

FOOD TESTS

12 FEBRUARY 2014



Lesson Description

In this lesson we:

- Look at how to test for the presence of carbohydrates, proteins and fats.
- Apply these tests to biochemistry applications.



Summary

To do food tests collect small samples of different food types which will serve as test material. If the test material is solid, rather grind it finely into small pieces

The test mediums that indicate the presence of a certain substance are known as **reagents**

Food tests for Carbohydrates			
Compound	Example	Chemical	Results obtained
Glucose	glucose powder/ grape juice/Energade/Oros	Benedict's solution OR Fehling's A and B	orange – red
Starch	starch powder/ bread/potato	Iodine	blue-black
sucrose	sucrose powder/table sugar	Benedict's solution OR Fehling's A and B and HYDROCHLORIC ACID	orange -red

Food tests for Proteins			
Compound	Example	Chemical	Results obtained
Protein	egg white/beans/soup powder/milk powder	Millons Reagent OR the Biuret test – copper sulphate and sodium hydroxide solution	purple/violet

Food tests for Lipids			
Compound	Example	Chemical	Results obtained
Lipids	peanuts/ olive oil	ether / ethanol alcohol	translucent greasy spot



Test Yourself

Select the most correct answer from the options given. Write down only the correct letter

Question 1

Hydrochloric acid is able to break the bond that joins two monosaccharides in a disaccharide. Solutions of four food substances (a to d) are tested for sugars. The table below shows the colours of the solutions after testing?

Which food is a non-reducing sugar?

food substance	heated with Benedict's solution	boiled with hydrochloric acid, neutralised, then heated with Benedict's solution.
A.	blue	blue
B.	blue	orange
C.	orange	blue
D.	orange	orange

Question 2

Which of the following is used to test for starch?

- A. Ether
- B. Iodine solution
- C. Fehling's solution
- D. Benedict's solution

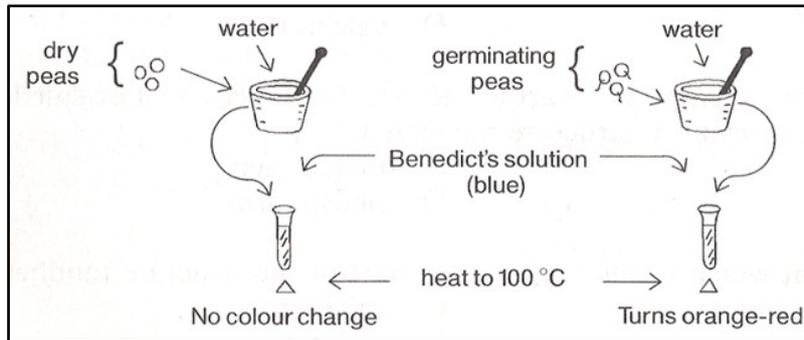
Question 3

You have a boiled strong glucose solution with 4cm^3 Benedict's solution. The colour of the precipitate changes to

- A. Yellow
- B. Green
- C. Red
- D. blue

Question 4

Questions 4 and 5 refer to the experiment below.



The best explanation for the different results in this experiment is that...

- A dry peas contain no water.
- B dry peas contain more protein than germinating peas.
- C there is more living material in dry peas in than germinating peas.
- D enzymes that convert starch into glucose are present in germinating peas.

Question 5

Which of the following is the correct deduction from the result of this experiment:

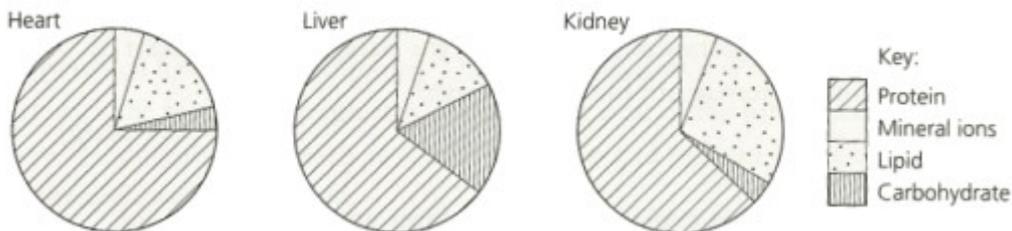
- A Germinating peas contain glucose.
- B Germinating as well as dry peas contain no glucose.
- C Germinating peas contain starch.
- D Dry peas contain starch.



Improve your Skills

Question 1

The pie charts below show the composition of three different organs from the body of an ox. The figures are percentages.



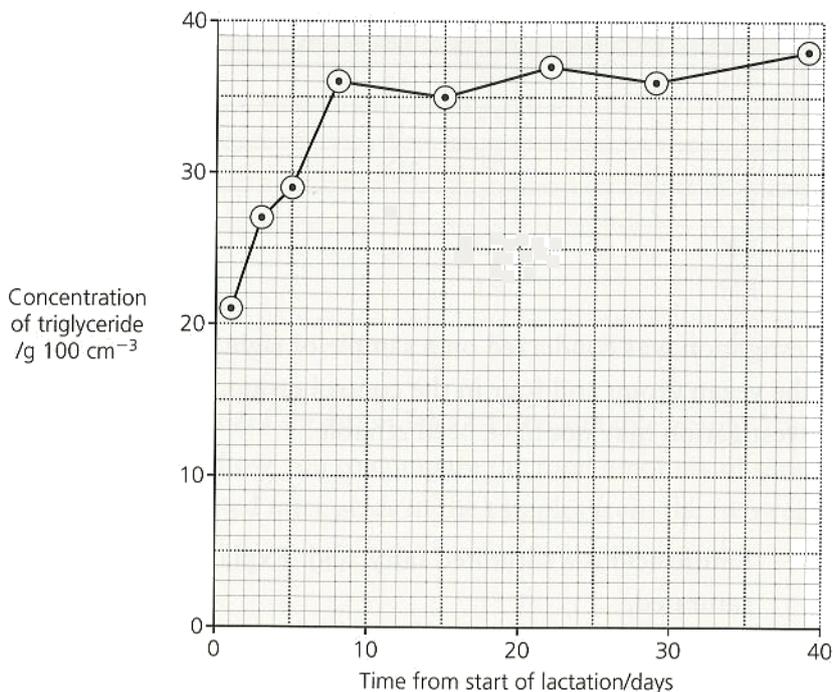
Describe how you could demonstrate that a sample of heart contains protein. (6)

Question 2

Milk provides a young mammal with all the nutrients it needs for its early growth and development. Milk contains proteins, carbohydrates and lipids. It also provides essential vitamins and minerals. The composition of milk, however, varies enormously. It varies from one species to another, from one individual to another, and even within a single individual.

notes for...

The graph below shows how the concentration of triglyceride in human milk changes as lactation (the period of milk production) progresses.

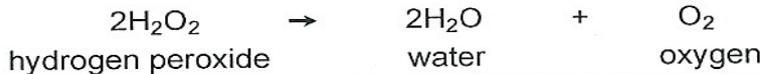


The preamble states that 'milk contains proteins, carbohydrates and lipids'. Draw up a table in which you state the tests used, the expected results and a conclusion of your results.

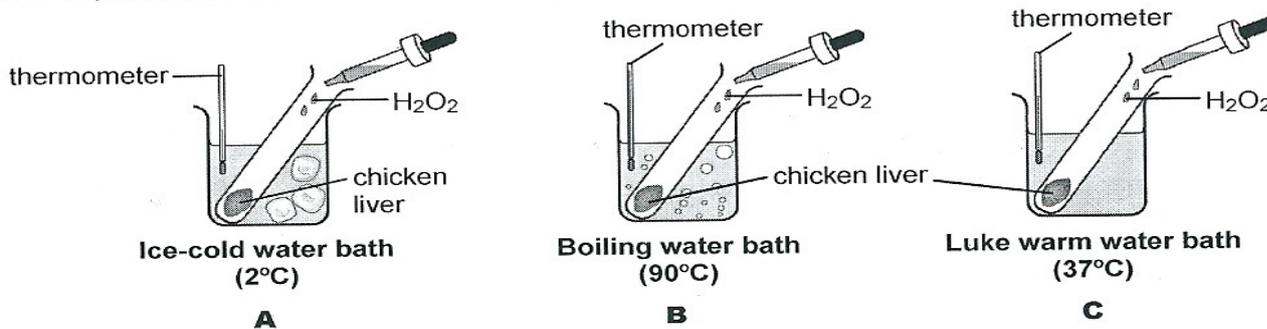
Question 3

Read the following extract and answer the questions that follow.

Sometimes during cell metabolism, chemical substances are formed that are poisonous to the body. However, the body cells are not destroyed due to the presence of enzymes that decompose these poisonous substances into harmless products. One such poisonous substance that is released as a by-product during normal cellular reactions is *hydrogen peroxide*. However, the enzyme, catalase, ensures that this poisonous substance is converted into two harmless products as quickly as possible.



An experiment is conducted to determine the effect of different temperatures on the action of the enzyme catalase, found in raw chicken livers. Study the setup of the apparatus for this experiment below and answer the questions that follow.



notes for...

- 3.1. What are the names of the two harmless products of the decomposition of hydrogen peroxide? (2)
- 3.2. Catalase is an enzyme. What is the function of an enzyme? (2)
- 3.3. Which benefit do humans derive from this function, mentioned in Question 6.1.2? (2)
- 3.4. Is the enzyme destroyed by the poisonous substance in the process, or will it be able to play a role in subsequent reactions? (1)
- 3.5. Which observation would indicate a positive reaction? (1)
- 3.6. In which of the test tubes A, B or C would the reaction take place the fastest? Give a reason for your answer. (3)
- 3.7. Explain and give reasons for the observations in test tubes A and B respectively (6)
- 3.8. Suppose you had to conduct this investigation, formulate a hypothesis for this experiment (2)
- 3.9. For this experiment, name the:
 - a.) Dependent variable
 - b.) Independent variable
 - c.) Fixed variables (3)
- 3.10 What would the result in test tube C have been if the chicken liver was cooked beforehand? Give a reason for your answer. (2)



Links

- Summary. Crash Course Biology www.youtube.com/watch?v=QnQe0xW_JY4
- Food tests (various ones available) <http://www.youtube.com/>