

Tobermory High School

Standard Grade Biology

Biotechnology

Reprogramming microbes

1. Explain briefly, what is genetic engineering? (1)
2. Give two advantages of genetic engineering over selective breeding. (2)
3. Give two examples of products of genetic engineering and their uses. (4)
4. What is:
 - a) A biological detergent?
 - b) A non-biological detergent?(2)
5. Name two advantages of immobilising enzymes. (2)
6. Read the following passage and answer the questions which follow.

An Experiment on Biological Detergents.

Two pupils investigated the effect of temperature on the removal of a food stain from a piece of fabric using a biological detergent. Here is a copy of their notes.

“ We carried out the experiment at five different temperatures. The stained fabric was cut into six pieces at the start. Five pieces were each put into separate beakers with some water and 5g of a biological detergent. The beakers were then placed in water baths at different temperatures. The sixth piece of fabric was left untreated. After four hours, we compared each piece of treated fabric with the untreated piece and estimated the percentage disappearance of the stain. At both 20⁰C and 40⁰C, the percentage disappearance of the stain was 80% while at 30⁰C the stain had completely disappeared. At 10⁰C only 40% of the stain had gone but at 100⁰C none of the stain had gone.”

- (a) Construct a table to show the results. (2)
- (b) Using the information given, describe the effect of temperature on the removal of stain by the detergent after four hours. (2)
- (c) Describe **two** precautions which should be taken to ensure valid results. (2)
- (d) What name is given to the sixth piece of fabric in such an experiment? (1)
- (e) Predict the likely percentage of disappearance of the stain at 15⁰C. (1)
- (f) What type of substance present in the detergent could have been responsible for the result at different temperatures? (1)

(1)
Total = 20