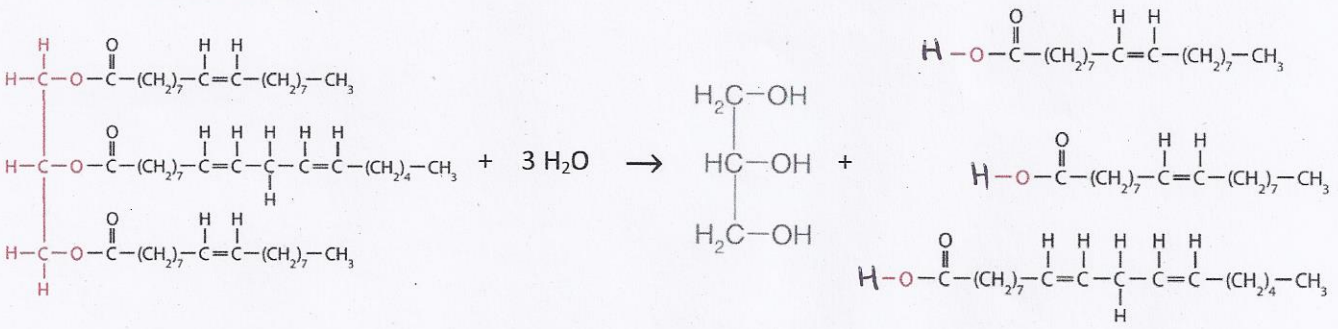
Information taken from: Brückl et al.(2014): *elemente chemie 2.* Stuttgart: Ernst Klett Verlag

Question: "Production of Biodiesel-Reaction at the Molecular Level"

1. Canola oil reacts with methanol to produce one glycerol molecule and three methyl esters during
   1. **hydrolysis** (reaction of canola oil with water to produce glycerol and three carboxylic acids) and
   2. **esterification** (reaction of three carboxylic acids with methanol to produce three water molecules and three canola methyl esters).

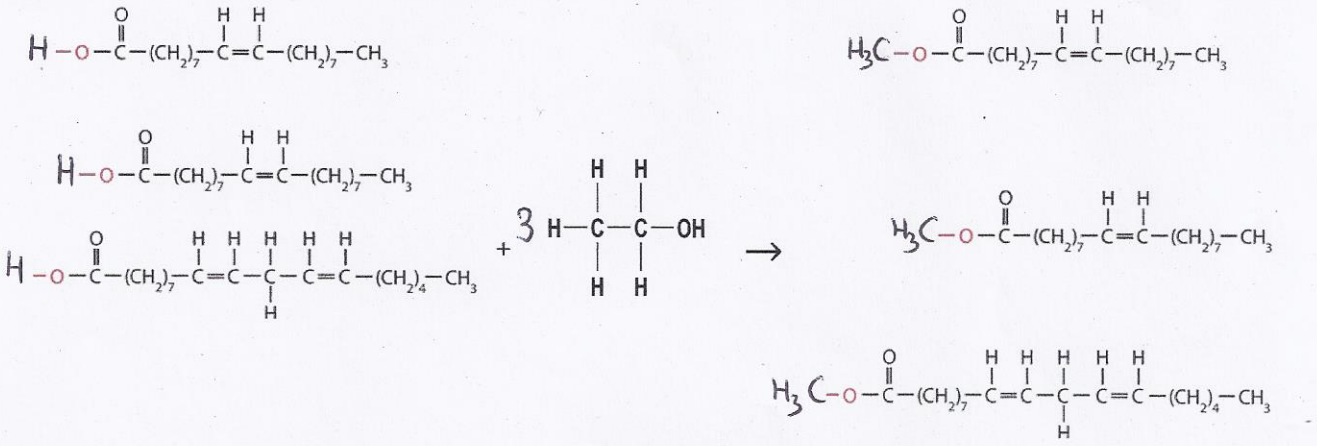
   Write the reaction equation using structural formulas for both hydrolysis and esterification.

Step 1: Hydrolysis



canola oil + water → glycerol + carboxylic acids

Step 2: Esterification



carboxylic acids + ethanol → canola methyl ester + 3 H_2O

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2. Why did the biodiesel have to be "washed" three times with water?

The biodiesel had to be washed to remove the glycerol, ethanol and water molecules from the mixture. In the end we only want the methylester (biodiesel) without any other products.