

Effect of added λ irradiated black pepper (*Piper Nigrum*) on quality characteristics and shelf - life of mortadella

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Introduction: Hot cured sausages represent a large percent of the meat products on the European market, especially in the western Balkan countries. Mortadella stands out as a high quality product. It is well known that during shelf life changes in sensory, biochemical and microbiological, parameters occur. According to this, objective of this work was to study the effect of adding treated black pepper with gamma irradiation (12kGy), on the quality characteristics and shelf-life, during household cold storage conditions ($4\pm 2^{\circ}\text{C}$), of mortadella (bologna-type) sausage.

Materials and method: Mortadella samples preparation was made using this recipe: 65% lean pork meat and 35% pork backfat; 15% ice, 3% potato starch, 0.5 % sodium ascorbate, 0.15 % sodium nitrite, 0.15% whole black pepper grains. Mixture was filled in plastic sausage casings and boiled for 3 hours on $75-80^{\circ}\text{C}$. This model was used as control sample while in the experimental sample black pepper was replaced with irradiated black pepper.

Five trained panelists conducted sensory evaluation for appearance, color intensity, shine, odor, acid taste, hardness and juiciness of mortadella.

Parameters that refer to biochemical changes, such as, pH value, lipid oxidation indicators (acid and peroxide value), and protein degradation indicator TVBN were analyzed on 1,7,14 and 21 day.

The conventional agar plate method was used as a standard microbiological method, in order to evaluate the effect of irradiation on TVC at black pepper samples and also for evaluation of microbiological state of mortadella samples during storage.

Statistical analyses were run in triplicate and results were reported as mean values \pm standard deviation (SD). Data were subjected to analysis of variance (one-way ANOVA Excel 5.0). A p-value less than 0.05 ($p \leq 0.05$) was considered statistically significant.

Results: Microbiological analyses of irradiated black pepper showed that initial microbial population was reduced to $0 \log \text{cfu/g}^{-1}$, compared to the normal untreated black pepper that was used in the control sample where $5.02 \log \text{cfu/g}^{-1}$ TVC were obtained.

Results in sensory evaluation showed that irradiation does not had unpleasant impact on aromatic components of black pepper and after 14 days of storage mortadella samples with irradiated black pepper showed higher ($p < 0,05$) results in appearance, hardness and juiciness. Sensory results are in agreement with physico chemical and microbiological results that showed lower pH, and higher acid and peroxide value at control sample after 14 days but the differences weren't significant. Significant differences ($p < 0,05$) during storage were obtained in the TVBN value in favor of mortadella with irradiated black pepper samples, which was indicative of microbial growth, that was reported with microbiological analysis that refer significantly lower values ($p < 0,05$) at experimental samples during whole storage and on 14th day, analyses showed $0.8 \log \text{cfu/g}^{-1}$ difference in favor of experimental sample where $5.3 \log \text{cfu/g}^{-1}$ were obtained.

Conclusions: Addition of irradiated black pepper seems to be viable alternative for improving quality characteristics and extending shelf life of heat cured meat products. In this case of mortadella it shown desirable effects as regards protein stability and reduce of microbial growth, which affect on some sensory parameters.

Acknowledgments: The authors would like to acknowledge the University "Mother Teresa" Skopje, University "Ss. Cyril and Methodius" Skopje, Vinca Institute of Nuclear Sciences in Belgrade and "Andonov" DOOEL, Sveti Nikole, for their help and support.