

21.2 Biotechnology

Name: _____ Class: _____ Date: _____

Total: 7 marks

KEY WORDS fermenter 发酵罐 • biofuel 生物燃料 • penicillin 青霉素 • yeast 酵母 • pectinase 果胶酶

Objective

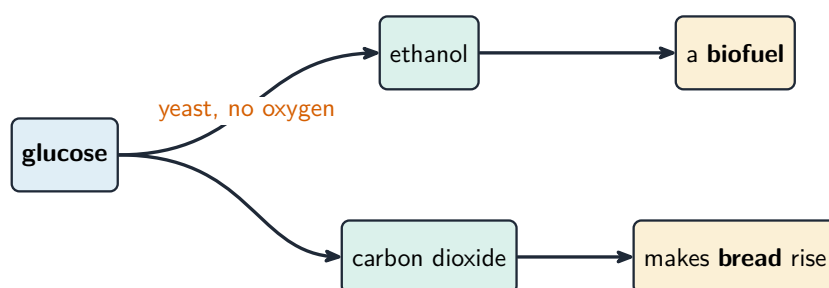
Build the skills to answer exam questions on **biotechnology** 生物技术 — **yeast** 酵母 (biofuel/bread), industrial **enzymes** 酶, and **fermenters** 发酵罐.

You must be able to:

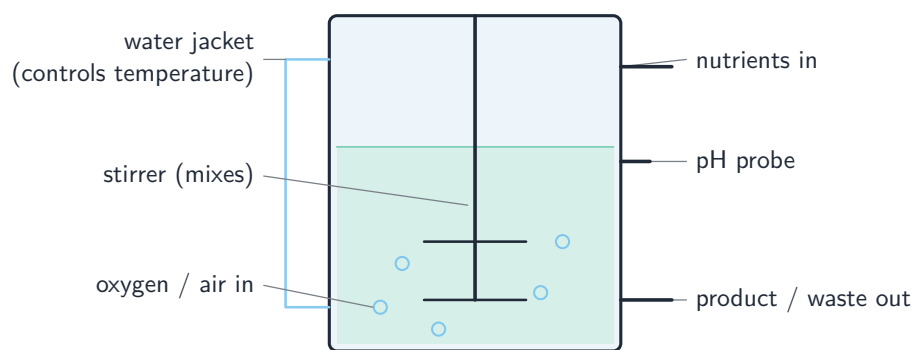
- describe how yeast makes ethanol and carbon dioxide
- give the uses of pectinase, washing-powder enzymes and lactase
- state the conditions controlled in a fermenter

1 Worked examples

■ Yeast and fermenters



Yeast respire anaerobically → ethanol (biofuel) and carbon dioxide (makes bread rise)



A fermenter grows microbes with the conditions controlled — e.g. to make insulin, penicillin, mycoprotein

- **pectinase:** more/clearer fruit juice; **lactase:** lactose-free milk.

2 Practice

2.1 Name the two products yeast makes by anaerobic respiration. [2]

2.2 State the use of pectinase. [1]

3 Exam-style questions

3.1 Biological washing powders contain enzymes that: [1]

- **A** make stains
 - **B** digest stains at lower temperatures
 - **C** colour clothes
 - **D** kill bacteria
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3.2 A fermenter is used to grow microbes.

(a) State two conditions that must be controlled in a fermenter. [2]

(b) Name one useful product made in a fermenter. [1]

Solutions

2.1 ethanol; carbon dioxide.

2.2 it breaks down cell walls to release more (and clearer) fruit juice.

3.1 B. The enzymes digest stains, even at lower temperatures.

3.2 (a) any two of: temperature; pH; oxygen; nutrient supply; waste removal.
(b) any of: insulin; penicillin; mycoprotein.