AGE-RELATED LIPOLYTIC AND OXIDATIVE STABILITY OF MALE LAYER-TYPE CHICKENS' MEAT

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I. INTRODUCTION

Valorization of usually culled male layer-type chickens is innovative direction fitting in current European regulation. The culling of hatched male layer-type chickens is common practice in poultry industry [1]. The process involves high energy cost and it's ethically critiqued. Therefore, our aim was to rear male layer-type chickens until age of 5 and 9 weeks and evaluated the lipolytic and oxidative stability of their meat.

II. MATERIALS AND METHODS

The male layer-type chickens used were divided in two groups: first were reared until 5 weeks age, and second – 9 weeks [2]. After slaughter the carcasses were chill stored for 24 h and 5 days at 4°C. The analyses were conducted using only the right-side chickens' leg and breast fillet identifying 4 groups: leg from chicken at 5 weeks (L5) and at 9 weeks (L9); breast fillet from chicken at 5 weeks (F5) and at 9 weeks (F9). Total lipids extraction was performed [3]. The degree of lipolysis was expressed by the free fatty acids content [4]. The peroxide value (POV) evaluated the primary products of lipid peroxidation [5]. While the quantity of secondary products of lipid oxidation was established by TBA value method of Botsoglou et al. [6]. Two-way ANOVA with replications was executed to establish the significance of both factors (age and time of chilled storage) at $P \leq 0.05$ ($n = 6$) [7].

III. RESULTS AND DISCUSSION

The degree of lipolysis in chicken legs was only affected ($P \leq 0.05$) by the age of male layer-type chickens (Figure 1, a). Samples L9 had almost twice free fatty acids compared to L5 ($P \leq 0.05$). In the examined fillets was established similar trend. In sample F5 and F9 the free fatty acids content increased ($P \leq 0.05$) during 5-day chilled storage. Suggesting their higher content of unsaturated fat, which are more susceptible to lipolysis [1].

The peroxide value (POV) of male layer-type chickens' legs wasn't affected ($P \geq 0.05$) neither by the age of chickens nor chilled storage (Figure 1, b). As for the fillets both factors had significant effect ($P \leq 0.05$). One-time POV decreased ($P \leq 0.05$) during chilled storage, suggesting ongoing oxidation and second-time with increase of age. The decrease in sample F9 could be due to age-related increased portion of saturated fats in fillets [1-2].

The secondary products of lipid oxidation, in particular malondialdehyde (MDA) decreased ($P \leq 0.05$) both during chilled storage of all samples and in age-related manner (Figure 1, c). First decrease could be due to the delicate nature of the meat and high reactive potential of MDA, which is known to initiate protein oxidation. The decrease ($P \leq 0.05$) of TBA value with increase of age confirms the hypothesis of increased portion of saturated fat, which are more stable to oxidation [1].

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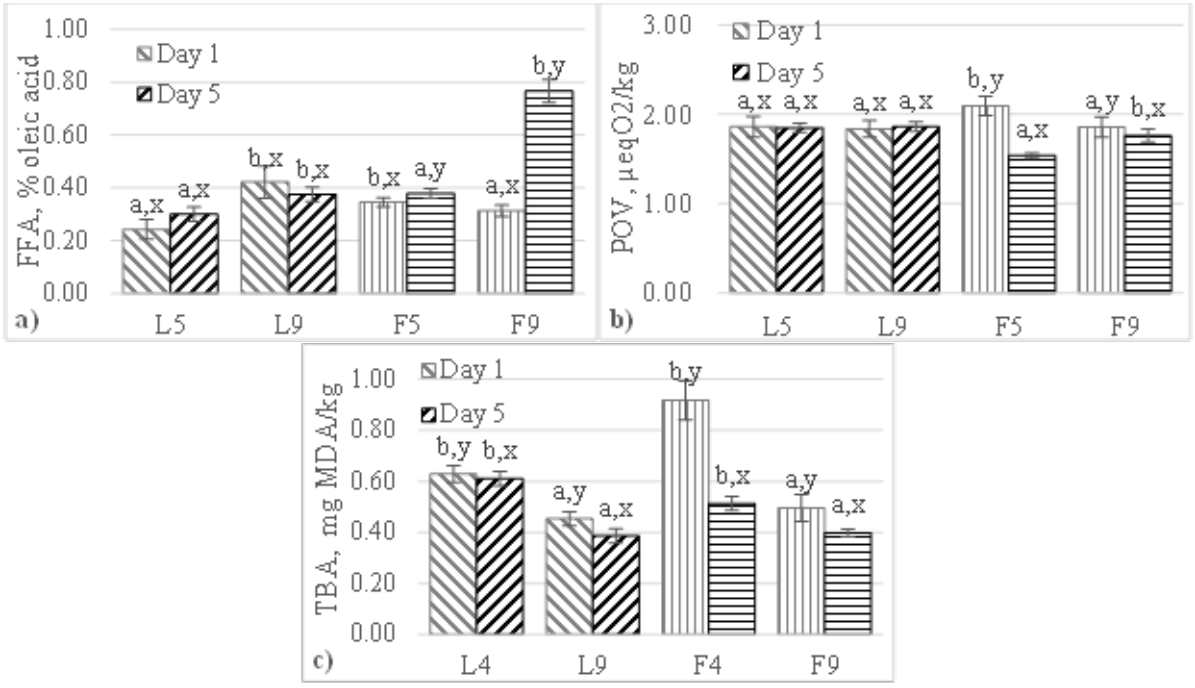

Figure 1. Lipolytic and oxidative stability: a) Free fatty acids (FFA) content; b) Peroxide value (POV); c) 2-thiobarbituric value (TBA)

[a,b] show significant ($P \leq 0.05$) effect of the factor "Age of male layer-type chickens" for each sample at each period of chilled storage separately; [x,y] show significant ($P \leq 0.05$) effect of the factor "Time of chilled storage" for each sample at each age separately.

IV. CONCLUSION

The oxidative stability increases in age-related manner favoring longer shelf-life and potentially processing of the male-type chickens in different poultry products.

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