MEAT QUALITY CHARACTERIZATION OF THE POLVERARA SLOW-GROWING CHICKEN BREED

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I.   INTRODUCTION

Local chicken breeds are important to preserve biodiversity, for breeding strategies and research, as well as for commercial purposes. In fact, meat and eggs from alternative production systems such as free-range and organic are demanded by modern consumers who are increasingly more interested in local and traditional products, identified as more respectful to the environment and animal welfare [1]. Polverara is a medium-size, rustic, slow-growing chicken breed of the Veneto region (Italy). Up to now, researchers focused on its genetic characterization [2] and, more recently, on its productive performance, slaughter yields and some physical meat quality traits [3]. The present study investigated the nutritional quality of the Polverara meat and compared the protein content and the amino acid composition of its leg meat with those of a conventional hybrid.

II.   MATERIALS AND METHODS

A total of 30 male hybrid chickens and 30 Polverara male chickens were bought at a local slaughterhouse. The slaughtering age of the two genotypes, which were processed under commercial conditions, were 40 and 180 days for the hybrid and the Polverara breed, respectively. The left legs of both genotypes were excised from carcasses, individually *vacuum*-sealed using a CSV-41n ORVED machine (99% *vacuum* level) and frozen at -40 °C at the Department of Animal Medicine, Production and Health of the University of Padova (Italy). Afterwards, samples were sent frozen to the Centro Tecnológico de la Carne de Galicia (Spain) to analyze the protein content [4] and the amino acid composition [5]. A one-way ANOVA of the PROC GLM [6] analyzed the effect of the genotype (fixed effect) on the considered variables.

III.   RESULTS AND DISCUSSION

Results (Table 1) showed that the leg meat of Polverara chicken had a higher protein content compared to that of the conventional hybrid (21.5 *vs* 18.5 g/100 g meat). The amino acid composition of the two chicken genotypes also differed, as the content of several amino acids was the highest in the leg meat belonging to the slow-growing chicken: isoleucine (P=0.0273), leucine (P=0.0134), phenylalanine (P=0.0023), threonine (P=0.0122) and valine (P=0.0313) among the essential amino acids and glycine (P=0.0341), proline (P=0.0007) and tyrosine (P=0.0049) among the non-essential ones. Distinct genotypes are known to exhibit different growth rate and body composition which also affects meat quality traits, but age, regardless of the genotype, is a key factor affecting the chemical composition of the meat. Younger chickens generally have a higher moisture content which decreases with age in favor of protein and fat contents [7]. Because of the long producing cycle of the Polverara chickens (180 days), the production cost is supposed to increase considerably. However, such meat is intended for niche markets in which consumers are willing to pay a high retail price for high meat quality. Involving the Polverara breed in commercial production strategies would be one of the most effective strategies to ensure the survival of this rustic and traditional breed [8].

Table 1. Effect of the genotype on the protein content and amino acid composition of chicken leg meat.

g/100 g meat	Genotype		P-value	RSD[1]
	Hybrid	Polverara		
N. samples	30	30		
Protein	18.5	21.5	<0.0001	0.940
Essential amino acids:				
Arginine	1.45	1.55	0.0614	0.206
Histidine	0.61	0.63	0.2686	0.075
Isoleucine	0.94	1.00	0.0273	0.112
Leucine	1.52	1.64	0.0134	0.186
Lysine	1.79	1.90	0.0910	0.240
Methionine	0.35	0.39	0.0719	0.092
Phenylalanine	0.77	0.84	0.0023	0.094
Threonine	0.83	0.89	0.0122	0.095
Valine	0.92	0.98	0.0313	0.103
Non-essential amino acids:				
Alanine	1.09	1.15	0.0533	0.123
Aspartic acid	1.76	1.85	0.1122	0.225
Cystine	0.21	0.21	0.7863	0.045
Glutamic acid	2.92	3.08	0.0991	0.372
Glycine	0.87	0.95	0.0341	0.148
Proline	0.75	0.84	0.0007	0.099
Serine	0.94	0.95	0.8677	0.279
Tyrosine	0.65	0.71	0.0049	0.080

[1] Residual Standard Deviation

IV. CONCLUSION

The meat of the Polverara chicken breed displayed an interesting nutritional quality, expressed in terms of both content and amino acid composition of its protein. Therefore, this slow-growing chicken breed seems to have a promising potential in providing high quality meat from alternative production systems.

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