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Effect of Sodium Chloride Concentration on the Reaction Rate of Peptide and Protein with Glucose

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Summary

During the food processing, storage and cooking process, the reaction between amino group with carbonyl group occurs. This reaction was named Amino-carbonyl reaction or Maillard reaction. In the late stage of this reaction, brown Melanoidin and AGEs (Advanced Glycation End products) are formed. AGEs are also generated *in vivo*. AGEs in vivo and in foods are considered to relate with ageing and diabetes. Traditional foods of Japan such as soy paste and soy sauce contained a high concentration of sodium chloride such as 12% and 15% respectively. In the Amino-carbonyl reaction, amino group often reacts with carbonyl under the form of anion, therefore, there is a possibility that sodium or chloride ions from sodium chloride concentration affects the reaction rate of this reaction. In this research, we used some oligo-peptides and 2 model proteins (beta-galactoglobulin and albumin) in the reaction with glucose to make clear this problem.

The results showed that:

1) Sodium chloride concentration retarded the reaction rate of proteins (beta-galactoglobulin, or albumin) with glucose, by the measuring of browning color at 470 nm, polymerization degree, and the loss of lysine.

2) The sodium chloride concentration has no effect on the generation of Amadori compound in the reaction of proteins with glucose.

From the above results, it can be concluded that high sodium chloride concentration retard the reaction rate of protein with glucose. It is hoped that the results of this study will be applied for the control of Amino-carbonyl reaction rate in the Food Industry.