SUMMARY OF PhD PUBLICATIONS

Nowadays, there is a variety of deli meat products on the market. Consumers are more informed and demanding; thus, they buy products with a high meat content, which they associate with a product quality. Furthermore, no synthetic additives on the list of ingredients is an asset and a factor influencing a purchase decision. With rising concerns about using synthetic antioxidants there is a higher interest of both the consumer and the producer in natural additives, which could be successfully used as an alternative to synthetic additives (Nikmaram et al. 2018). Therefore, the aim of the research was the evaluation of the influence of natural additives (ginger rhizome and chilli pepper fruits) and refrigerated storage time on oxidation changes and the quality of pasteurised canned meat.

The experimental material was canned pork prepared from cured ham- 40%, cured hock- 32%, cured bacon- 20%, cured hock skin- 8%, and 1% salt and 1% water relative to meat weight. In both experiments, there were four formulations. The first formulation was combined with ginger rhizome (G- 1.5% relative to meat weight) and the second one with chilli pepper fruits (CHP- 3% relative to meat weight). For both experiments canned meat was used as a control sample (C- no additives) combined with sodium ascorbate (SA sample- 0.5 g/kg) and butylated hydroxytoluene (BHT sample- 0.2 g/kg). Jars were pasteurised in the convection oven/ steamer with 100% steam saturation at 100°C for 90 min., and then stored at 5°C for 50 days. In the first experiment, the content of protein, fat, malondialdehyde were determined, pH values, water activity, colour parameters were measured, texture profile analysis, sensory evaluation and microbiological analysis were conducted. In the second experiment, the content of water, protein, fat and malondialdehyde were determined, colour parameters were measured, texture profile analysis and sensory evaluation were conducted.

In the first experiment, the protein content was at a similar level and it ranged from 18.94% to 19.11%. The ginger rhizome samples showed a significantly lower ($P<0.05$) fat content (9.70%) in comparison to other samples (10.09%-10.90%). In the second experiment, the water content ranged from 65.05% to 67.53%, the protein content ranged from 17.55% to 19.71%, and the fat content ranged from 13.30% to 14.48%. The chilli pepper fruits samples had a siginificantly higher water content but less protein than other samples; however, there were no significant differences noted in the fat content between samples.

The pH values of meat preserved with ginger rhizome (the first experiment) in the analysed storage time ranged from 6.15 to 6.34 and were similar to other samples (6.14-6.37). The average values of water activity were identical in all samples and were estimated at 0.981.

The addition of 1.5% ginger rhizome to canned meat inhibited lipid oxidation at a similar level as sodium ascorbate in storage time. The addition of 3% ground chilli pepper fruits did not slow down lipid oxidation in canned meat during 50 days of refrigerated storage. According to Cadun et al. (2008), the content of malondialdehyde (MDA) in high quality meat products should not exceed 3 mg/kg of the product. The MDA content in all jars (in both experiments) was below 2 mg/kg through the entire period of storage, which indicates high quality.

The addition of ginger rhizome siginificantly influenced colour parameters (L* and a*) of all jars. The samples were lighter (L*) and were characterised by lower saturation of the red colour (a*) in comparison to other samples. The addition of chilli peppers resulted in a siginificantly lower vividness of the colour (L*) and decreased colour saturation (C*), and it contributed to the increase of the h° parameter and a shift from red to orange.

Jars with ginger rhizome and chilli pepper fruits were characterised by lower hardness and better chewiness in comparison to other samples. Sensory evaluation revealed that meat with ginger was more juicy and soft while meat with chilli peppers had a less intense fatty flavour and aroma, and no off-flavour and off-odour. Moreover, meat with CHP was evaluated as more juicy and soft, and received higher scores for overall quality. The microbial analysis (experiment one) showed that the applied pasteurisation process was effective, and the addition of ginger rhizome did not affect the quality.

In conclusion, it can be stated that the addition of ginger rhizome to canned meat effectively inhibited oxidative changes throughout storage. It also improved the quality of meat in terms of a* colour parameter, texture parameters, and sensory quality. The addition of chilli pepper fruits did not inhibit lipid oxidation, but improved the product quality; therefore, it can be an advantageous alternative to the consumers as a meat product enriched in plant-based bioactive compounds.