
\]

**Example 1:**

\[
\text{Ester} + \text{H}_2\text{O} \rightarrow \text{Carboxylate} + \text{Alcohol}
\]

**Mechanism**

1) Nucleophilic attack by hydroxide
2) Leaving group removal

3) Deprotonation

Contributors

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