
Solvability of mathematical model for brewing process of Japanese Sake and its numerical simulations

Murase Yusuke*¹

¹Meijo university – Japan

Abstract

The main purpose of our research is analysing a mathematical model for brewing process of Japanese Sake, and disclosing the brewing process. Japanese sake is brewed by using a complicated brewing technique so called "Multiple parallel fermentation" with 5 brewing steps. We configured a mathematical model to represent the brewing phenomena. Our model is formulated with 14 reaction-diffusion equations with homogeneous Neumann boundary condition, a heat equation with Robin boundary condition, and a constraint condition. In first step of fermenting, the mathematical model can be simplified 5 reaction-diffusion equations, a heat equation, and constraint condition.

The constraint in the model is determined by fixing unknown functions. It's one of the difficulties to analyse this model. From variational inequality point of view, we can say that constraint set depends upon unknown functions self. We call this type variational inequality "Quasi-variational inequality".

In this talk, We discuss solvability of approximated model and original model in first fermenting step, and some numerical results, especially.

*Speaker