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<http://www.hles.ocha.ac.jp/food/chori/cook.htm>

**NUTRITION
AND
FOOD**

**Cookery
Science**

■ Researcher information

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Major

Cookery Science

■ Research topics

Prediction of cooking time of vegetables

Keywords

temperature, time, rate constant, hardness, vegetable

Contents

■ Overview (background, goal, detail)

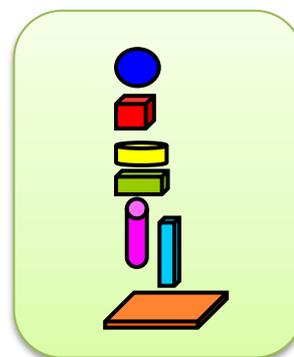
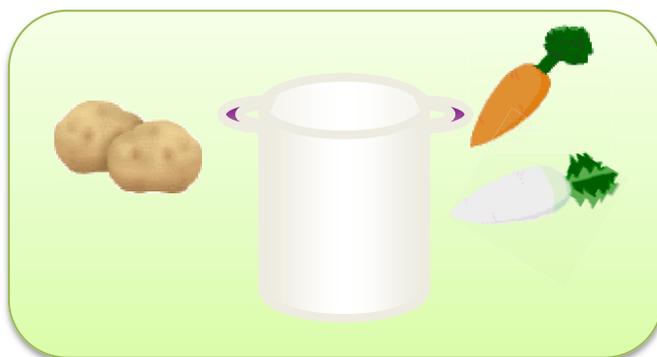
In the food processing of vegetables, it is important to control the hardness of vegetables. To obtain the constant quality of foods, the prediction of optimum cooking time is needed. Vegetables harden together with the softening during cooking depending on the temperature. Therefore we observe the apparent change in the hardness of vegetables. The hardening takes place in the range of 50-80 °C, especially around at 60 °C, and the softening mainly takes place above 90 °C. Thus the hardness change of vegetables is complicated and to predict it needs the formulation of this phenomena. We investigate how to control the hardness change of vegetables during cooking based on kinetic analysis and how to predict the optimum cooking time by combining with thermal analysis and sensory evaluation for optimum cooked state.

■ Process, case study

- 1) Understanding the hardening and softening of vegetables during cooking and formulating the hardness change depending on temperature
- 2) Measurements of rate constants of hardening and softening by using instrument and quantification of optimum cooked state by sensory test
- 3) Calculation of inner temperature for various shaped models based on the thermal analysis and simulation of the hardness change corresponding to the temperature history of cooking and prediction of optimum cooking time.

■ Potential (applications, future goals)

- 1) The constant cooked stage of vegetables is obtained by the prediction of the hardness change during cooking.
- 2) Quantification of energy savings is capable by the prediction of optimum cooking time.
- 3) The automation of cooking system is possible by simulation of cooking process of vegetables under various conditions.



Potential of social/industrial contribution

- Joint research/ licensing / technical consulting / knowledge sharing (open courses, workshops, publications)