Candidate 4 evidence

Inhibition of Catchenal Oxidase in banana by lead.

Aim

To investigate the effect of the concentration of lead ethanoate on the enzyme activity of Catchenal Oxidase.

Underlying Biology

Enzyme action is said to be specifec as an enzyme can act on one substrate. This is due to the specific shape of the substrate molecule fits into the shape of the active site. Induced fit is what describes enzyme function. The active site binds with the substrate, this causes a change in the shape of the active site. This makes the gap between the enzyme and substrate smaller, making the chance of reaction higher. Once the product forms, the active site returns to its orginal shape and the product moves away. There are two types of inhibition - competitive and non-competitive. Competitive ~~inhibitors~~ inhibitors bind with the enzymes active site, stopping the substrate from binding. Whereas non-competitive inhibiters bind to another part of the enzyme, and therefore change the shape of the active site in doing so, meaning the substrate cannot bind.

Experimental procedure.

1. Mix banana, sand and water together and strain through a muslin cloth, the extract - the clear liquid which is catechekal oxidase.
2. Then add lead ethanoate using a $10cm^3$ to each test tube

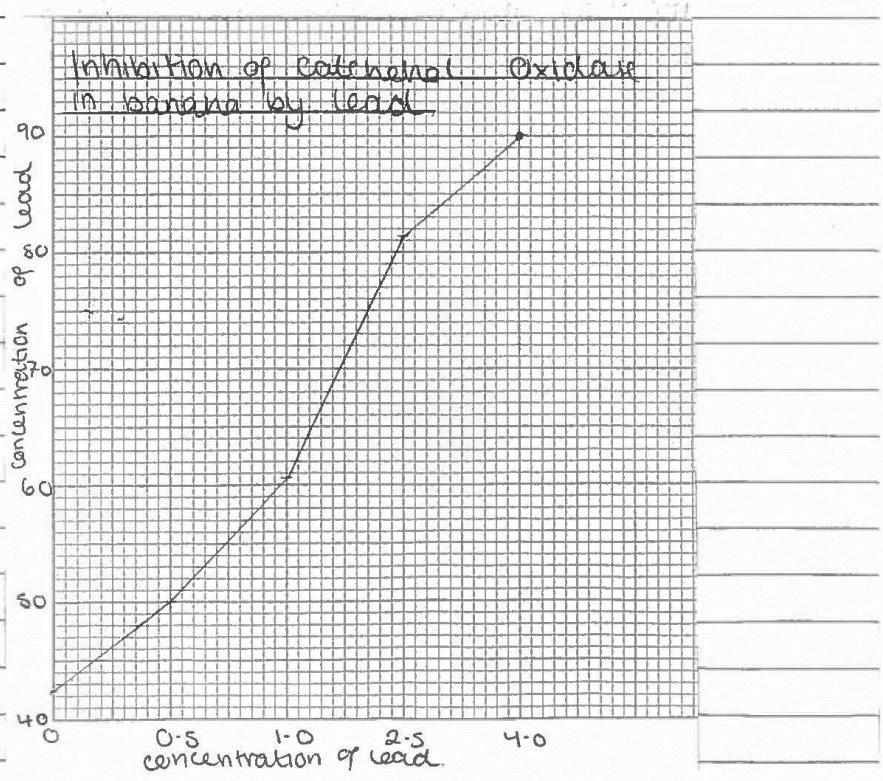
Syringe and also pH buffer with a different 10cm³ syringe, then add 1cm³ of catechenal oxidase to each boiling tube.

3 Then filter each test tube and find the intensity of the yellow colour present with a colorimeter.

Results

Concentration of lead	Colour intensity					
	1	2	3	4	5	Average
0	23.5	70.4	54.6	43.2	20.9	42.5
0.5	28.6	76.5	67.9	53.1	24.1	50.0
1.0	32.2	83.5	80.9	73.8	31.5	60.4
2.5	82.4	92.5	81.7	80.2	68.7	81.1
4.0	91.7	94.6	84.5	81.3	97.8	90.0

Graph



Source.

Table 2

Time (minutes)	Colorimeter reading (units)		
	Tube A	Tube B	Tube C
	sample of extract + distilled water	sample of extract + 0·01% lead ethanoate	sample of extract + 0·1% lead ethanoate
0	1·6	1·8	1·6
10	7·0	5·0	2·0
20	9·0	6·0	2·2
30	9·6	6·4	2·4
40	10·0	7·0	2·4
50	10·0	7·6	2·4
60	10·0	7·6	2·4

http://www.st-a-and-st-b.s-lanark.sch.uk/sasbhs_science_biology_highers_44_1382468875.doc (12/12/18)

Analysis

In the internet source they are looking at banana with different concentrations of lead ethanoate and are measuring the brown pigment that are present. Whereas we are measuring the yellow pigments. The source results are similar to ours as they found out the more lead ethanoate added the less brown pigment present and we found out that the more lead ethanoate added the more yellow pigment present in the source at 0·01% of lead ethanoate the average amount of brown pigment was ~~at~~ 5·9 and at 0·1% was 2·2 this shows how the less ~~the~~ brown pigment there is the more lead ethanoate that has been adde. Also in our

Results we found that when 0.5% of lead ethanoate was added the average amount of yellow pigment was 50.0 compared to 1% which was 60.4 showing the more lead ethanoate added the more yellow pigment.

Conclution.

The effect of the concentration of lead ethanoate on the enzyme activity of Catechol Oxidase was that the more lead ethanoate Present the more yellow pigment found in the banana. therefore less Catechol Oxidase.

Evaluation.

I think that the source we used was effective as it had a similar trend to those of our results, this is because the source showed the more lead ethanoate added the less brown pigment and our results showed that the more ~~test~~ lead ethanoate added the more yellow pigment present.

I also think that our results would have been more effective if we had timed the amount of time we let the reaction take place for, before we measured the colour, as all of our results were left for different times.

I also think it was effective at how we repeated the experiment multiple times. This meant we were able to get averages which gave us more useful results for each one.