

Enzymatic Degradation of Unutilized Protein Resources and Peptide Synthesis in the Presence of High Concentration of Salts

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Summary

We have reported that a thermophilic proteinase, thermolysin, is activated remarkably (10-30 times) and its stability increases in the presence of high concentration of salts (for example, 1-5 M NaCl). Thermolysin is considered to be a thermo- and halophilic enzyme. In the present study, application of thermolysin to the enzymatic degradation of unutilized protein resources and peptide synthesis was examined.

The thermolysin-catalyzed hydrolysis of soybean protein isolates and protein wastes produced from soy sauce fermentation was studied in the presence of salts. The addition of salts, however, showed little effect on the hydrolysis, suggesting the structural change of the substrate proteins by high concentration of salts not to be recognized by thermolysin. The peptide synthesis catalyzed by thermolysin was promoted by adding salts in the medium, and the degree of activation in the reaction rate was almost the same as that observed in the peptide hydrolysis, namely 4-5 times with 3 M NaCl. Equilibrium of the reaction, however, was shifted to the cleaved site of the peptide bonds in the presence of salts, which made the yield of the peptide synthesized decreased. In the absence of salts, the yield was 3 %, but it decreased to 1-2 % by adding 3 M salt. It was found that the solubility of thermolysin increased to >10 mg/ml without its aggregation and dispersion, although it is only 1 mg/ml in the absence of salts. It is shown that the salt effects might be totally desirable for application of thermolysin to peptide synthesis.