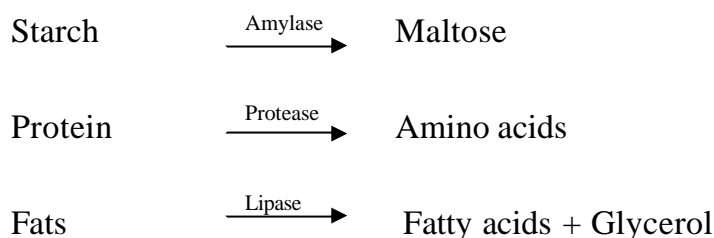


ENZYME ACTION

NAME: Pancreatin

DESCRIPTION: Cream coloured powder. MC23.26M

ACTION: There are three principal enzyme components of pancreatin responsible for the digestion of the following foods.



STORAGE: Store in the refrigerator at 4°C.

SAFETY: Enzymes are biologically active proteins and should be handled with care. Avoid direct contact or inhalation.

TIPS FOR TEACHERS:

Suggested pracs:

To observe amylase activity. Equilibrate 5mL of 1% starch solution (use a soluble starch that has been boiled and cooled) and 5mL of 1% Pancreatin solution to 40°C in separate test tubes. Pour the starch solution into the enzyme solution and shake to mix. Maintain the temperature.

To monitor the progress of the reaction. Place two drops of iodine solution (1.5% / 3% I/KI) into each of six wells of a Handy Tray (G11.38). Using a clean pipette, transfer two drops of the starch/pancreatin solution into the first well and record any change in colour. Repeat this process at set times. The strong blue colour that indicates the presence of starch will become less intense as the enzymic reaction progressively breaks down the starch. You can expect the starch to have been removed within 5 - 10 minutes.

To observe Protease activity. Prepare a suspension of skim milk powder (MC41.3) by adding 100mL of “just boiled” water to 4.0g of milk powder. Stir to homogenise the suspension then allow to cool to 40°C in a water bath. Combine 5mL of milk suspension with 5mL of 1.0% Pancreatin solution and maintain the mixture at 40 °C. The action of protease on the casein in the milk suspension results in a clear transparent solution.

Run a control along side your experiment by substituting distilled water for the 1.0% Pancreatin.

To observe Lipase activity. Place 5mL of full cream milk, (UHT milk works well) in a test tube and add 3mL of 0.05M Na_2CO_3 . Add 6 drops of 1% phenolphthalein indicator solution and warm to 40°C in a water bath.

Place 5ml of a 1% pancreatin solution into a separate test tube and warm to 40°C.

Using a clean pipette, transfer 2mL of pancreatin solution to the test tube containing the milk, swirl the mixture and maintain the temperature at 40°C.

Evidence of lipase action should become evident within 10-15 minutes as the pH of the mixture decreases and the indicator becomes colourless.

Note: Prepare 0.05M Na_2CO_3 by dissolving 5.3gm of anhydrous sodium carbonate Na_2CO_3 in 1000mL of distilled water.

Comments and further Ideas:

Pancreatin contains many enzymes. The main three are amylase, proteases such as trypsin, and lipase, which are secreted into the lumen of the small intestine. Pancreatic secretions also contain sodium bicarbonate which neutralises the acidic material from the stomach. The optimum pH for these enzymes is in the neutral to slightly alkaline range.

The pancreas produces many other digestive enzymes, including ribonuclease, deoxyribonuclease, gelatinase and elastase.

Please note: Variations in substrate composition and enzyme activity can mean that the suggested experiment might not work exactly as described in every situation.