

Effects of salt on absorbed energy of the food models during microwave cooking

Keiko Nakamura

Faculty of Education, Fukushima University

Summary

Salt is one of the most important substance as a seasoning or for food processing, however, its influence on the heating conditions during microwave cooking had not been explained. In this study, the effect of salt on cooking food models by microwave oven was investigated from the point of view of absorbed energy.

Two types of food models (liquid and solid models) were cooked in microwave ovens (500W or 600W). The changes of temperature and weight were measured and absorbed energy was calculated. Temperature distribution of the models was observed by thermal video system.

In case of liquid models, before their temperature reached boiling point, average temperature of 5% sodium chloride solution was lower than that of distilled water, though the amount of weight loss by water evaporation was larger. When temperature distribution of model surface was measured, hot spots were observed in upper part of sodium chloride solution. It was considered that hot region appeared and moved upward by convection in salt-added sample during microwave cooking, which cause the observed phenomena.

Absorbed energy of 200ml models was in 290~350W. It was decreased when the concentration of sodium chloride was increased. Moreover, consumption ratio of absorbed energy for rising sample temperature was lower in sodium chloride solution when the temperature of samples was below their boiling point.

In the case of solid models, the same phenomena as liquid models was observed, though the temperature distribution became more remarkably.

It was concluded that the effect of salt on cooking food model by microwave oven was the appearance of hot spots and the increase of water evaporation, though the absorbed energy and the rates of temperature rising were decreased.