New Processing for Improvement of Quality and Quantity of Soybean Product
—— Application of Electro-osmotic Dewatering for Frozen Tofu Processing ——

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Drying process for manufacturing Kori-tofu, a porous dried soybean curd, is a very essential but very energy-and time-consuming. It is both economically attractive and technologically feasible to decrease the water content of the dewatered tofu.

The effect of the compression time, loading speed at a constant pressure on the deformation, the final moisture content and the remaining strain of the sample with a rheometer and a large scale setup had been respectively explored. After dewatering one min, the different electric fields (DC voltage, duty ratio (DR) voltage and different frequency voltage) were respectively supplied to the sample for 3 min with the large scale setup. The effect of the electric field on the temperature increment, the final moisture content, the remaining strain, the energy efficiency ratio, and the appearance of the dewatered sample had been investigated.

The results confirmed that the compression time had significant effect on the final moisture content and the remaining strain ($p<0.05$) during the pressure dewatering (PD) course. The final moisture content of the sample decreased with the compression time, and the remaining strain linearly increased with the increase in the compression time.

For the electro-osmotic dewatering (EOD) course, it is concluded that the Joule heat generated in the sample should not be neglected. The final moisture content decreased with the increase in the voltage, and decreased with the decrease in the DR. However, the frequency did not significantly affect the final moisture content. The remaining strain increased with the increase in the voltage and deceased with the increase in the DR, but the frequency had no significant effect on the remaining strain. The energy efficiency ratios were significantly different ($p<0.05$) when the duty ratios were different. But the different voltage and the different frequency did not significantly affect the energy efficiency ratio ($p>0.05$). The effect of the electric field on the colour (L, a, and b value) of the sample was significant ($p<0.01$). When a higher frequency (0.2 Hz) duty ratio (90 %) voltage (40 V RMS) was supplied to the sample, the colour of the EOD sample was not significantly different from the control ($p>0.05$), except for the a value of the undersurface of the EOD sample. This condition was an optimum condition under the experimental conditions.