



Cambridge IGCSE Chemistry

Topic 14: Organic chemistry

Natural polymers

Notes





Name proteins and carbohydrates as...

- Constituents of food

(Extended only) Describe proteins as...

- Possessing the same (amide) linkages as nylon but with different units

*(Extended only) Describe the hydrolysis of proteins to amino acids
(Structures and names are **not** required)*

- Hydrolysis is the splitting up of a molecule using water
- Hydrolysis of polymers results in the formation of their monomers
- In the case of proteins, when you add water to split up this natural polymer, you will get amino acids (the monomers that form the proteins)

(Extended only) Describe complex carbohydrates in terms of...

- A large number of sugar units (diols) joined together by condensation polymerisation, e.g. a polyester with -O- linkages

(Extended only) Describe the hydrolysis of complex carbohydrates (e.g. starch), by...

- Acids or enzymes to give simple sugars
- similarly to proteins, complex carbohydrates can be broken down into their monomers (simple sugars) using water with acids/enzymes

(Extended only) Describe the fermentation of simple sugars to...

- Produce ethanol (and carbon dioxide)
- **sugar (glucose) → ethanol + carbon dioxide**
- conditions: yeast enzyme, around 30°C, anaerobic conditions (no oxygen)



(Extended only) Describe, in outline, the usefulness of chromatography in separating and identifying the products of hydrolysis of carbohydrates and proteins

- Chromatography is used to separate a mixture of molecules, therefore when you hydrolyse large molecules (polymers) like carbohydrates and proteins, you are left with a mixture of their monomers
 - Thus, chromatography can be used to separate and identify these monomers by their R_f values
 - sugars and amino acids will not produce visible spots, so once the chromatogram is dry, you need to spray it with a locating agent (Ninhydrin produces purple spots with amino acids and resorcinol makes coloured spots with sugars)

