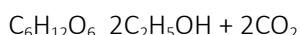


- **Biodegradable plastics** are plastics that **decompose** (rot) naturally in the soil when dumped.
- Recycling plastics and sorting them into different types to make new products, **saves energy and resources**. However, paper is easier to recycle than plastics.
- However, the use of a food crop like corn to make plastics raises the same problems as using **biofuels**. Developing countries would starve, more land would be used and it will destroy **wildlife habitats** which could affect **global warming**.

5.5 Ethanol

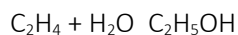
- Ethanol is a member of the group of organic compounds called the **alcohols**. The chemical formula of Ethanol is C_2H_5OH . This shows the $-OH$ group that all alcohols have in their molecules.
- Making Ethanol by Fermentation:
 - Ethanol for drinks is made by the **fermentation** of sugar from plants. Enzymes in yeast break down the sugar into the ethanol and carbon dioxide gas.

Sugar (glucose) → ethanol + carbon dioxide



- Ethanol can be made from ethene reacting with steam in the presence of a catalyst. This is called **hydration**.
- Using ethene to make ethanol needs non-renewable crude oil as its raw material whereas fermentation uses renewable plant material.
- Making Ethanol by Hydration:
 - Ethanol for industrial use as a fuel or solvent can be made from ethene instead of by fermentation. Ethene gas can react with steam to make ethanol.

Ethene + steam → ethanol



- The reaction requires energy to **heat** the gasses and to generate a **high pressure**. The reaction is **reversible** so ethanol can break down back into ethene and steam. This process is **continuous** and **produces no waste products**. However, ethene to make ethanol relies on **crude oil** which is a **non-renewable** resource. Therefore making ethanol as a **biofuel**, will become ever more important. Large-scale industrial uses for fermentation will be a big problem, because we will need crops, which take land, which **ruins wildlife** and could **harm the environment**.

6.1 Extracting vegetable oil

- Vegetable oils can be extracted from plants by **pressing** or **distillation**.
- Steps (extraction by pressing/crushing):