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Effect of Salt on Hydration and Glass Transition of Food Protein Analyzed by Thermal Analysis and Near‐Infrared Spectroscopy

Hiroshi Nakagawa

Japan Atomic Energy Agency, Materials Science Research Center

Summary

1. Purpose

In order to clarify how salt works on the dynamic behavior of water in the protein, the relationship between the water activity and the dynamic behavior of water was investigated by the addition by thermal analysis and near infrared spectroscopy. The aim of this work is to elucidate the molecular mechanism of food preservation by salt.

2. Methods

The thermal analysis and near infrared spectroscopy was used, chicken egg white lysozyme was used as protein sample.

3. Results

Changes in hydration structure and molecular mobility as a function of water content have been confirmed by neutron scattering, molecular dynamics calculation. In this study, we could not grasp such change with sufficient accuracy by thermal analysis and near infrared spectroscopy so far. The further study will be required in the future.

4. Discussions

Regarding thermal analysis and near infrared spectroscopy, both the sample setting and the measurement conditions were examined, but the results expected at present are not obtained. It is necessary to investigate in the future how to measure the background and how to analyze it.

5. Future subjects

Neutron scattering experiments used in the previous subsidy are excellent methods to capture molecular dynamics, but large neutron sources require large research facilities such as research nuclear reactors and accelerators. Therefore, it is convenient to study with general laboratory-scale measurement technology such as thermal analysis or near-infrared spectroscopy, and they can also give complementary information. However, at the present time, major changes are not yet grasped by these methods. In detail, we can confirm small changes in the data, so we plan to continue our research by considering the measurement conditions and analytical methods, and so on.

6. Reference

[1] Nakagawa H. *et al*. (2004) J.Phys.Soc.J.73.2.491-495.