Candidate 3 evidence

The effect of temperature during the rising process of dough

The aim of this investigation is to investigate the effect of temperature on yeast which makes dough rise.

The rising process of bread relies on fermentation to occur. Carbon dioxide gas is what helps the dough rise. Fermentation occurs when flour is converted by yeast into carbon dioxide and ethanol. In the flour gluten proteins trap carbon dioxide gas which causes the dough to rise. Enzymes also control bread dough rising.

A batch of dough was made with 500g of flour, 15g fresh yeast, a tablespoon of sugar and 300ml of warm water. It was mixed well and then split into 15 beakers. A mark was put on the beakers to show the height of the dough at the start. The beakers were place in different water baths, 3 at each temperature of 0°C, 18°C, 31°C, 43°C and 49°C. They were left there for 2 hours. Then another mark was put on the beakers to show how high the dough was. The difference between the two marks is the increase in the height of the dough and this was measured by using a ruler as carefully as possible.

Temperature (°C)	Increase in height of dough (cm)			
	1	2	3	Average
0	0	0	0	0
18	0.4	0.6	0.4	0.5
31	1.1	1.4	1.9	1.5
43	2.3	2.2	2.0	2.0
49	1.8	1.9	1.6	1.8

The Effect of Temperature on Fermentation in Yeast

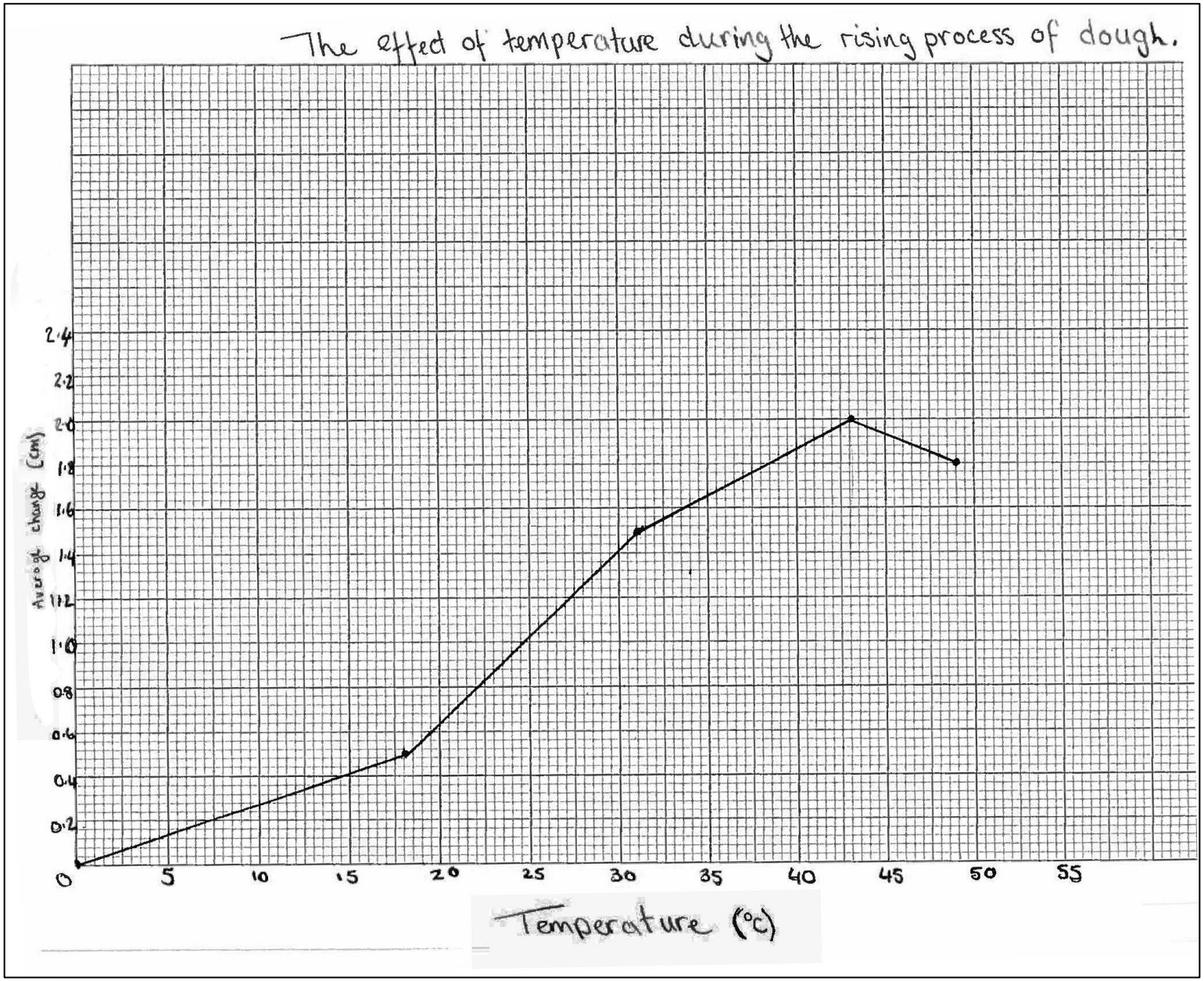
Temperature	Activity
-20 C. (-4 F)	Loss of Fermentation Capacity
< 20 C (68 F > 40 C (104 F)	Growth Rate Significantly Reduced
20 C (68 F) - 27 C (81 F)	Most Favorable Range For Yeast to Multiply
26 C (79 F)	Optimum multiplication of Yeast Achieved
27 C (81 F) - 38 C (100 F)	Optimum Fermentation Range
35 C (95 F)	Optimum Fermentation Temperature
> 60 C (140 F)	Yeast cells Die

http://www.theartisan.net/dough_fermentation_and_temperature.htm

After analysing both data tables, I can see that my data shows the optimum temperature to be 43°C. Compared to the internet source it shows the optimum temperature to be 35°C.

I conclude that temperature does effect the rising of dough. As shown in both sources of data, the rising of bread dough has an optimum temperature in which it can reach its full potential.

After evaluating my experiment, although I tried to keep them the same, I realised that the pieces of dough in the 15 beakers might not have been exactly the same size. This would mean that my results might not be fair. To fix this, I should have weighed each piece of dough and made sure that they were all the same weight.


The effect of temperature during the rising process of dough.
Average height (cm)
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
5
10
15
20
25
30
35
40
45
50
55
Temperature (°C)