



Isoelectric Point Measurement of Lysozyme

Outline

Lysozyme is an enzyme which can be found in egg albumen as well as in tears, saliva and other secreting fluids; it serves to protect eggs, eyes and mouth from microorganism infection. Commercially, it is extracted from egg albumen for use in food items and medical supplies. Included among its physical properties are a molecular weight of 14,307, an isoelectric point of 11.1-11.4, an optimum pH of close to 5 and an optimum temperature of 50 degree C (Fig. 1).

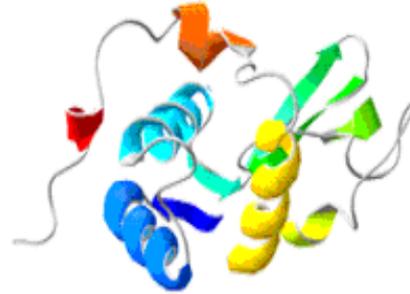


Fig. 1 Tertiary structure of lysozyme
Source: Free encyclopedia "Wikipedia"
(2011/8/21)

Method

Analyzer: SZ-100
Temperature: 25.0 degree C
Sample: Lysozyme, 100 mg/mL, pH 3.8
Disperse medium: Pure water

Results

The lysozyme sample was prepared using pure water. With an optional pH controller connected to the SZ-100, sodium hydroxide was added dropwise to the sample to adjust the pH value, and the zeta potential at each pH was measured. The zeta potential at each pH is shown in Table 1. Fig. 2 illustrates a trend graph which plots the zeta potential as a function of pH. From this graph it is obvious that the isoelectric point is pH 11.4.

pH	Zeta Potential (mV)
3.8	16.3
5.0	8.8
6.0	6.8
7.0	7.6
8.0	7.9
9.0	6.7
10.0	6.7
11.0	2.1
12.0	-10.6
12.8	-9.8

Table 1 Zeta potential at each pH

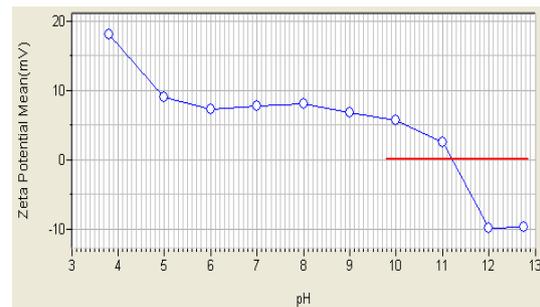


Fig. 2 Dependence of zeta potential on pH

Conclusion

The isoelectric point of lysozyme (which is a protein) was measured. The value obtained coincides well with the one reported in literature. Lysozyme is a form of enzyme that catalyzes the hydrolysis of polysaccharides in vivo. While in vivo, this protein is denatured by changes in temperature and pH, either varying or losing its liveliness. Measuring its dependence on these two parameters thus provides valuable information for the study of enzymatic reactions.