

# Exploring meat quality variations from Duroc, Hybrid, and Pietrain finishing pig lines

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## I. INTRODUCTION

Pork is an important source of animal protein and is among the most consumed meats in the world (MOTTE; ROTHSCCHILD, 2019). Meat quality is influenced by several factors, the genotype being one of the most important. A viable approach within genetic programs to enhance desirable traits in offspring is the introduction of genetic diversity through crossbreeding systems (KIM et al., 2014). Genetics plays an important role in determining the characteristics of muscle tissue, thus influencing the organoleptic properties of meat, such as flavor and texture (LEBRET; ČANDEK-POTOKAR, 2022). Color is a crucial parameter for quality, influencing consumer perception and their purchasing decision. In addition, the attractive appearance of meat is associated with freshness, flavor, and quality (GAGAOUA et al., 2023). Another factor that indirectly influences consumer purchasing decisions is pH, due to its relation to water retention capacity, color, tenderness, and shelf-life of the meat. Based on this, the main objective of this study was to compare meat quality data, especially pH and color, from pigs of different genetic lines.

## II. MATERIALS AND METHODS

This study was approved by the Ethics Committee on Animal Use of the Luiz de Queiroz College of Agriculture (University of São Paulo, Piracicaba, Brazil), under CEUA nº. 7416051222. A total of 600 pigs were used for this experiment, representing three sire lineages: Duroc, Pietrain, and hybrid (50% Duroc and 50% Pietrain), of which, in total, 117 animals were randomly selected, with the maternal lineage being the DanBred Hybrid (DB90) from DanBred Brasil, maintained the same for all sires. All pigs were raised in the same management and nutritional system in the same fattening pig farm. Slaughter occurred at 169 days and the left half carcasses were used for to evaluate the quality characteristics of the meat in the *Longissimus lumborum* (LL) muscle. The color ( $L^*$ ,  $a^*$  and  $b^*$ ) of the LL muscle was assessed using the Konica Minolta colorimeter with calibration parameters provided by the manufacturer (D65,  $Y = 93,7$ ,  $X = 0,3160$ ,  $y = 0,3323$ ), and the final pH was measured using a digital pH meter, after refrigeration. To assess the effects of different crossbreeding systems on pork quality traits, we conducted an analysis of variance (ANOVA) with terminal sire line and slaughter age as a fixed effect and covariate, respectively, followed by the Tukey test. All statistical analyses were performed using the R program, and significance was assessed at  $p$ -value  $\leq 0.05$ .

## III. RESULTS AND DISCUSSION

The color ( $L^*$ ,  $a^*$  and  $b^*$ ) and final pH are shown in Table 1. In this study, there was no difference ( $p > 0.05$ ) on pH and color among the terminal sire line groups. However, there was a trend towards of difference for the  $b^*$  color parameter ( $p < 0.10$ ), as shown in Table 1. The Duroc pig showed higher yellowness ( $b^*$ ) and lightness ( $L^*$ ) values than Pietrain and Hybrid animals. The redness ( $a^*$ ) was lower in Duroc pigs and more intense in Pietrain animals. Regarding the final pH, Pietrain and Duroc pigs had the highest and lowest pH values, respectively. Additionally, the pH of Pietrain pigs in this study was 5.68, which was similar to the pH of 5.67 in the Hybrid pig population. The results obtained in this

study indicate that the crossbreeding of finishing pig lines did not have a significant effect on the final pH and meat color parameters. However, there was a tendency ( $p < 0.01$ ) for Duroc pork to exhibit higher yellowness than Pietrain and Hybrid. This slight color difference between the meats may influence the consumer's purchasing decision. These findings corroborate with previous research that highlighted the benefits of crossbreeding pigs in improving meat quality. (KIM et al., 2020). However, in this study, we identified results that are opposite to those found by Edwards, Bates and Osburn (2003), who reported a significant difference between pH values and the color parameter  $a^*$ .

Table 1 – Effect of Duroc, Hybrid and Pietrain finisher breeds on color and final pH post-mortem.

	Lineages						<i>p</i> -value
	Duroc		Hybrid		Pietrain		
	Mean <sup>1</sup>	SE <sup>1</sup>	Mean	SE	Mean	SE	
L*	51.354	0.427	51.239	0.443	51.090	0.443	0.911
a*	4.939	0.199	4.982	0.206	5.105	0.206	0.837
b*	6.075	0.196	5.486	0.203	5.661	0.203	< 0.1
Final pH	5.631	0.023	5.671	0.0242	5.680	0.0239	0.302

<sup>1</sup> The values were expressed as means and standard error (SE).

#### IV. CONCLUSION

The use of different finishing pig lines for crossbreeding in this study did not show significant differences regarding the color parameters and final pH of meat quality.

#### ACKNOWLEDGEMENTS

This study was funded by the São Paulo Research Foundation (FAPESP, process number 2023/02067-7). We acknowledge the support of the Brazilian National Council for Scientific and Technological Development (CNPq) for the purchase of reagents. We express our gratitude to DanBred Brazil for providing the animals, housing, food, and personnel, which assisted in conducting this research. Additionally, we appreciate the collaboration and provision of space and personnel by the Suinco abattoir.

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