SEA BUCKTHORN CO-PRODUCTS AS A POTENTIAL NATURAL ANTIOXIDANT IN RAW-COOKED MEAT PRODUCT

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AIM OF THE STUDY

Plant co-product additives provide phenolic compounds, a complex group of molecules generated by the metabolism of plants, which are natural antioxidants. Fruits, vegetables, spices, herbs, cereals, grains, and seeds are some of the richest sources of antioxidants produced by plants. The oxidative process in meat and meat products can be controlled technologically by using various plant parts, such as seeds, peels, leaves, husks, stems, and roots (as undiscovered novel sources of natural antioxidants).

Sea buckthorn berries, leaves and bark are rich in many bioactive substances valuable for nutritional and health-promoting properties. The importance of sea buckthorn is usually attributed to its high amount of antioxidants. In addition, a wide variety of different positive biological, physiological and medicinal effects of sea buckthorn have been widely described, such as antioxidant, antibacterial and antiviral effects and many others. The leaves are rich in phenolic compounds including flavonoids, phenolic acids, quercetin, kaempferol and isohamnetin. Sea buckthorn branches contain phenolic compounds such as catechin, gallocatechin, epigallocatechin and tritepenoids such as ursolic acid.

The aim of the work was to find out how sea buckthorn co-products affects the qualitative characteristics of a raw-cooked meat product - sausages. In this work, we prepared four experimental groups. Control group without antioxidant, control group with ascorbic acid, experimental group with 3 $ml.kg^{-1}$ extract and experimental group with 3 $g.kg^{-1}$ powder.

MATERIAL AND METHODS

The following materials were used for preparing the meat product: pork meat, water, a salting mixture with 0.3% sodium nitrite concentration, black pepper, sweet and sour paprika, and nutmeg.

Determination of Oxidative Stability

Measurements of the malondialdehyde (MDA) content by thiobarbiturate test using a 2-thiobarbituric acid (TBA) solution served as the basis for the oxidative stability of the raw-cooked product. The final results were calculated using a calibration curve and expressed as the amount of malondialdehyde (MDA) (mg) present in 1 kg of sample. Oxidative stability was done on the 1^{st}, 7^{th}, 14^{th} and 21^{st} days.

RESULTS

Lipid oxidation is the reaction that progresses depending on the degree of unsaturated fatty acids with oxidative stress. These reactions are responsible for off-flavor, discoloration, loss of nutritional value, and decreased shelf life of meat products.

In the control group without antioxidant addition (Con), the highest MDA values were measured on the 1^{st} (0.224 mg MDA/kg) and the 21^{st} day of storage (0.404 mg MDA/kg). In the group with the addition of ascorbic acid (Con-C), the measured value on the 1^{st} day of storage was the lowest at 0.131 mg MDA/kg, and on the last day the measured amount of MDA increased to 0.340 mg MDA/kg.

As for the experimental groups, the addition of the extract (SBE) was able to significantly inhibit the formation of MDA (day 21 = 0.309 mg MDA/kg) compared to the group with the addition of powder (SBP) (day 21 = 0.367 mg MDA/kg).

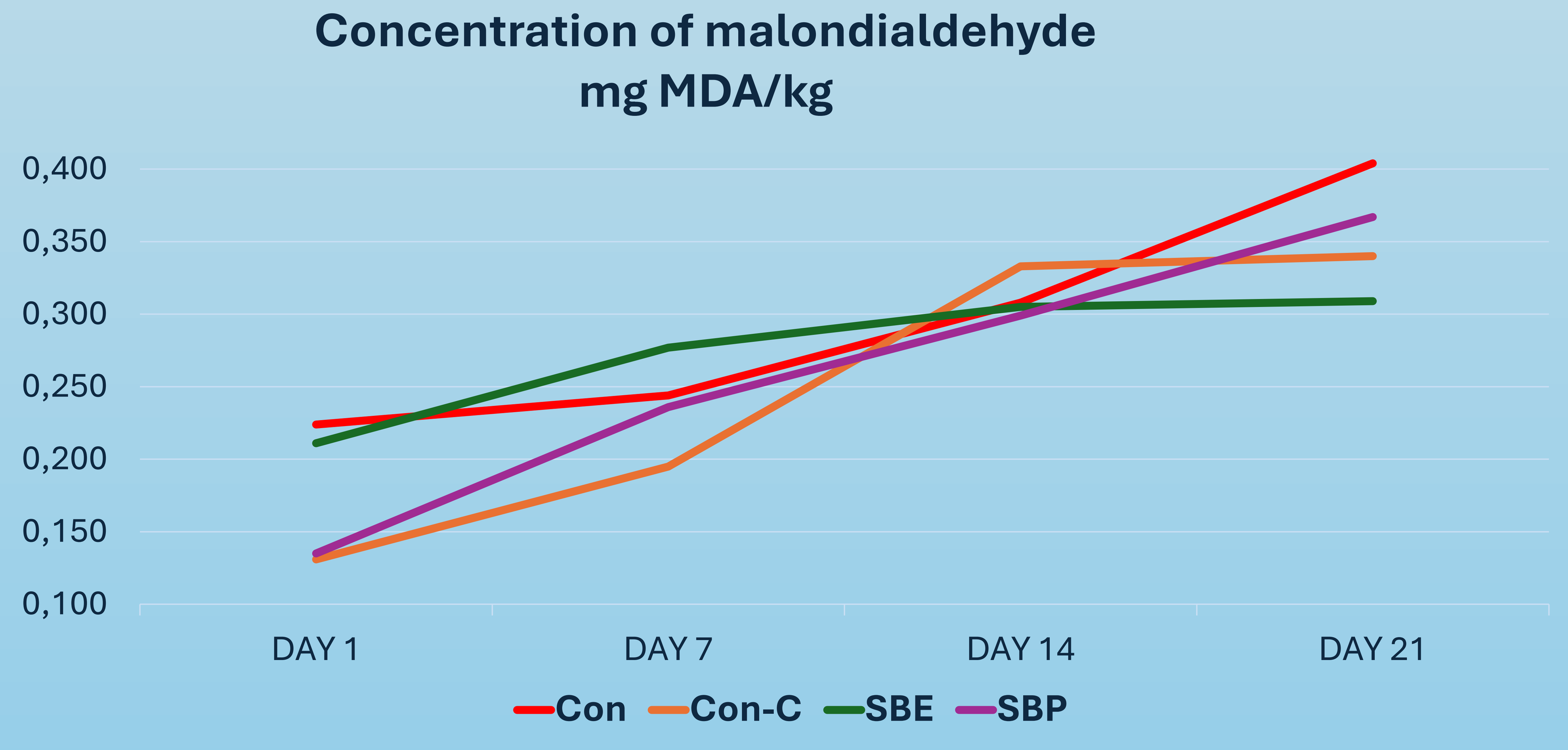

Fig. 1 Concentration of MDA in raw-cooked meat product during refrigeration storage

CONCLUSION

From the results achieved, we can evaluate that the addition of sea buckthorn co-product appears to be a potential natural antioxidant in meat products. Both extract and powder from sea buckthorn co-product were able to significantly inhibit the formation of MDA in raw-cooked meat products. The addition of ascorbic acid was able to inhibit the formation of MDA at the level of 16%. On the other hand, sea buckthorn co-product extract inhibited the formation of MDA by up to 45.5% and the powder approximately 29% of MDA formation. However, further experiments are still needed.

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