S3 Biology – Biotechnology HW 2 Microorganisms in Industry

Number

Graph paper needed

1. In a commercial process a **bacterial** species is provided with **glucose** and produces a **hormone**. The bacteria release the hormone into the surrounding liquid. The graph shows changes in the glucose concentration and the hormone concentration during a 60 hour period

1. How many hours did it take for 50% of the glucose to be used up by the bacteria?
2. During which 10 hour period was release of the hormone greatest?
3. 20-30hrs 30-40hrs 40-50hrs 50-60hrs
4. Calculate the average decrease per hour, in glucose concentration over the 60hour period.
5. If glucose continues to be used at the same rate as between 50 and 60 hours, predict how many more hours would it be before all the glucose would be used up.
6. During the first 10 hours of the process, energy was being used for functions other than making the hormone. What evidence from the graph supports this?

2. The table below shows the production of alcohol for use as an alternative fuel from 1998 to 2008.

|  |  |
| --- | --- |
| *Year* | *Alcohol production* (*megalitres*) |
| 1998 |  4 000 |
| 2000 | 6 500 |
| 2002 |  11 000 |
| 2004 |  12 000 |
| 2006 | 13 500 |
| 2008 |  17 500 |

1. On your graph paper draw a **line** graph.
2. During which period was there the greatest increase in production?
	* 1. 1998 – 2000
		2. 2000 – 2002
		3. 2002 – 2004
		4. 2004 – 2006
		5. 2006 – 2008
3. What was the percentage increase in production from 1998 to 2004?

**[CLUE % increase = increase ÷ starting x100]**

3. Decide if the following statements are TRUE or FALSE. If FALSE state ***the word that would replace the underlined word*** to make the statement TRUE.

i) Bacteria coagulate milk by making the pH lower.

ii) Rennet slows down the separation of milk into curds and whey.

iii) Biogas (methane) is made by yeast breaking down animal waste without oxygen.

iv) The dependent variable is the one variable changed in an experiment.

v) Stem cells are specialised cells that can divide to make new cells.