Answers

Enzyme Experiment

Many common substances contain enzymes. For example, fresh pineapple, contact lens protein remover, meat tenderiser and some washing powders contain enzymes that breakdown protein found in dirt.

Aim:

To observe how enzymes break down food.

Equipment:

- 3 petri dishes of jelly
- 3 pieces of fresh pineapple
- 3 pieces of canned pineapple
- Sticker labels

Method:

1. Collect the equipment.
2. Label each petri dish – control, fresh pineapple and canned pineapple.
3. On the dish labelled fresh pineapple, place three pieces of fresh pineapple.
4. On the dish labelled canned pineapple, place three pieces of canned pineapple.
5. The other dish labelled control should be left as is – plain jelly.
6. Leave the jelly overnight and then observe to see what affect the fresh pineapple and canned pineapple has on the jelly.

Background Research:

Pineapple contains a chemical called bromelain, which contains two enzymes capable of digesting proteins, which are called proteases. During the canning process pineapple gets heated and the bromelain breaks apart making it inactive.

Jell-O and other gelatins get their structure from links formed between chains of collagen, which is a protein.

Hypothesis: *write a hypothesis for this experiment…*

It is hypothesised that jelly containing collagen protein will break down more when exposed to fresh pineapple than when exposed to canned pineapple or no-pineapple.

Results:

FOOD CONTAINING PROTEIN	ENZYME ADDED TO JELLY	OBSERVATIONS
Jelly	Fresh pineapple	**Jelly is runny and liquid, especially in areas near the pineapple.**
Jelly	Canned pineapple	**Jelly is mostly firm.**
Jelly	None	**No observable changes**

Analysis:

	Fresh pineapple	Canned pineapple
Digested protein (yes/no)	**YES**	**NO**

Questions:

1. What is a control group? *NOTE: This should not be confused with a controlled variable.*

The group in an experiment which is not exposed to the independent variable. It receives no treatment.

2. Why was it essential to have a control group for each experiment?

A control group is used as a comparison against the results of the group that were exposed to the independent variable.

3. Jelly packets often contain recipes for jellied fruit. However, they always say not to use fresh pineapple. What is the reason for this? (Use your results to support your answer).

Fresh pineapple contains enzymes which breakdown the protein (collagen) that forms jelly. In our experiment the jelly that was exposed to fresh pineapple turned into liquid.

4. Tinned pineapple can be put into jelly quite easily and has no effect on the jelly. Why doesn't it affect the jelly in the same way as the fresh pineapple? (Use your results to support your answer).

Tinned pineapple is heated during the canning process - this denatures the enzymes making them ineffective in breaking down the protein in jelly. In our experiment the jelly exposed to canned pineapple remained solid.

5. Why is it important to have enzymes that digest protein in your stomach and small intestines?

Proteins are a common macronutrient found in food. Proteins are too large to be absorbed into the blood via the digestive system. Enzymes in the stomach + small intestine breakdown proteins into their smallest units, amino acids. Amino acids are small enough to be absorbed into the bloodstream.