Thesis title:	**Investigation of the Effect of Freezing and Thawing During Meat Curing**
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From the ancient times meat curing was an important part of human diet. Main reasons why do people salt meat is to preserve its original quality as well as to improve its sensory parameters. Preservation of the meat through time developed significantly as knowledge about salt curing methods find its scientific approach.

Salt curing nowadays is represented by two main techniques such as dry curing which performed by simple addition of the salt on the meat pieces, and wet curing or brining which is curing of the meat in the saturated salt solution. More advanced version of the wet curing which is nowadays widely applied on the modern meat processing plants is injection curing, where meat tissues are penetrated with the brine directly. Injection curing is usually subjected to further vacuum tumbling process, which ensures homogeneous distribution of the brine.

Salt influences flavor, preservation, and water holding capacity in meat. Factors affecting salt diffusion include meat piece geometry, brine concentration, meat-to-brine ratio, diffusion constant, chemical reactions, boundary layer, temperature, and salt distribution. Accelerating salt diffusion methods, such as injection curing and ultrasound treatment, enhance salt distribution, reduce curing time, and improve meat product quality. Freezing and thawing processes significantly increase salt intake during curing, improving curing kinetics, but the impact on sensory parameters varies based on specific conditions.

In this study, the choice of raw materials involved using pork loin (M. Longissimus dorsi) with a homogeneous structure, free from bones and connective tissues, and ensuring the meat is fresh and free from defects such as PSE, DFD, or off-odors. The meat was purchased from a reputable Hungarian food supplier and had a normal pH level. The experiment involved freezing the meat to -30ºC to maintain its quality and enable uniform sample preparation. Samples were cut into cylindrical shapes, avoiding fat and connective tissues. The experiment encompassed three wet brining methods, involving various curing times (15, 30, 60, 90, 120,

150, 180 minutes), and the samples were categorized into three treatment groups. The wet curing methods included a control group stored at -3–5ºC before curing, a group brined after thawing (BAT) following 12 hours of freezing at -30ºC, and a group brined during thawing (BDT). A total of 63 samples were used in the experiment. The brine was prepared using commercial curing salts, and salt and moisture content were determined. The study also employed mathematical models to evaluate salt and water mass transfer and diffusion, with parameters (kw, ks, D) determined through software optimization and evaluated using RMSE and R^2 values.

The salt content was assessed for three brining methods: Control, BDT (Brining during Thawing), and BAT (Brining after Thawing). Notably, BAT showed the highest salt intake, followed by BDT and Control, indicating that brining after thawing results in the most significant salt absorption.

We employed the Peleg model for salt diffusion. BAT displayed the fastest diffusion rate, followed by BDT and Control, with the model fitting well for all groups. Zugarramurdi and Lupín model provided similar results, with BAT again having the highest diffusion rate but less satisfactory model fitting. Telis model for salt diffusion confirmed BAT's faster kinetics and excellent model fit. A summarized table presented a Peleg model being the most accurate.

Moisture content was also investigated. Control exhibited the smallest moisture loss, followed by BDT and BAT. The Peleg model for moisture content showed that Control had the least moisture by the end of brining, with excellent model fitting. Zugarramurdi and Lupín model confirmed that BAT had the lowest moisture content, although the model fit was not perfect. Telis model also demonstrated that BAT had the highest moisture content decrease, with good model fitting. The summarized table for moisture content evaluation revealed that Peleg's model was the most accurate.

In conclusion, our experiments clearly indicate that the brining method significantly affects salt and moisture content. Brining after thawing results in higher salt content and more substantial mass transfer compared to brining during thawing. Brining without prior treatment has the lowest salt content and mass transfer. Moisture content follows a similar trend, with samples brined after thawing experiencing the highest water losses. These results have implications for the development of brining technology and can benefit meat processing plants looking to increase salt content or reduce moisture content rapidly, thereby enhancing production capacity.