IMPACT OF BIOSTARTER APLICATION ON VOLATILE COMPOUNDS AND SENSORY QUALITY OF DRY AGED BEEF

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I. INTRODUCTION

There are two main methods of beef aging, known as wet and dry aging. Dry technique is considered to be more valuable. The quality of dry-aged beef can also be modulated with biostarters that changes the sensory characteristics of the meat. However, there is little information about aroma volatiles which could be important to understand the characteristics of dry-aged beef flavor and its contributors. Due the fact, the changes in the concentrations of volatile compounds of dry aged beef with biostarters may provide valuable information with effect on flavour liking. The aim of the study was to analyse the effect of biostarter application on volatile compounds in relation to sensory quality in dry aged beef.

II. MATERIALS AND METHODS

The meat samples for the experiment originated from 18 (3x6) individuals being crossbred of Holstein-Friesian cows with bulls of meat breeds. To standardize the material, the samples were taken from R class, according to EUROP system of cattle classification after slaughter. The fungal strain KKP 2092p came from the culture collection of the University of Warsaw was used as biostarter in this experiment. The strain was identified as *Mucor flavus* Bainier [MB#179990]. The fungal strain KKP 2092p is assigned under application patent number: P.443722. The aging of meat was performed in a Dry Aging Fridge (DX 1000 Premium S. DryAger. Bad Saulgau. Germany) at 1.5°C with 80-90% humidity for 28 days. Methods. The pH value and color parameters were measured before and after aging. After 28 days of aging the sensory quality was established using consumer and trained panel. Finally, the volatile compounds concentration was measured using apparatus GCMS-QP2010 (Shimadzu Corporation, Japan). The separation of aroma compounds was performed with the use of Stabilwax (30 m x 0.25 mm x 0.25 μm, polyethylene glycol). The statistics 13.3 PL program and one-way Anova analysis as well as post-hoc test- Tukey's was applied.

III. RESULTS AND DISCUSSION

In Table 1 a characteristics of beef quality before dry-aging and after 28 days of maturation is presented. After 28 days of aging the pH value increased only in case of sample with biostarters. Moreover, the steaks characterized by higher L^* values and lower a^* and b^* parameters after established time of aging (Table 1). These results were consistent with the observations of other authors [1,2]. Our results indicated that softness, juiciness and overall liking were higher for meat seasoned with biostarter usage. Similarly, these samples were characterized by higher overall quality results established by sensory trained panel. The largest group of volatile compounds in the control samples included the highest share of aldehydes and esters. On the other hand, the samples seasoned with biostarter were characterized by the highest share of alcohols and aldehydes compare to the control ones. It indicates that the biostarter produce significant higher level of alcohols and

aldehydes and reduces the amount of esters in comparison to control samples. The obtained results are consistent with previous results [3]. The Authors reported that the largest group of compounds was the group of hydrocarbons, followed by alcohols and aldehydes. A higher amount of heptane, esters and unclassified compounds was found in dry-aged meat [3].

Table 1. Characteristics of beef quality before dry-aging and after 28 days of aging.

	Traits		Control	Biostarter	SEM	P-values
Before aging	pH		5.87	5.86	0.17	0.96
	Color parameters:	L^*	32.9	34.1	1.98	0.78
		a^*	20.3	17.3	1.43	0.32
		b^*	19.4	16.3	1.37	0.28
After 28 days of dry aging	pH		5.85	5.94	0.16	0.79
	Color parameters:	L^*	34.7	35.7	1.70	0.80
		a^*	15.3	17.5	1.60	0.52
		b^*	14.1	15.8	1.50	0.59
	Odour before grilling (1-9)		5.91[a]	7.43[b]	0.39	0.04
	Odour after grilling (1-9)		6.83	7.37	0.17	0.12
	Softness (1-9)		6.60[A]	7.50[B]	0.16	0.01
	Juiciness (1-9)		6.62[A]	7.56[B]	0.17	0.01
	Flavour liking (1-9)		6.64[a]	7.48[b]	0.20	0.05
	Overall liking (1-9)		6.66[A]	7.45[B]	0.18	0.01
	Acids (numer of compounds)*		3.45 (4)*	2.70 (3)	0.67	0.60
	Alcohols		14.5[a] **(5)**	23.5[b] **(10)**	2.42	0.05
	Aldehydes		33.9[a] **(6)**	46.7[b] **(10)**	3.12	0.03
	Esters		19.3[A] (3)	8.91[B] (3)	2.02	0.01
	Ketones		10.1 (3)	8.40 (1)	2.29	0.73
	Others		4.59 (3)	1.57 (9)	1.09	0.18

* numer of compound: sbold letters- main differences; [A,B; a,b] Different superscript letters differ for $P<0.01$ or $P<0.05$.

IV. CONCLUSION

The use of *Mucor flavus* based biostarter had an impact on a higher degree of meat odor liking before heat treatment, as well as on higher degree of softness and juiciness after heat treatment, as well as flavor and overall liking. The obtained results indicate that the biostarter used in this study produced significant higher level of alcohols and aldehydes and reduced the amount of esters in comparison to control samples and this was related to higher odor and flavor liking as well as overall liking.

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