Candidate 1 evidence

THE EFFECT OF FERTILISERS ON ALGAE GROWTH

Aim:

To investigate the effect of fertilisers on algae growth.

Underlying environmental science

Farmers apply fertilisers to crops to promote growth. Commercial fertilisers are manufactured with set amounts of nitrogen (N), phosphorus (P) and potassium (K) so farmers know what they are adding. Nitrogen boosts leafy growth. Phosphorus helps flowers and fruit to form. Potassium promotes root development. (Gardeners World)

If fertilisers enter streams and rivers they can boost growth of aquatic plants. Algae living on the surface can also take in the nutrients and increase rapidly to form an algal bloom. This is known as eutrophication.

Farmers should manage use of fertilisers to reduce the amount that enters streams and rivers. They can do this by spraying their crops at the right time of year for the plants to use the nutrients. They should not spray crops when it is rainy or windy, so the fertiliser is not washed or blown into the water. A buffer zone should be left between the field and the water to reduce the amount of nutrient running off into the water.

Data collection and handling

I used two algae culture samples. One included liquid plant food to represent fertiliser, with an NPK ratio of 20:20:20.

A microscope slide with a counting grid was used to find out how many algae cells were present in the two samples.

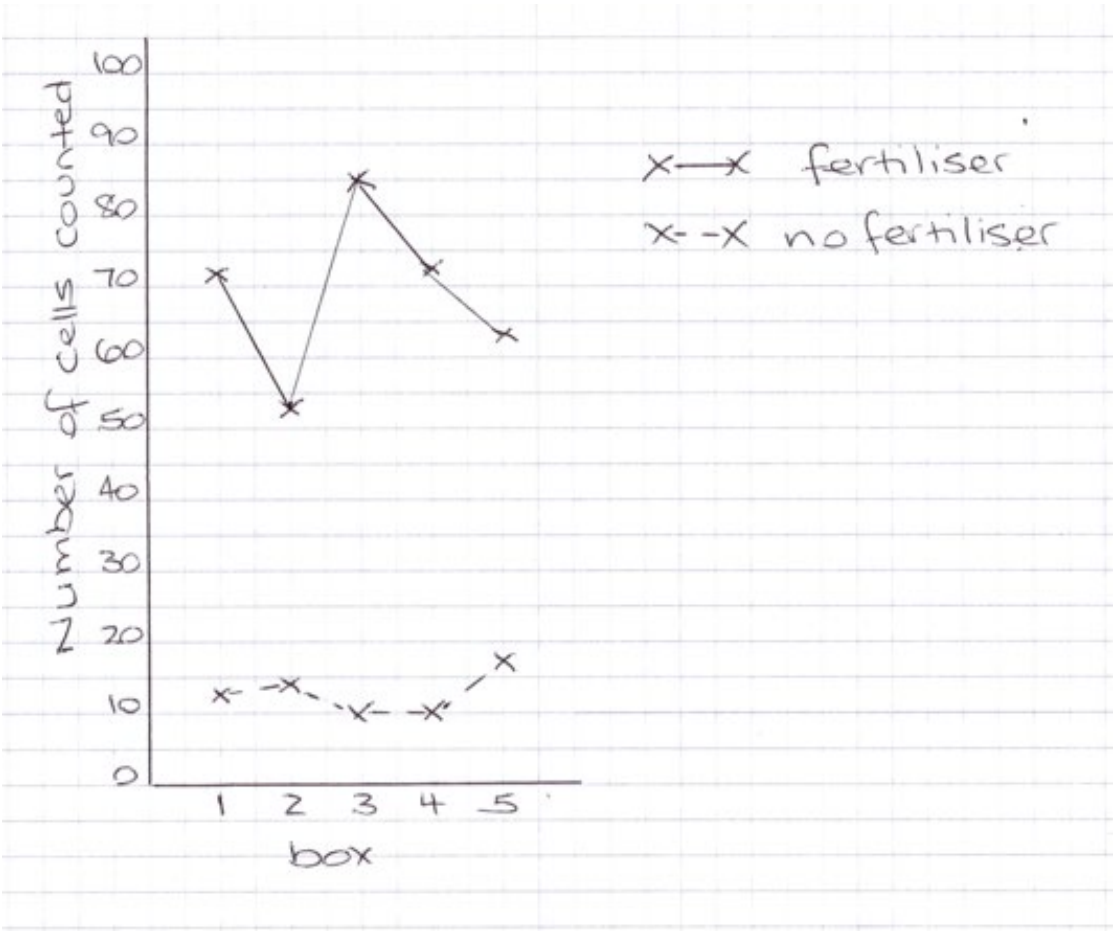
Raw data:

Fertiliser present/ absent	Number of algae cells counted						
	Box 1	Box 2	Box 3	Box 4	Box 5	Total	Average
Absent	12	14	10	10	17	63	13
Present	71	53	85	72	63	344	69

The counts of cells in 5 boxes represent 0.02 mm^3 and should be converted to the number of cells in 1 cm^3.

Fertiliser present/ absent	Total number of algae cells in 0.02 mm^3	Total number of algae cells in 1 cm^3
Absent	63	3,150,000
Present	344	17,200,000

Graphical presentation



Analysis

My experiment investigates how fertilisers affect the growth of algae. The graph shows that there are more algae cells present in the sample containing fertiliser than the one without fertiliser.

Conclusion

From my results I can see that the fertiliser increased the number of algae cells present in the culture.

Evaluation

The fertiliser increased the number of algae cells in the sample but I don't know if this was due to the nitrogen, phosphorus or potassium in it. If I was to do the experiment again I would use each nutrient separately to see which one makes the most difference.

Sources

BBC Bitesize Fertiliser - Food production - National 5 Biology Revision - BBC Bitesize

Gardeners World Understanding and Using NPK Fertilizer. | BBC Gardeners World Magazine

RS Science How to Use a Hemocytometer to Count Cells - Rs' Science (rsscience.com)