# Proteolysis in fish meat during sous vide cooking: Peptidomic analysis of salmon mie cuit

**SAKUYAMA M. (1), KOMINAMI Y. (1), USHIO H. (1)**
1 The University of Tokyo, Tokyo, Japan

The cooking of raw materials (meat and fish) in a vacuumed state at precisely controlled temperature is called “sous vide cooking”, which can improve the flavor and texture. Recently, sous vide cooking is increasingly applicable in many food industries worldwide. Improvement of tenderness during sous vide cooking has been discussed by focusing on thermal protein denaturation. Many previous studies have already suggested mathematical models of thermal protein denaturation kinetics and predicted the textural changes of meat depending on heating temperature and time. On the other hand, effects of proteolysis on the tenderization have not been explored well. Some proteases which are activated at low temperatures (<30°C) are found in meat and fish fillet, thus these proteases may also contribute to the tenderization. In this study, we focused on mie cuit which is famous as one of the fish dishes prepared by sous vide cooking. The relationships between cooking temperature and proteolysis in Atlantic salmon (Salmo salar) fillet was investigated.
The small fillets (15-20 g) were boiled in sealed plastic bags at 30, 40, 50, 60, or 85°C for 15 min. The samples were immediately cooled in ice water after heating and used for peptide extraction. The extracted free peptides were desalted and subjected to quantitative peptidomic analysis with nano LC-ESI-MS/MS. The database search was performed with the protein dataset of salmoniforms obtained from NCBI.
As a result of peptidomic analysis, glycolytic enzymes, myofibrillar proteins, and collagen were identified as degraded proteins. Less free peptides were found in in the salmon fillet cooked at 60°C or 85°C compared to the raw fillet. This result indicates that free peptides can be lost by water leakage due to thermal shrinkage. A lot of free peptides derived from actin was generated in the salmon fillet cooked at 50°C. Comparison of the quantified actin degraded peptides showed that the c-terminal ~20 residues of actin was frequently cleaved in the salmon fillet cooked at 50°C. Salmon mie cuit is generally cooked at 45-55°C. The results suggest that the proteases activated at 45-55°C can tenderize salmon meat by degrading actin.