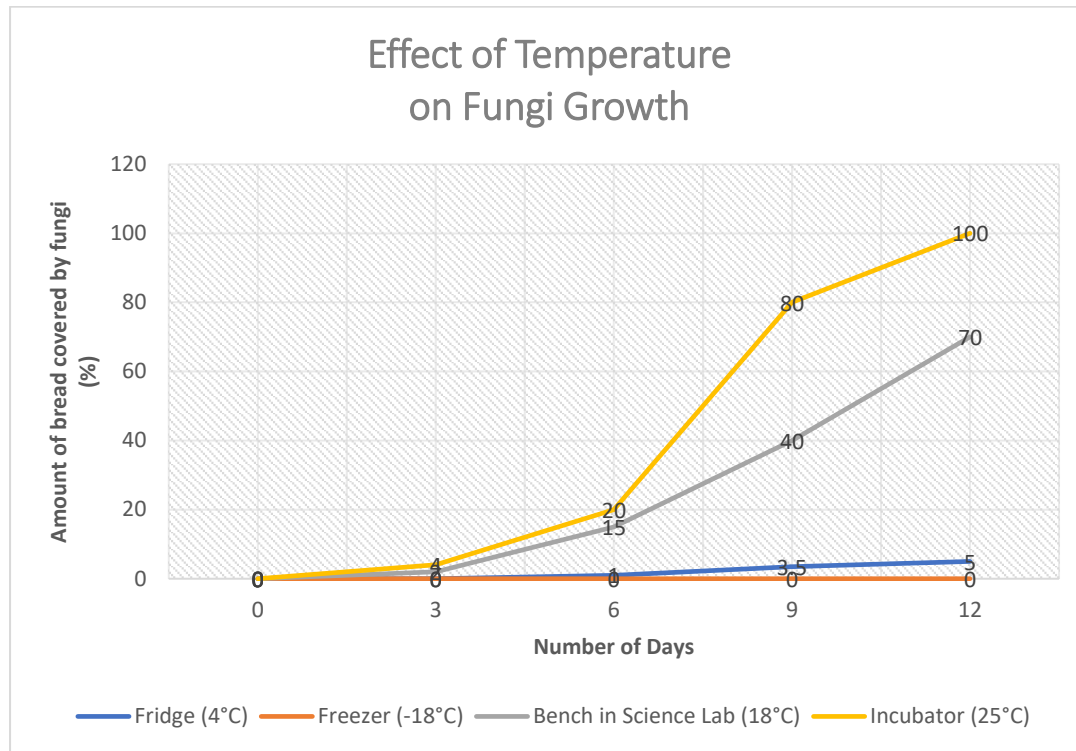


Merit
Intended for teacher use only

For Achievement with Merit the student response also includes:



The fungi feeding on organic waste within a compost are affected by the temperature in the interconnected environment because the enzymes involved in extracellular digestion are affected by temperature. The trend in the data we collected (as shown above) can be explained using the rate of enzyme activity vs temperature graph below.

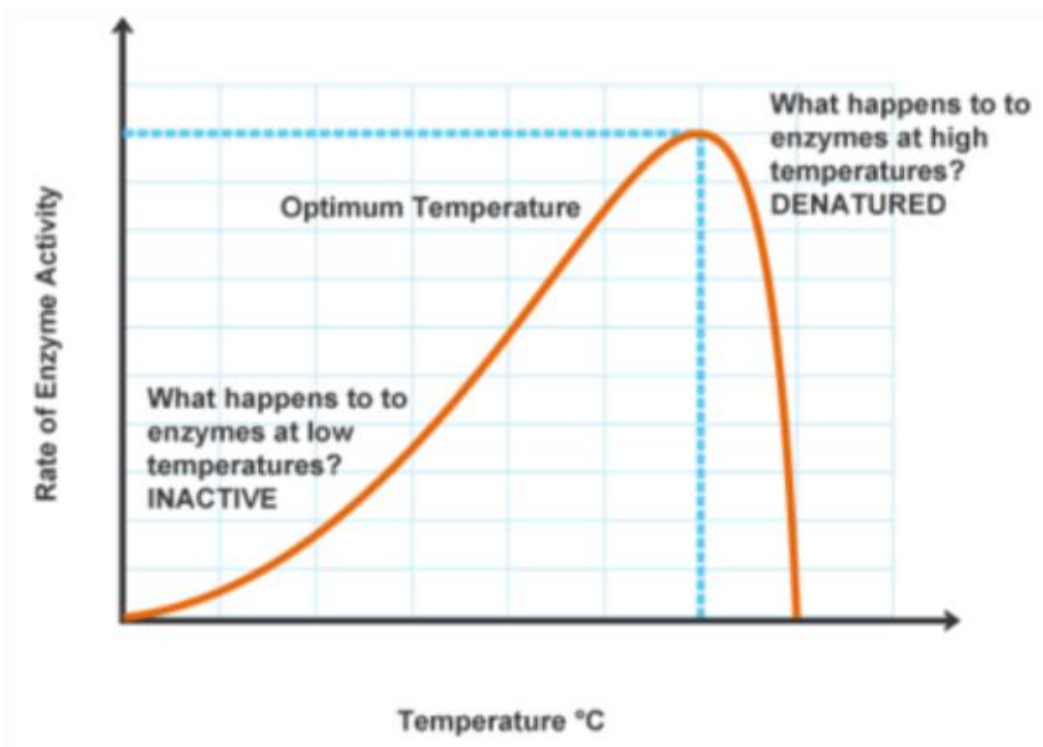


Image Source: [BIOCHEMISTRY / ENZYMES -TEMPERATURE - Pathwayz](#)

When the temperature is low the enzymes inside the fungi work 'slowly' and are only slowly secreted through the cell membrane. This means the enzymes come into 'contact' less often with the food causing nutrients to breakdown at a slower rate. This means there is less nutrients that can be absorbed by diffusion back through the fungi's cell membrane. This is why the fungi growth in the fridge was low. As the temperature increases the enzymes work 'faster' and are secreted quickly through the cell membrane onto the food. This means they come in contact with food more often and can break it down faster. The fungi also absorb the nutrients 'quickly' back across the fungi's cell membrane. Therefore, the fungi absorb more nutrients, and this is why fungi growth at 18-25°C is higher than fungi growth at lower temperatures.

92020 Merit Exemplar Notes

The student has explained the relationship between a microorganism and the environment by:

- linking a change in temperature (abiotic factor) of the compost pile (interconnected environment) to the life process of extracellular digestion. Using fungi growth on bread as a model the student has linked temperature to extracellular digestion and explained the relationship between enzymes involved in extracellular digestion, availability of nutrients for growth and temperature.