Enzymes

Health & Medicine

Enzymes increase the rate of chemical reaction by inducing the reaction to proceed to a path with a lower activation energy. For example, the catalyzed dissociation of a compound is hastened by exposing it to a positively charged catalyst, which attracts the anionic component of the reactant, and subsequently weakens the ionic bond between them. As a result, a lower energy is needed to completely break the bond between the compound (Masterton and Hurley, 2005, p. 303-304).

Despite its effectiveness, enzymes only work within a narrow range of conditions. Because they are usually proteins, a temperature lower or higher than the optimal range results to denaturation, which changes the shape of the protein. Chemists have already successfully utilized solids such as synthetic polymers, porous glass and even stainless steel to prevent such structural changes (Masterton and Hurley, 2005, p. 304).

Despite the improved stability using these scaffolds, its effects on the enzyme’s catalytic ability should still be taken into consideration. If a part of the enzyme is attached to the stabilizing scaffold, then it is highly possible that the surface area available for catalysis is reduced. If that is the case, it can be hypothesized that the stability compromises the function of the enzyme.

This can be tested by comparing the catalytic abilities of equal amounts of immobilized and naked aspartame on the same amount of radio labelled L-aspartate. This design will be tested at 25°C, 37°C and 40°C. The concentration of the reactant will then be measured at different times. The measurements will then be plotted, and the resulting graph will be analyzed. If the graphs are significantly different between unprotected and protected enzyme. Decreasing the concentration of scaffold may be considered to try

and balance stability and function of enzyme.

References

Masterton, William L. and Hurley, Cecile N. Chemistry Principles and Reactions. Connecticut: Brooks/Cole, 2005. Print.