

Anaerobic Respiration in Plants and Yeast 2

Q:1 Yeast can ferment some types of sugar.

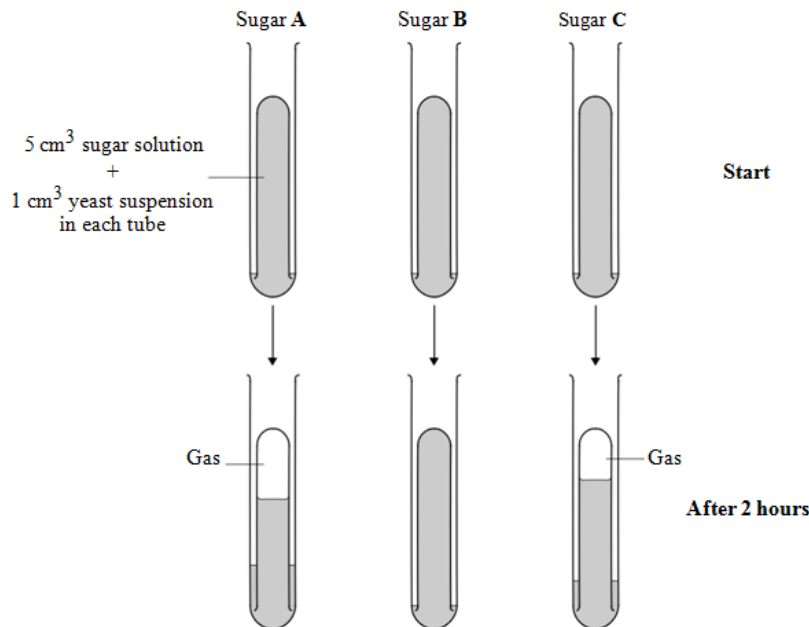
(a) Name two substances produced by yeast in fermentation.

1 _____

2 _____

(2 marks)

(b) A student investigated the fermentation of different types of sugar by yeast. The student set up three sets of apparatus, as shown in the diagram. She put a solution of a different type of sugar, A or B or C, into each apparatus. She then placed all three sets of apparatus into a water bath at 30 °C for 2 hours. The results are also shown in the diagram.



(b)(i) Give two variables that were controlled in this investigation.

1 _____

2 _____

(2 marks)

(b)(ii) Which of the sugars, A, B and C, could the yeast ferment?

Use evidence from the diagram to explain your answer.

(2 marks)

Q:2 Three students each prepared a flask of yoghurt.

- They used equal volumes of the same type of milk.
- They added equal amounts of a 'yoghurt starter culture' (plain yoghurt which contains living bacteria).
- They then placed the three flasks in a water bath at 25 °C.
- They measured the pH of their yoghurt at 50-minute intervals using a pH meter.

The table shows their pH measurements.

Time in minutes	pH			
	Flask 1	Flask 2	Flask 3	Mean
0	6.4	6.4	6.5	6.4
50	6.3	6.4	6.5	6.4
100	5.9	6.1	6.3	6.1
150	5.0	5.5	5.7	5.4
200	4.6	5.8	4.9	5.1
250	4.3	4.6	4.6	4.5

(a)(i) Give two variables that were controlled in this investigation.

1 _____

2 _____

(2 marks)

(a)(ii) Why was it helpful to do the investigation three times and to calculate mean values?

(1 mark)

(a)(iii) The students chose to use a pH meter rather than pH indicator papers. Explain why.

(1 mark)

(b) One of the results in the table appears to be anomalous. Which result is this?

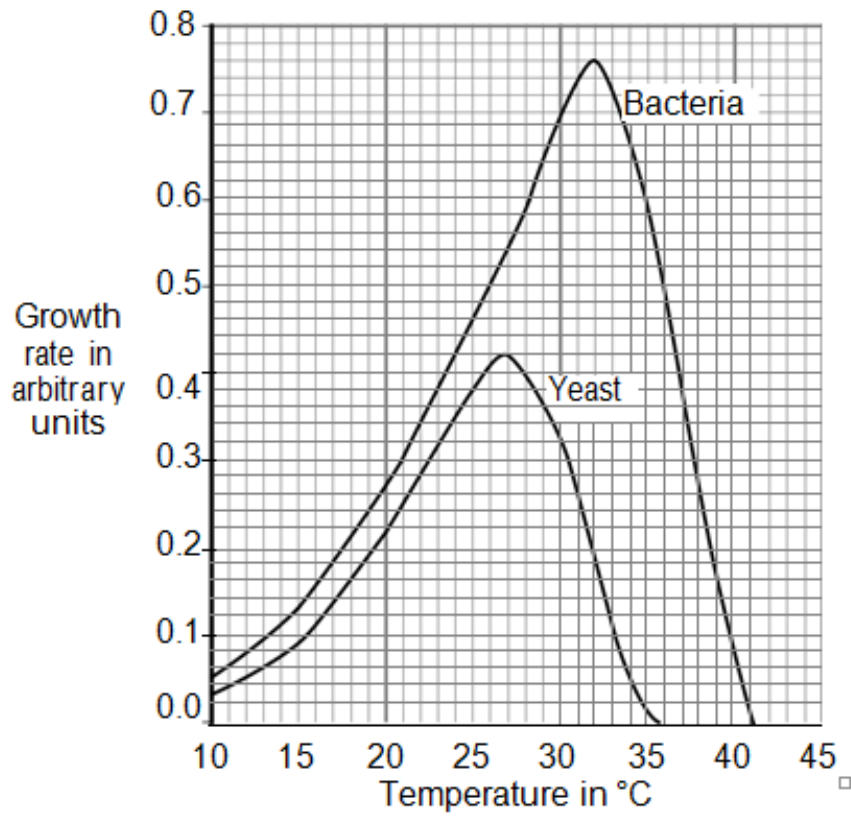
(1 mark)

(c) The students noticed that, after 200 minutes, their yoghurts began to thicken. What caused this?

(2 marks)

Q:3 Sourdough bread is light in texture and tastes slightly sour. It is made using two types of microorganism, a yeast and a bacterium. The bacterium can make acids such as lactic acid. This acid makes the bread taste sour.

The graph shows how the growth rates of the yeast and the bacteria change with temperature



(b) (i) Sourdough bread rises fastest at 27 °C. Explain why.

(2 marks)

(b) (ii) The bread has a sourer taste if it rises at 32 °C. Explain why.

(2 marks)

(b) (iii) The growth rate of the yeast is unaffected by pH in the range 3.5 to 7.0 pH units. Why is this useful in the production of sourdough bread?

(1 mark)

Q:4 Microorganisms are used to make yoghurt and alcoholic drinks.

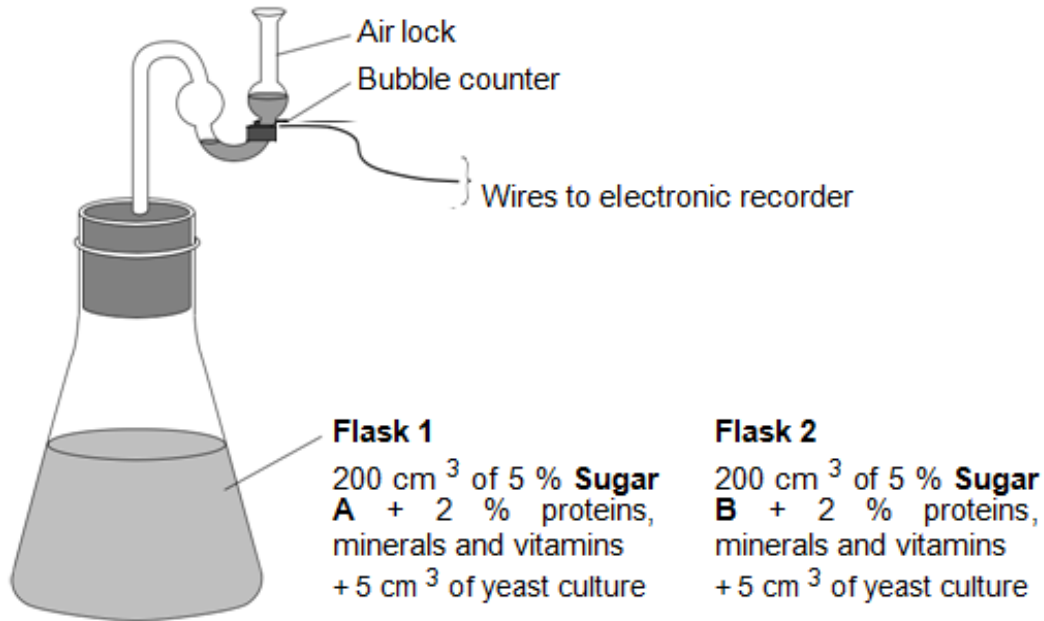
List A gives four materials used in making yoghurt and alcoholic drinks. List B gives information about these materials.

Draw a line from each material in List A to the correct information in List B.

List A Material	List B Information
Lactose	The sugar in milk
Lactic acid	Used in brewing beer to give a bitter flavour
Hops	Enzyme made by yeast
Ethanol	Causes milk to clot in yoghurt making
	Made in fermentation by yeast

(4 marks)

Q:5 Some students wanted to investigate whether yeast could ferment two different types of sugar, A and B. They set up two flasks, as shown in the diagram.



(a) (i) When setting up the flasks, it is important not to allow any other microorganisms to enter.

Describe two precautions that the students could have taken to prevent the growth of other microorganisms.

- 1 _____

- 2 _____

(2 marks)

(a) (ii) Each flask contained the same concentration of sugar.

Why was this important?

(1 mark)

(b) The yeast in each flask produced a gas. The gas escaped as bubbles through the liquid in the air lock. The experiment ran for 120 hours.

(b) (i) Name the gas produced by the yeast. _____

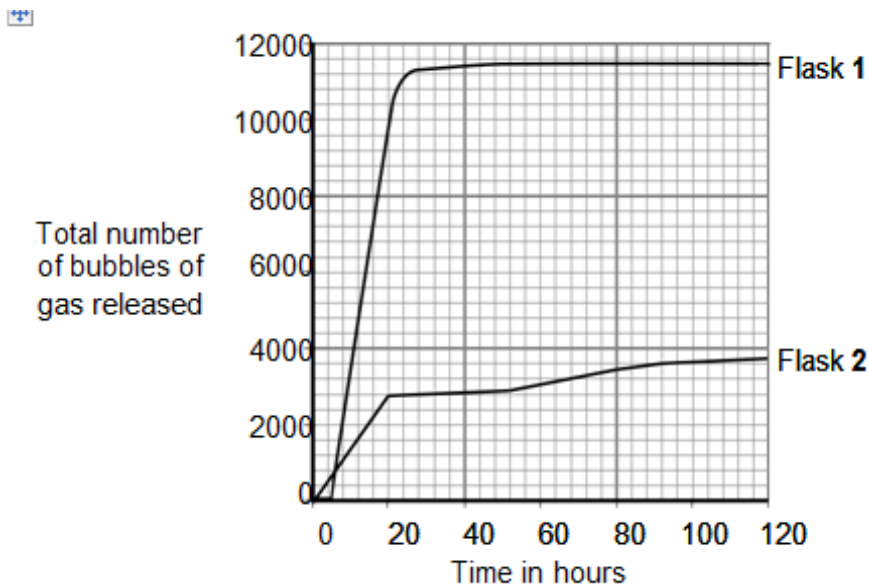
(1 mark)

(b) (ii) Every time a bubble of gas passed from the flask through the air lock, the bubble counter sent an electrical signal to the recorder.

Give one advantage of using a bubble counter and electronic recorder instead of a person to count the bubbles.

(1 mark)

(c) The graph shows the students' results.



(c)(i) Which sugar, A or B, does the yeast ferment better?

Draw a ring around your answer. A / B

Give one reason for your answer.

(1 mark)

(c) (ii) What happened to gas production in Flask 1 after 50 hours?

(1 mark)

TOTAL MARKS=29