

# Comparison of the effect of organic acid mixture on quality parameters of red deer and beef

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## Introduction

Organic acids have been extensively researched for their ability to enhance the quality of meat products. They have been shown to have antimicrobial properties and can improve meat quality parameters, such as tenderness, color, and shelf life [1].

Red deer round and beef round are two types of meat that are highly valued for their flavor and nutritional value. However, bacterial contamination can lead to spoilage and reduced shelf life of these meats [2]. The use of organic acids as a meat preservative is a promising solution to this problem.

This study aims to investigate the effect of a 2% lactic acid (LA) and 2% ascorbic acid (AA) mixture on the quality parameters of red deer and beef meat.

## Methods

- The meat was cut into steaks of similar sizes.
- The samples were randomly divided into two groups, a control group, and a treatment group.
- A mixture of 2% LA + 2% AA were applied to treatment group samples.
- Both non-treated and treated samples were vacuum packed and stored at  $4 \pm 1^\circ\text{C}$  for 21 days.
- Quality parameters pH, instrumental color and microbiological count were measured on days: 1, 7, 14, and 21.

## Results

### 1. pH measurement

On day 21, beef and deer meat treated samples were slightly higher than non-treated ones. This indicates that the lactic acid and ascorbic acid mixture treatment may have contributed to a slight increase in pH over time.

**Table 1.** Effects of LA and AA mixture and vacuum packaging on pH values of beef and deer meat samples during retail display at  $4 \pm 1^\circ\text{C}$ .

Day	Treatment	Beef	Deer
		pH	
1	Treated	$5.48 \pm 0.07^b$	$5.60 \pm 0.03^b$
	Non-treated	$5.59 \pm 0.10^b$	$5.68 \pm 0.03^b$
7	Treated	$5.44 \pm 0.15^b$	$5.57 \pm 0.02^b$
	Non-treated	$5.54 \pm 0.04^b$	$5.56 \pm 0.04^b$
14	Treated	$5.25 \pm 0.06^a$	$5.33 \pm 0.06^a$
	Non-treated	$5.24 \pm 0.10^a$	$5.38 \pm 0.05^a$
21	Treated	$5.10 \pm 0.07^a$	$5.38 \pm 0.04^a$
	Non-treated	$5.06 \pm 0.05^a$	$5.31 \pm 0.16^a$

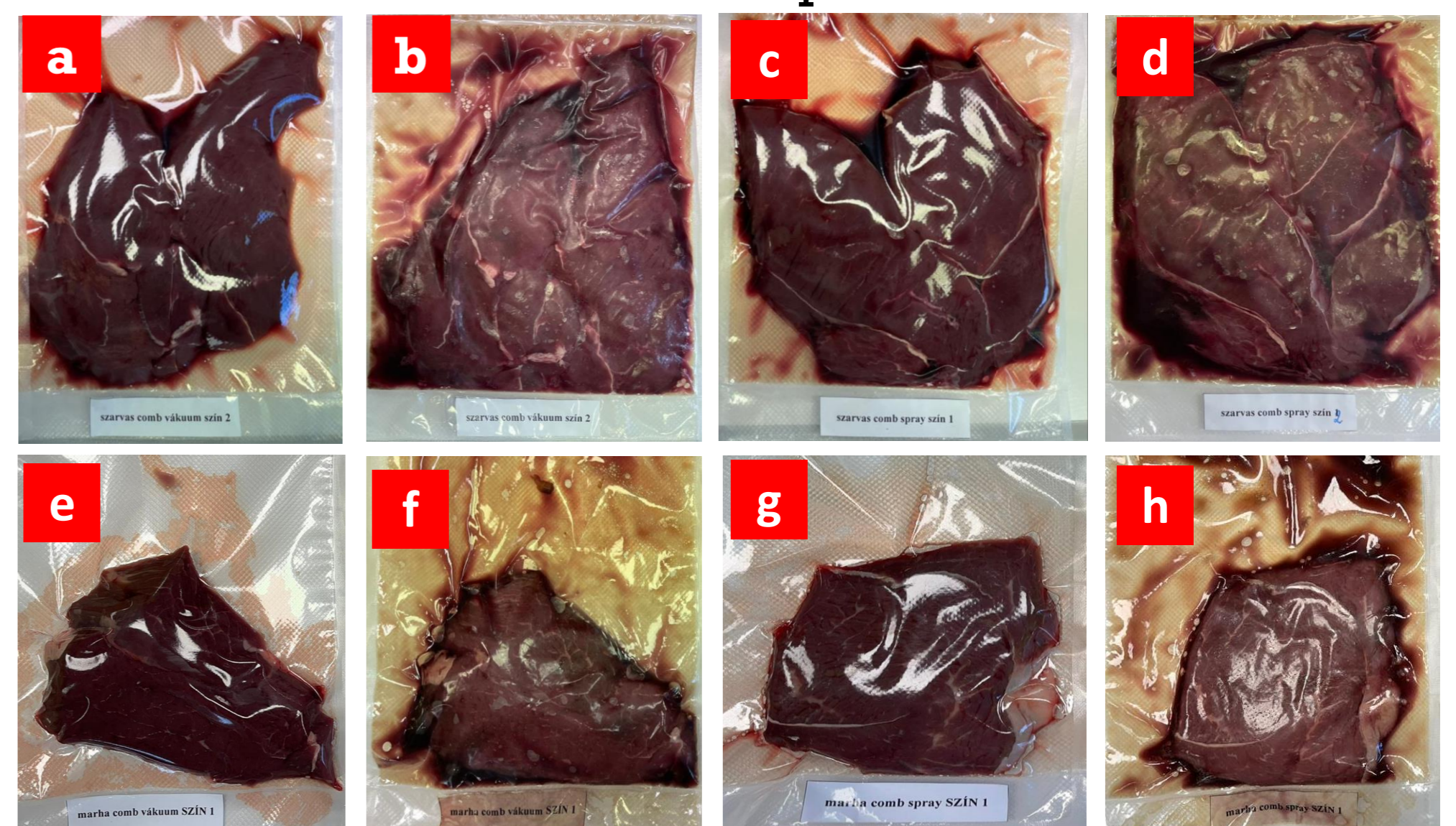
## Acknowledgements

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## Results

### 2. Instrumental color measurement

There were no significant differences observed between the treated and non-treated samples of both beef and red deer meat in terms of color parameters. This indicates that the lactic acid and ascorbic acid mixture treatment did not have a noticeable effect on the color characteristics of the meat samples.



**Figure 1:** Difference between treated and non-treated samples (a) day 1 deer meat non-treated, (b) day 21 deer meat non-treated, (c) day 1 deer meat treated, (d) day 21 deer meat treated, (e) day 1 beef non-treated, (f) day 21 beef non-treated, (g) day 1 beef treated, (h) day 21 beef treated.

### 3. Microbiological evaluation

On day 21, beef and deer meat treated samples exhibited a significantly lower microbial count compared to the non-treated samples.

## Conclusion

The results showed no significant differences in color between treated and non-treated samples. However, the treated samples exhibited a significantly lower microbial count on day 21 compared to non-treated samples. Overall, the lactic acid and ascorbic acid mixture shows promise as a natural preservative, effectively reducing microbial load in both meat types without adverse effects on color. Further research can optimize the application of these organic acids in meat preservation.

## References

- [1] Dave, D., and Abdel E. Ghaly. "Meat spoilage mechanisms and preservation techniques: a critical review." *American Journal of Agricultural and Biological Sciences* 6.4 (2011): 486-510.
- [2] Friedrich, L., Siró, I., Dalmadi, I., Horváth, K., Ágoston, R., & Balla, Cs. (2008). Influence of various preservatives on the quality of minced beef under modified atmosphere at chilled storage. *Meat Science*, 79(2), 332-343.