

**39** Why is pectinase useful in fruit juice production?

- A** Cloudier juice is produced.
- B** More juice can be extracted from the fruits.
- C** Proteins in the fruit are digested.
- D** Starch is digested to produce more sugar.

**40** Which features make bacteria useful in biotechnology?

- 1 They are unaffected by antibiotics.
- 2 They do **not** contain plasmids.
- 3 They make complex molecules.
- 4 They reproduce rapidly.

- A** 1 and 2      **B** 1 and 4      **C** 2 and 3      **D** 3 and 4

**5** Penicillin is an antibiotic.

- (a) (i)** State the type of organism that antibiotics are used to kill.

..... [1]

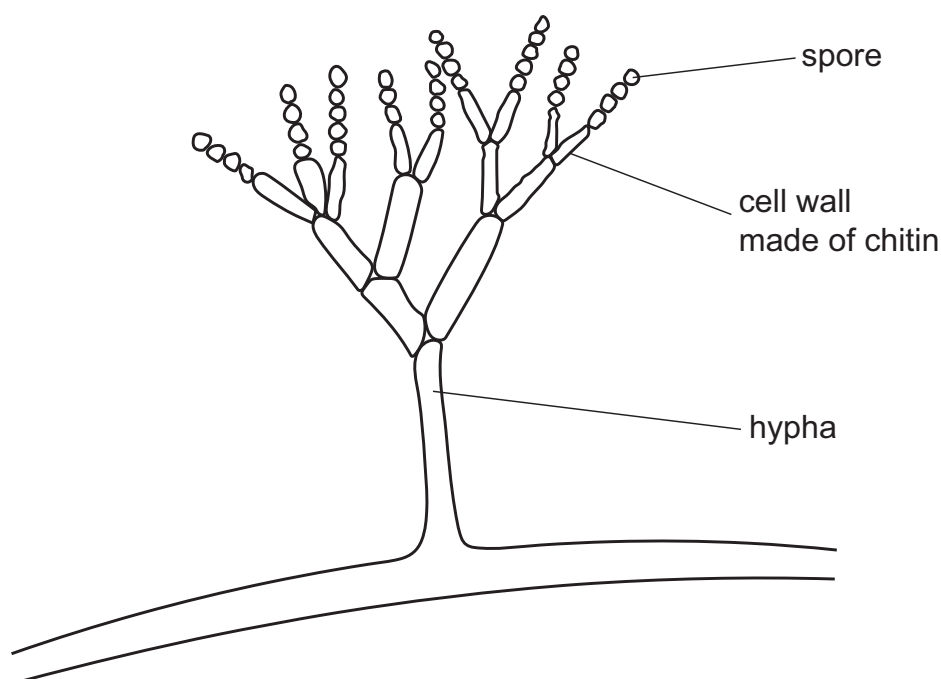
- (ii)** It is important to try and limit the development of antibiotic resistance.

Describe ways of limiting the development of antibiotic resistance.

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.....  
..... [2]

- (b)** Penicillin is produced by an organism called *Penicillium chrysogenum*.

Fig. 5.1 is a diagram of *Penicillium chrysogenum*.



**Fig. 5.1**

- (i)** State what *Penicillium* in the scientific name of *Penicillium chrysogenum* represents in the binomial system.

..... [1]

- (ii)** Using the information in Fig. 5.1, identify the kingdom that contains *Penicillium chrysogenum*.

..... [1]

(c) Penicillin can be made in a fermenter.

(i) State the name of **one other** product made in a fermenter.

..... [1]

Fig. 5.2 shows a fermenter.

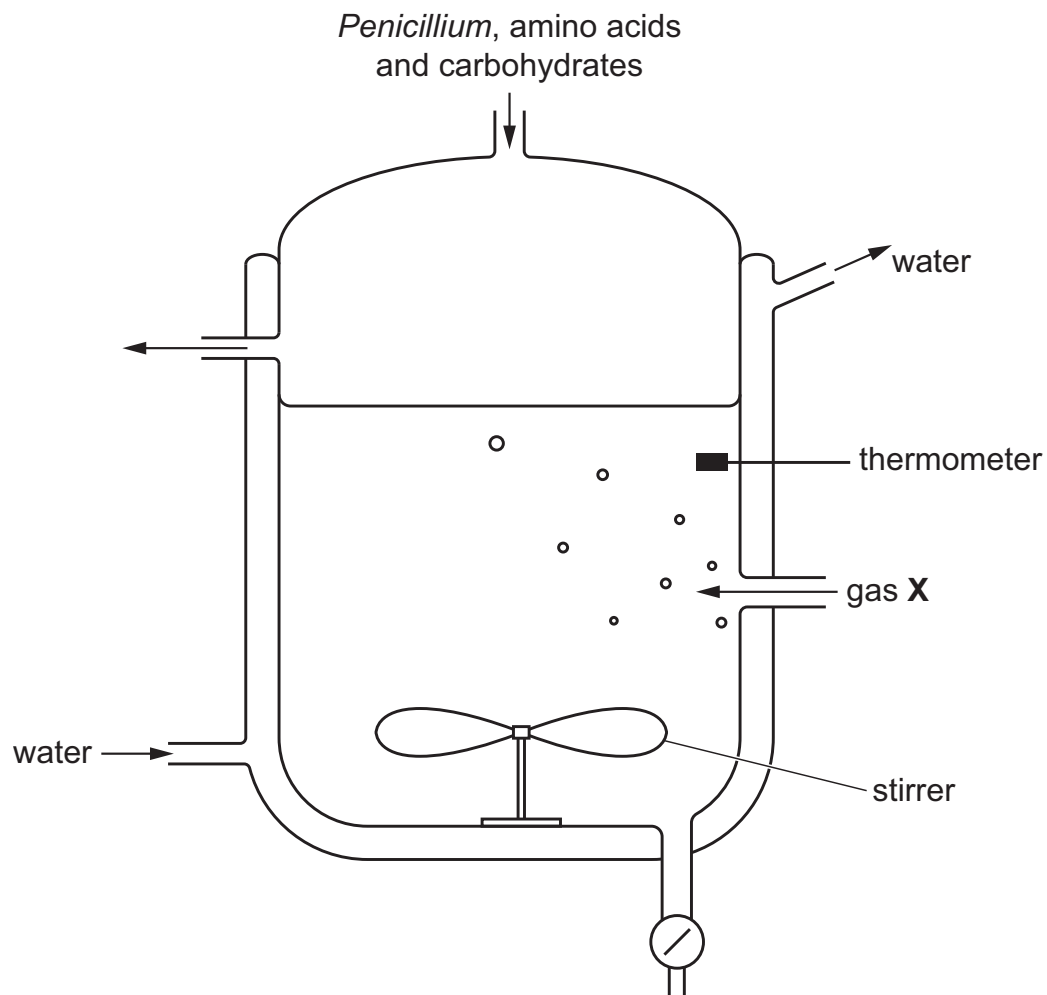


Fig. 5.2

(ii) Gas **X** in Fig. 5.2 is needed for the production of penicillin.

State the name of gas **X**.

..... [1]

- (iii) The concentration of gas **X** is one of the conditions that must be controlled to ensure that penicillin is produced.

State the **other** conditions required to produce penicillin **and** describe how they are controlled in the fermenter.

[5]

- (d)** State the name of the organism that is used in bread-making **and** in biofuel production.

..... [1]

[Total: 13]