QUALITY TRAITS OF THIGH MEAT FROM THE MORE PROMISING MEDIUM-GROWING GENOTYPES TO BE USED FOR EUROPEAN BROILER PRODUCTION

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I. INTRODUCTION

The increasing attention and awareness of consumers about animal welfare and quality are driving an increased demand for foods of animal origin from less intensive and outdoor farming systems [1]. For this purpose, in 2018 the European Chicken Commitment (ECC) aimed to define standards for the improvement of broiler welfare and supply chain sustainability to be pursued by 2026 [2]. One of the issues by the ECC is to promote the use of alternative genotypes having reduced growth rates and more suitable for less intensive and outdoor systems in respect to the currently fast-growing hybrids used for broiler production. Thus, the present study aimed at comparing the quality traits and sensory profile of chicken leg meat from the more promising ECC medium-growing (MG) genotypes as compared the main fast-growing (FG) hybrid used for broiler meat production in the EU.

II. MATERIALS AND METHODS

A total of 3,512 broiler chickens were reared under experimental conditions in an environmentally controlled poultry facility. Birds were divided according to their genotype and gender into eight experimental groups (n=439/group). In detail, 4 genotypes were considered of which one FG and 3 MG (MG1, MG2, MG3) slaughtered at 42 and 50 d of age, with an average weight of 2.5-2.6 and 2.9-3.1 kg for females and males, respectively. Then at 3 h *post-mortem*, 12 thighs for each experimental group were weighed and used to assess the main meat quality traits (ultimate pH, colour, drip and cooking losses and shear force). Data were analysed by factorial ANOVA considering the main effects of the genotype and gender along with their interactions. When significant, means were separated by Tukey-HSD test (P<0.05).

III. RESULTS AND DISCUSSION

The results concerning the effect of genotype and gender on meat quality traits are reported in Table 1. The genotype strongly affected the main quality traits and technological properties of thigh meat, although no clear and consistent trends among the groups were observed. No significant differences were found for thigh weight (P>0.05) between FG and MG genotypes. As for pHu, significantly higher values were found in FG and MG3 compared to MG1 and MG2. However, the higher pHu values observed in FG and MG3 had different implications on the water holding capacity (WHC) of meat. Indeed, FG showed the highest pHu values and juice losses, whereas the high pH values observed in MG3 resulted in a remarkably improved WHC as depicted by the lower cooking losses (P<0.001). This result could be explained by considering muscle hypertrophy characterizing the FG broilers which is often associated to an impaired protein functionality [3]. Notably, despite the significant differences observed in cooking losses between FG and MG3, these groups did not show any difference in terms of shear force (P>0.05). This outcome may be ascribed to the different growth patterns of the FG genotype which likely imply a lower reticulation of the intramuscular collagen, which is one of the main contributors to meat tenderness [4]. As for gender effect, significant differences were found for thigh weight, redness (*a**) and cooking loss. In detail, as expected males exhibited significantly higher thigh weight (P<0.001) and redness (P<0.01). These findings may be due to the different body development and composition characterizing male and female chickens with the first exhibiting a higher myoglobin content at muscular level [5]. On the other hand, the higher cooking losses observed in females if compared to males was unexpected since it is generally reported that male broilers having larger fiber cross-sections frequently exhibit a reduced WHC [6].

Table 1 Effect of genotype (G), gender (g) as well as their interaction on the main quality characteristics and technological properties of thigh meat.

		Thigh weight (g)	pHu	Lightness *L**	Redness *a**	Yellowness *b**	*Drip loss* (%)	*Cooking loss* (%)	Shear force (kg)
Genotype	FG (n=24)	193.4 ab	6.37a	53.69	2.30a	2.25a	5.0ab	20.1a	1.16b
	MG1 (n=24)	178.3 b	6.20b	52.20	1.80b	0.46b	7.9a	17.6b	1.23ab
	MG2 (n=24)	199.7 a	6.21b	52.41	2.19a	0.92b	3.9b	19.2ab	1.36a
	MG3 (n=24)	193.0 ab	6.34a	51.49	1.78b	0.75b	5.0ab	15.1c	1.17b
Gender	Male (n=48)	218.1 a	6.30	53.13	2.22a	0.99	4.8	17.0b	1.24
	Female (n=48)	164.5 b	6.26	51.77	1.81b	1.20	6.1	19.0a	1.23
esm		3.6	0.02	0.33	0.08	0.12	0.4	0.4	0.02
				P-value					
Genotype		<0.01	≤0.001	0.0910	<0.01	≤0.001	<0.01	≤0.001	<0.01
Gender		0.001	n.s.	n.s.	<0.01	n.s.	n.s.	0.01	n.s.
Genotype x Gender		n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

esm= error standard means; ns= not significant; a-c= mean values followed by different letters significantly differ among the groups (p<0.05).

IV. CONCLUSION

In light of the available information and considering the importance of this topic considering European Chicken Commitment goals, the results obtained in this study highlighted the possible implications on the meat quality traits of the use of medium growing genotypes are used when compared with fast-growing hybrids. Moreover, sensory profile evaluation using *Flash Profile* analysis is in progress.

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