EXERCISE 2D: An Enzyme-Catalyzed Rate of H_2O_2 Decomposition

Sample Results

Table 2.1

(from page 26 in the student manual)

$KMnO_4$ (ml)	Time (seconds)					
	10	30	60	120	180	360
a) Base Line	3.4	3.4	3.4	3.4	3.4	3.4
b) Final Reading	8.6	10.2	11.2	11.5	11.6	11.6
c) Initial Reading	6.1	8.6	10.2	11.2	11.5	11.6
d) Amount of $KMnO_4$ Consumed (B minus C)	2.5	1.6	1.0	.3	.1	1 drop
e) Amount of H_2O_2 Used (A minus D)	.9	1.8	2.4	3.1	3.3	3.4

Sample Results

Sample data are shown in Table 5.1 and sample results are shown in Graph 5.1. Note that the data are cumulative. In the 0–10 line, the reading 0.90 is subtracted from the initial reading, 0.93, to obtain the difference of 0.03. This difference is then used to correct differences in the germinating and nongerminating pea data. For example, in the same line under the "Reading at Time X" column for germinating peas, 0.91 − 0.77 = 0.14. This difference is corrected to 0.11 by subtracting 0.03 from 0.14. Movement of water toward the peas indicates a positive value (oxygen is being consumed). Movement of water away from the beads or peas indicates a negative value, which may be caused by decreases in atmospheric pressure and/or increases in temperature.

Table 5.1: Measurement of O_2 Consumption by Soaked and Dry Pea Seeds

(from page 58 in the student manual)

Temp. (°C)	Time (min)	Beads Alone		Germinating Peas			Dry Peas and Beads		
		Reading at Time *X*	Diff.*	Reading at Time *X*	Diff.*	Corrected Diff.	Reading at Time *X*	Diff.*	Corrected Diff.
25	0	0.93		0.91			0.92		
	5	0.91	0.02	0.84	0.07	0.05	0.89	0.03	0.01
	10	0.90	0.03	0.77	0.14	0.11	0.87	0.05	0.02
	15	0.90	0.03	0.71	0.20	0.17	0.87	0.05	0.02
	20	0.90	0.03	0.64	0.27	0.24	0.85	0.07	0.04
10	0	0.95		0.92			0.91		
	5	0.94	0.01	0.88	0.04	0.03	0.90	0.01	0.00
	10	0.92	0.03	0.85	0.07	0.04	0.87	0.04	0.01
	15	0.93	0.02	0.83	0.09	0.07	0.86	0.05	0.03
	20	0.93	0.02	0.80	0.12	0.10	0.85	0.06	0.04

* Difference = (initial reading at time 0) 2 (reading at time X)
Corrected difference = (initial pea seed reading at time 0 2 pea seed reading at time X) 2 (initial bead reading at time 0 2 bead reading at time X)