

2022 Enzyme Engineering Homework 4 Due date: May 23

1. An enzyme-catalyzed reaction was found to be affected by an inhibitor. The following results were obtained at fixed total enzyme concentration.

Substrate concentration (mmol/l)	Initial reaction velocity (mmol/l·min)	
	Uninhibited	With 1 mmol/l inhibitor
2	0.55	0.25
2.5	0.66	0.30
3.3	0.80	0.36
5	1.02	0.47
10	1.43	0.65

- 1) What is the type of inhibition?
- 2) What is the degree of inhibition (%)?
- 3) Calculate time to reach 85% substrate conversion (initial substrate concentration, $S_0=50$ g/l)

2. An enzyme-catalysed reaction was found to be affected by two inhibitors A and B. The following results were obtained at fixed total enzyme concentration:

Substrate conc ⁿ (mmol l ⁻¹)	Initial velocity (absorbance units per minute)		
	Uninhibited	With 1 mmol l ⁻¹ A	With 1 mmol l ⁻¹ B
50	0.684	—	—
20	1.08	—	—
10	1.43	1.01	0.653
5	1.02	0.649	0.468
3.3	0.798	0.476	0.363
2.5	0.657	0.374	0.296
2.0	0.549	0.311	0.250

- 1) What is the type of inhibition for each reaction ?
- 2) What is the degree of inhibition (%) for each reaction ?