

A level Biology A
H420/03 Unified biology

Question Set 19

1 Bacteria and fungi can be used to make food for human consumption. The use of microorganisms in food production creates fewer ethical issues than the use of animals.

(a) (i)* Using examples, describe and explain some **other** advantages of using microorganisms to produce food for human consumption.

[6]

(ii) On an industrial scale, microorganisms can be cultured using either batch fermentation or continuous fermentation.

The table below lists statements about industrial culturing of microorganisms.

Place ticks (✓) in the table to indicate whether each statement applies to batch or continuous fermentation.

Statement	Batch	Continuous
Waste is removed during the fermentation process		
A fixed volume of nutrient medium is used		
Secondary metabolites are more likely to be produced		
The growth rate tends to be faster		
The culture is grown for a fixed period of time		

[3]

(b) (i) Serial dilutions can be used to estimate the size of a bacterial population in a culture.

A scientist used 20 cm³ of a bacterial culture that contained 1.0 × 10⁶ bacterial cells.

- 5% of the 20 cm³ culture was transferred to a new test tube and made up to 10 cm³ with water.
- An additional ten-fold dilution was carried out, which produced a final 10 cm³ solution.
- 0.1 cm³ of the final 10 cm³ solution was transferred to an agar plate.

Each colony that developed on the agar plate was assumed to represent a single bacterial cell in the bacterial culture.

Estimate the number of colonies that you would expect to develop on the agar plate.

number of colonies =

[3]

(ii) A student carried out a different serial dilution to estimate the size of another bacterial population.

The serial dilution resulted in four colonies developing on an agar plate.

Explain why the student's estimation of this bacterial population is likely to be inaccurate.

[1]

- (c) Some microorganisms can be used by humans in industry. Some microorganisms are pathogenic.

Pathogenic microorganisms are transmitted in various ways.

Complete the following passage about the transmission of pathogenic microorganisms using the most appropriate terms.

Some pathogens are carried between host organisms by animals, which are often insects.

These animals suffer no symptoms of the disease and are known as

Other pathogens, such as *P. infestans* that causes potato blight, produce reproductive structures

called, which can be carried on air currents to infect other hosts.

[2]

Total Marks for Question Set 19: 15



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