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The digestive enzymes

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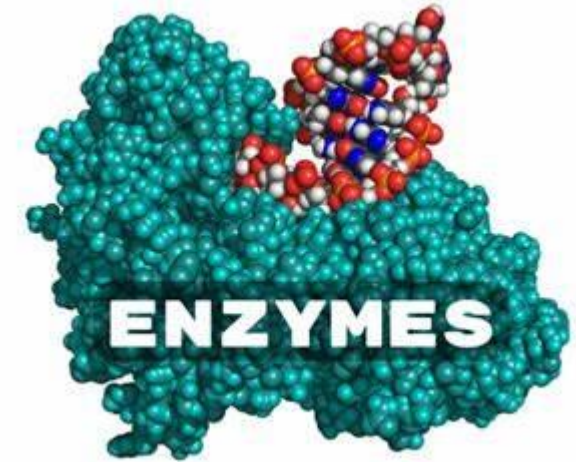
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Digestive enzymes:

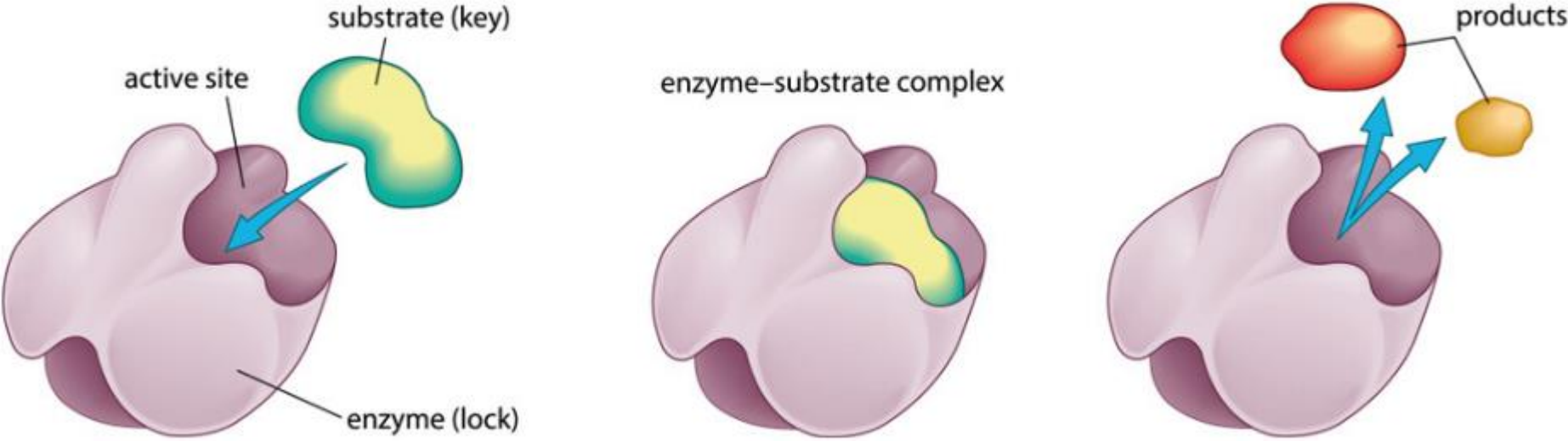
Digestive enzymes are substances that help you **digest** your food.

Stomach, small intestine and pancreas all make digestive enzymes.

The **pancreas** is really the enzyme “powerhouse” of digestion. It produces the most important digestive enzymes, which are those that break down carbohydrates, proteins and fats.

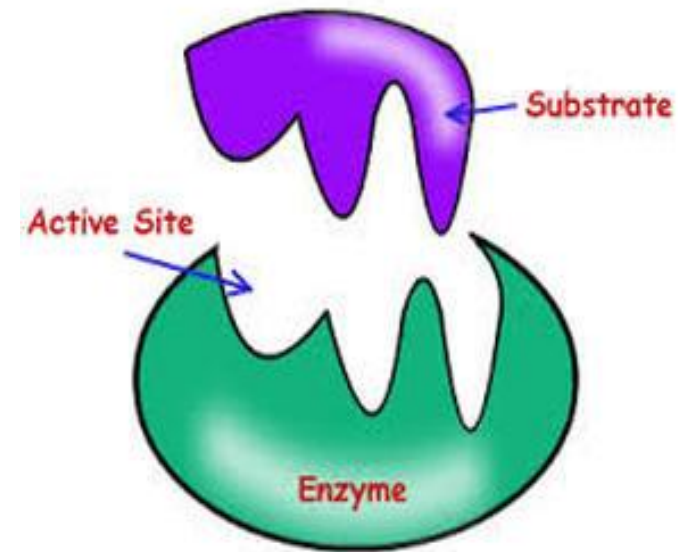


How enzymes work?



How enzymes work?

Enzymes have a specific shape. This shape fits into the molecule it will break apart. The part of the enzyme where the molecule fits is called **the active site** . The molecules that enzymes act upon are called **substrates**. An enzyme is specific for its substrate like a key is for its lock. This is called the lock and key model.





Digestive Enzymes

- There are 3 main types of digestive enzymes:
 - **Amylase** breaks **starch** down into **glucose**.
 - **Protease** breaks **protein** down into **amino acids**.
 - **Lipase** breaks fats down into **fatty acids** and **glycerol**

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Location of enzymes in the digestive system

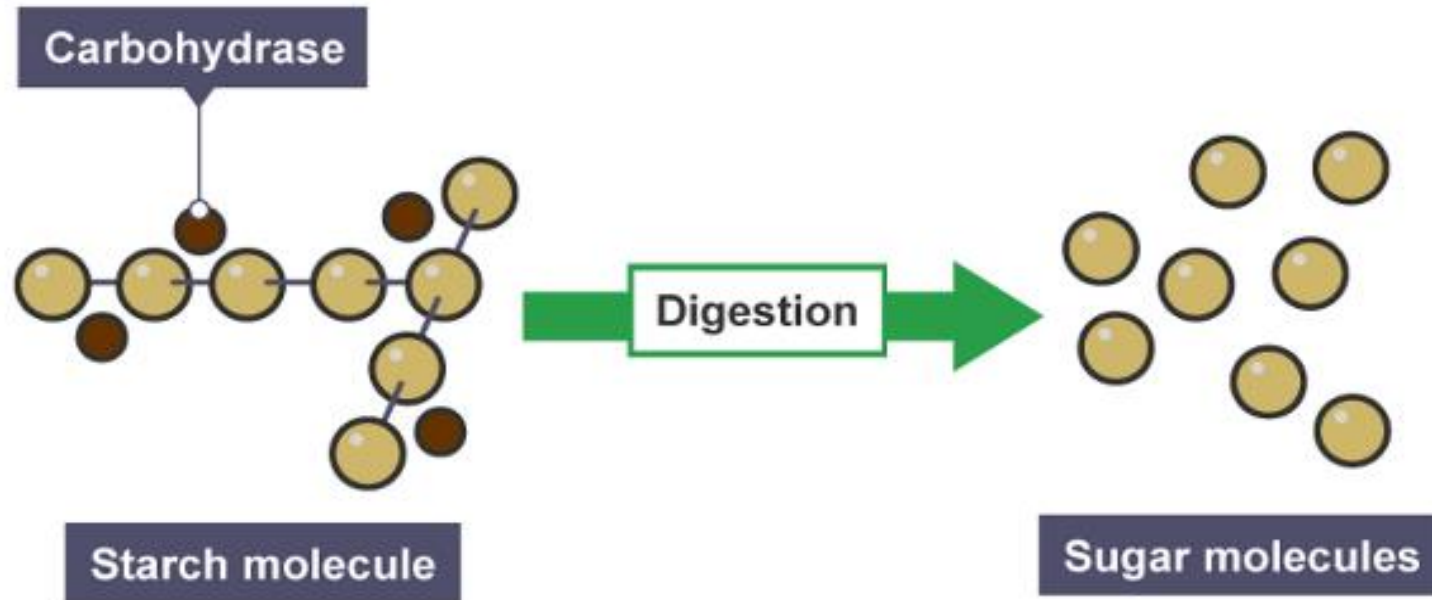
This table shows where the types of digestive enzyme are found.

Enzyme	Location in the digestive system
Amylase	Mouth, pancreas and small intestine
Protease	Stomach, pancreas and small intestine
Lipase	Pancreas and small intestine



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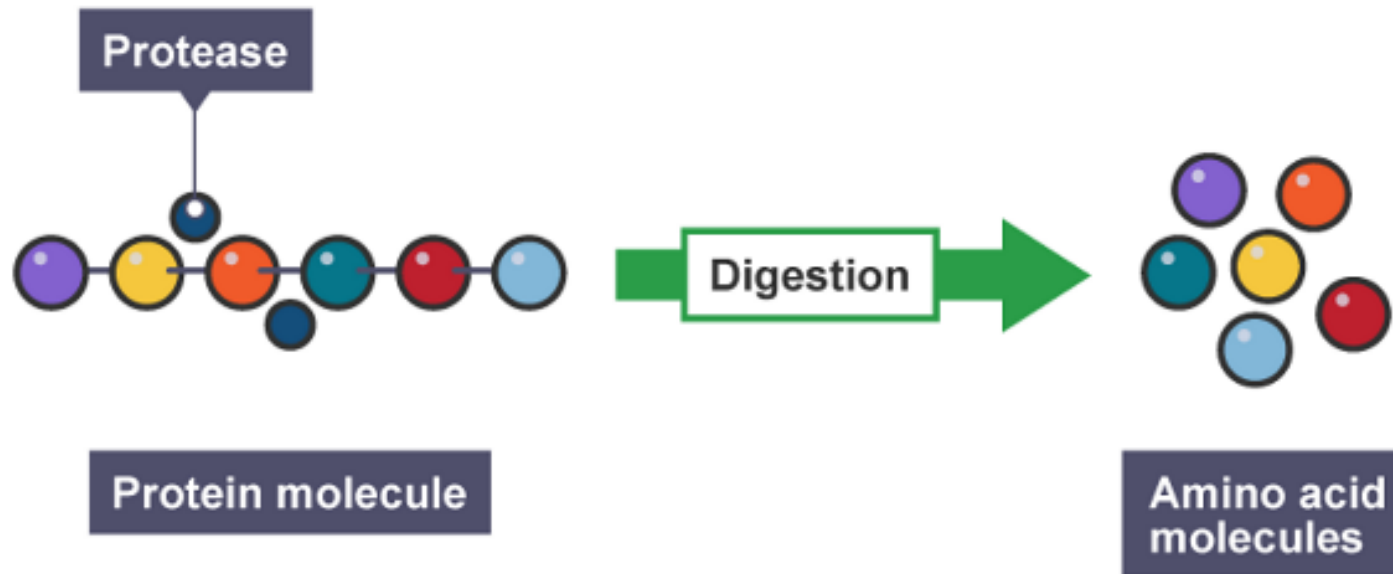
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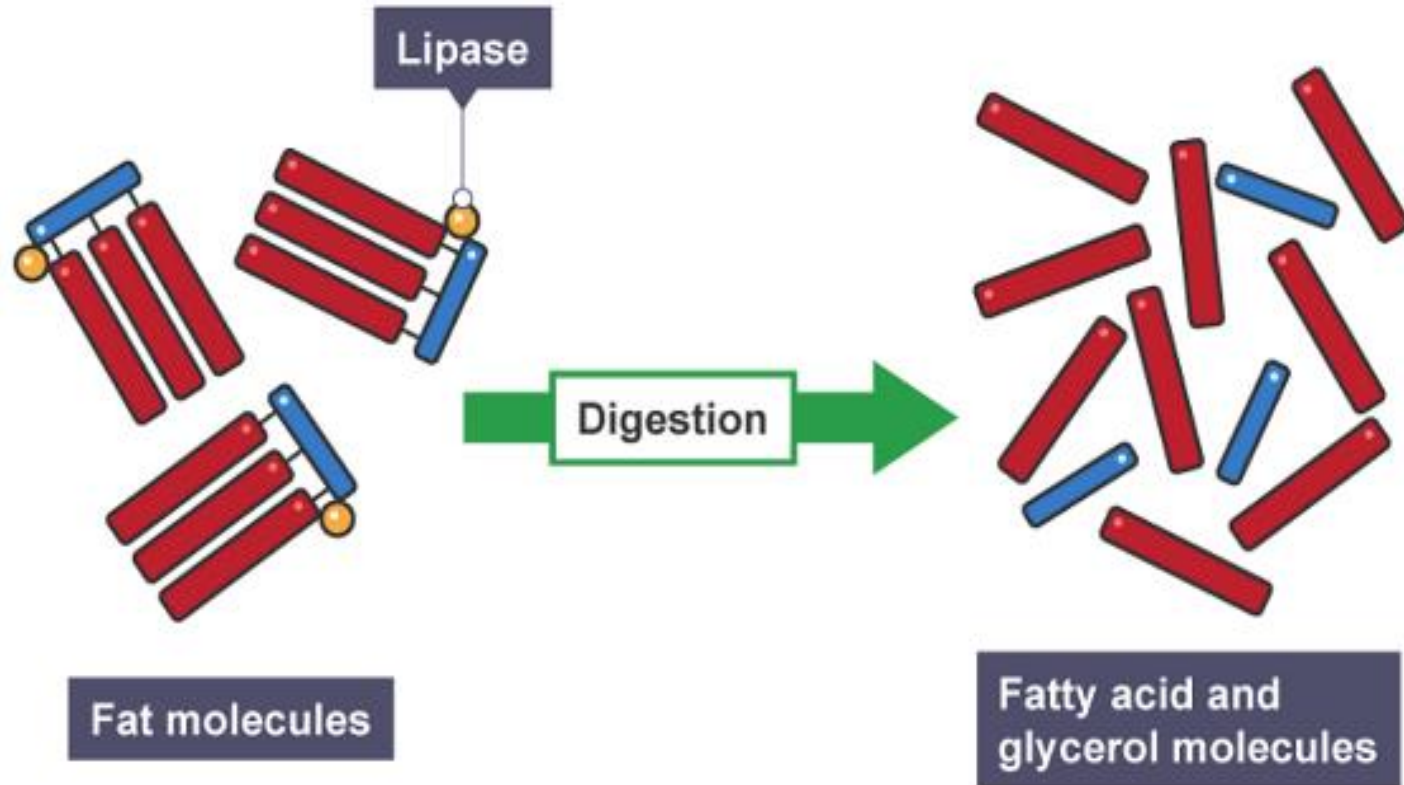


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Factors that affect the function of enzymes:

1- Temperature:

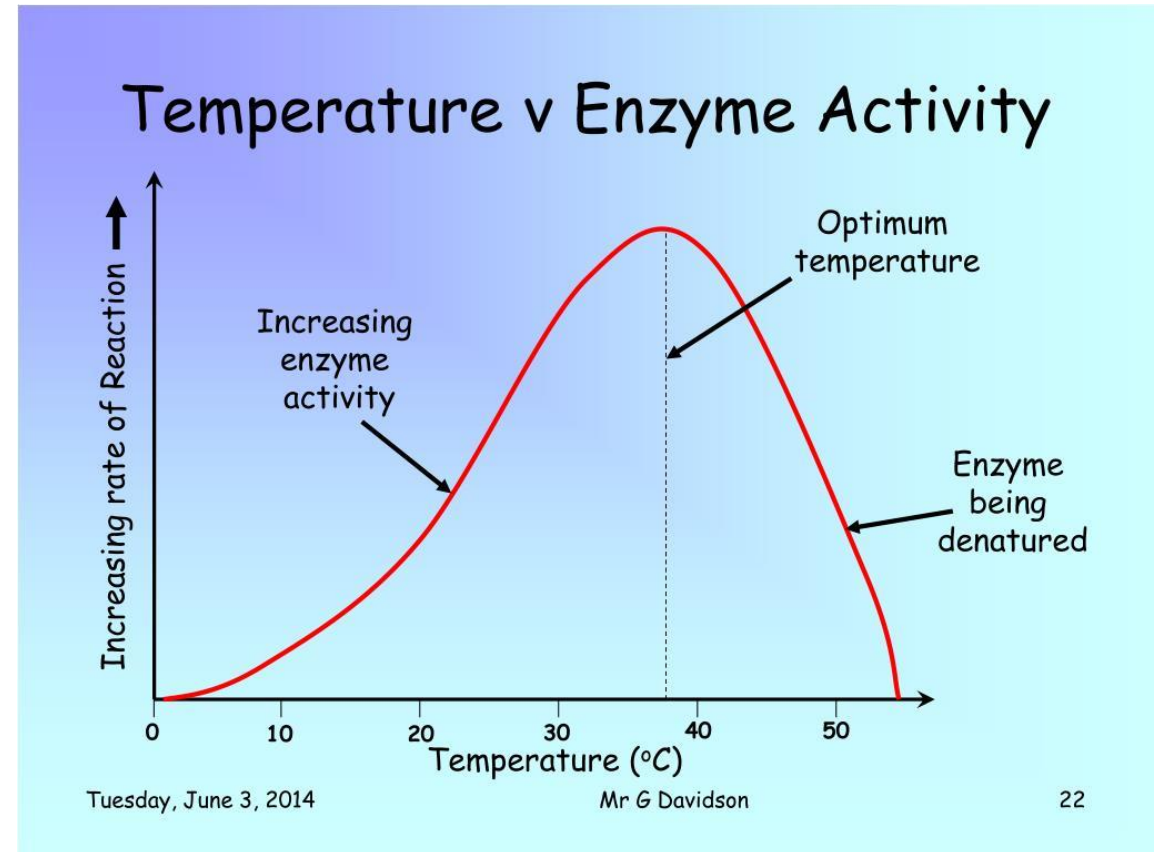
As the temperature increases the enzyme rate of reaction increases until it reaches its optimum

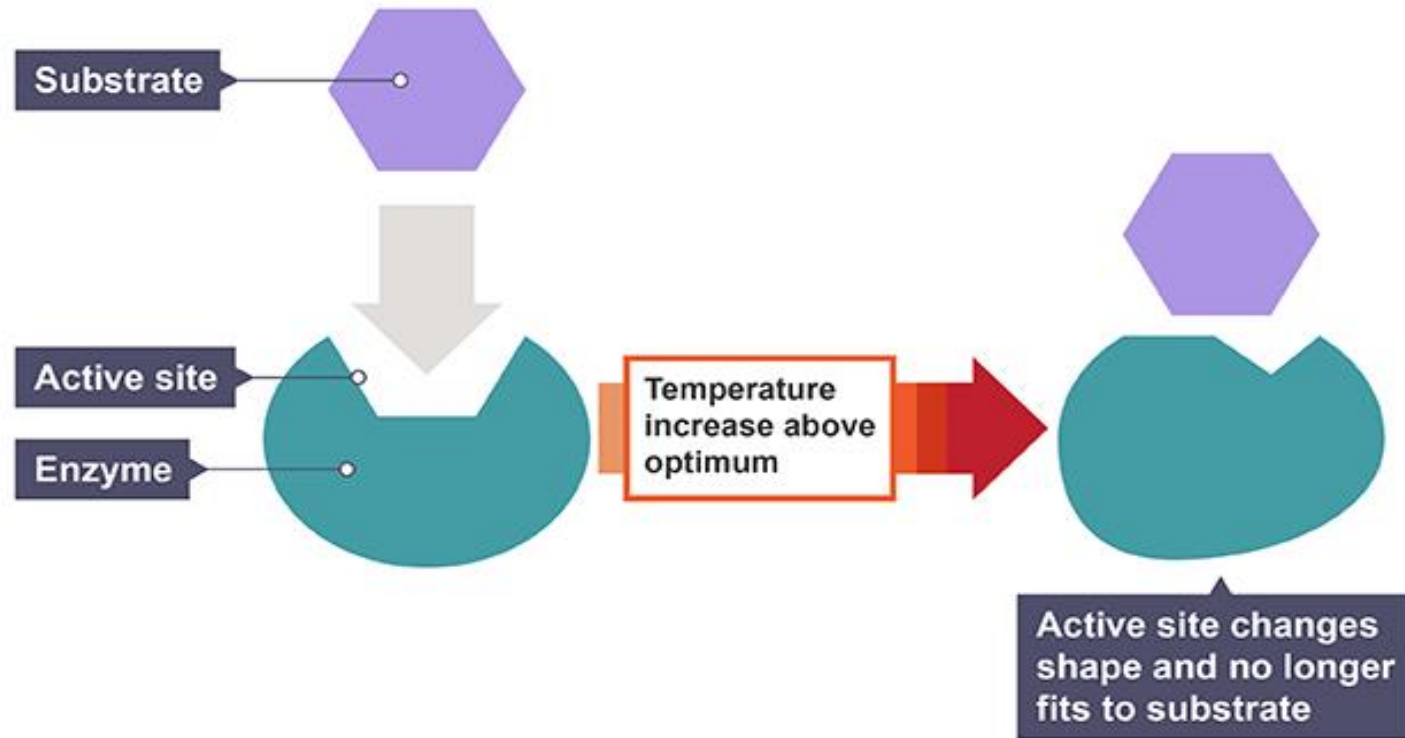
Temperature.

After the optimum temperature further increase of temperature will start to break apart the bonds holding the enzyme together.

So the active site start changing shape and then it wont be able to bind with the substrate.

So the enzyme becomes **denatured**.





Factors that affect the function of enzymes:

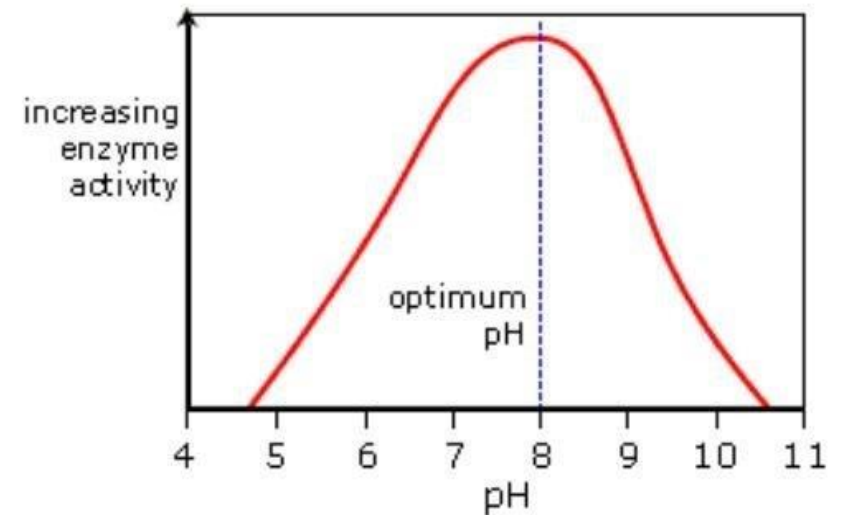
2- PH:

Ph measure the acidity.

If the PH is too high or too low it will lower the rate of the reaction. So the bonds holding the enzyme start to break apart and then the active site starts changing shape and the substrate cant fit the enzyme.

The enzyme becomes **denatured**.

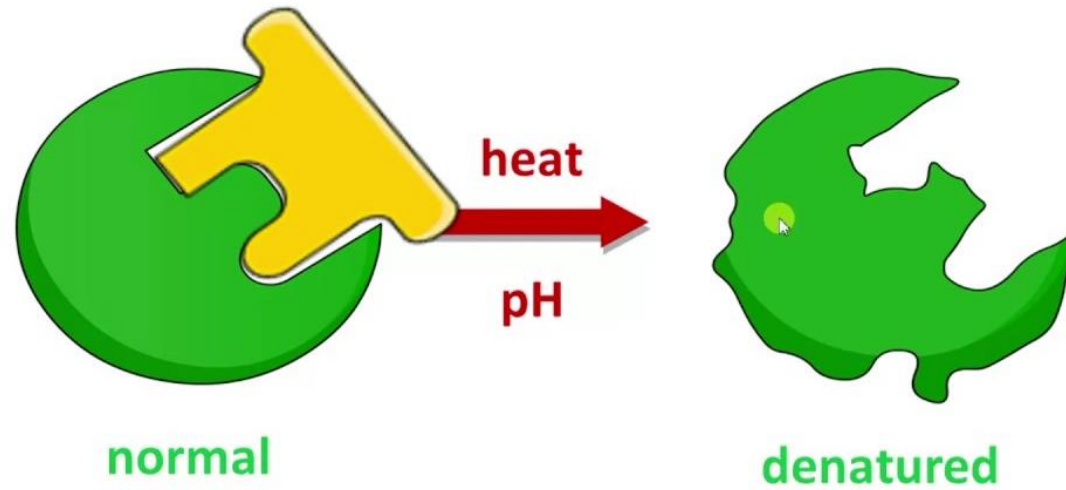
* Each enzyme has a different optimum PH depending on where the enzyme works.





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Reagents and food testing

There are different tests which can be used to detect carbohydrates, proteins and lipids.

They involve adding a reagent to a food sample which changes color depending on what molecules are present.



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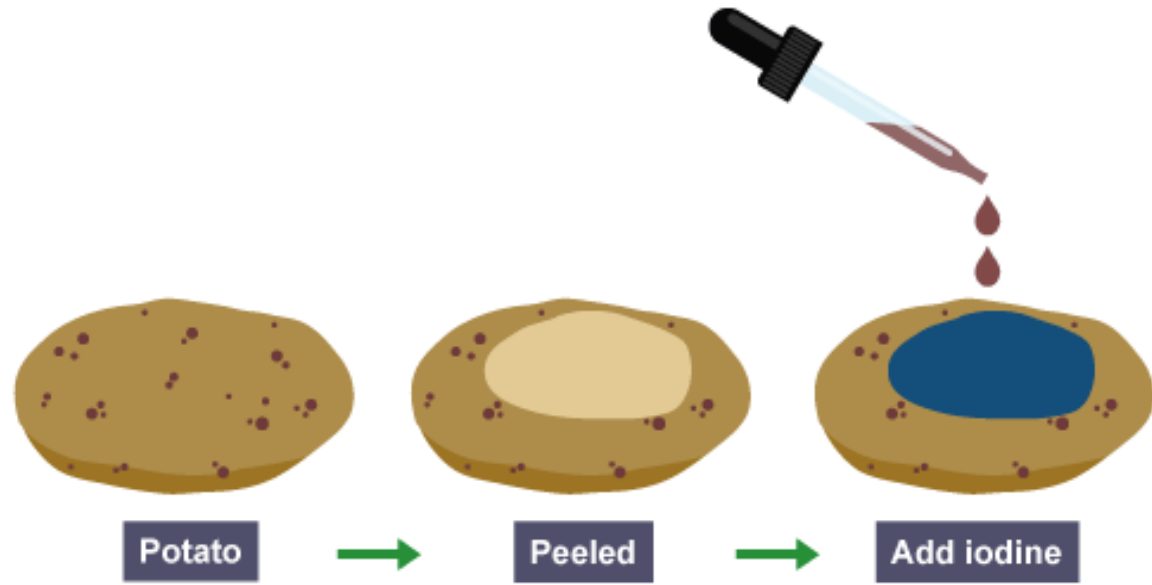


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Test for starch

Add iodine solution to the food being tested.



Foods containing starch will turn a blue-black colour.

Test for proteins

The biuret test is used to detect proteins **i**.

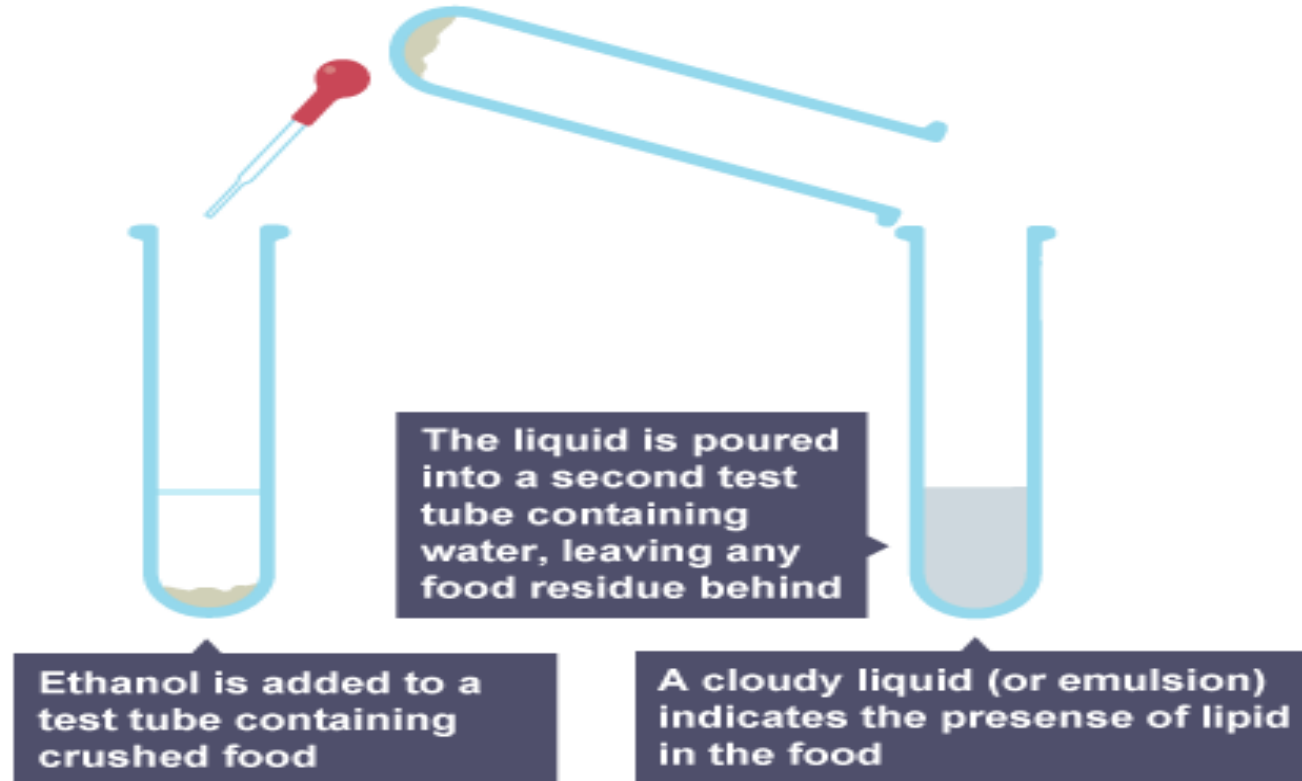
Biuret reagent is sometimes available as a single solution

Results



Test for fats

The emulsion test



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Thank you