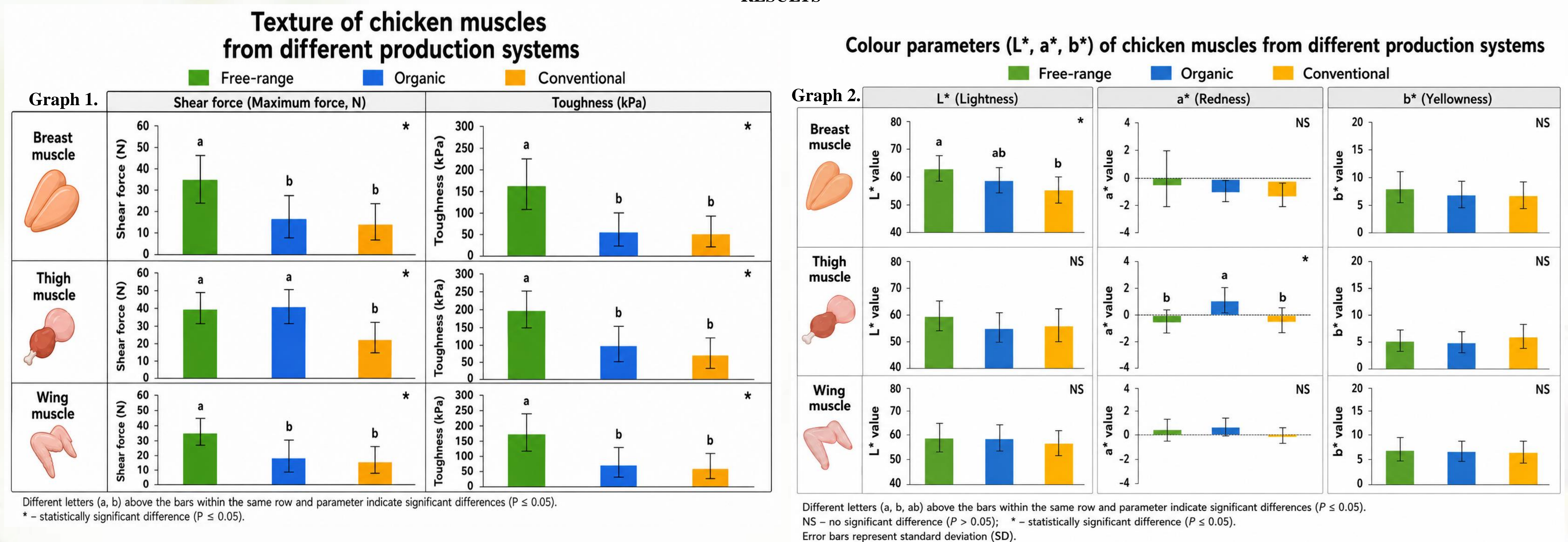


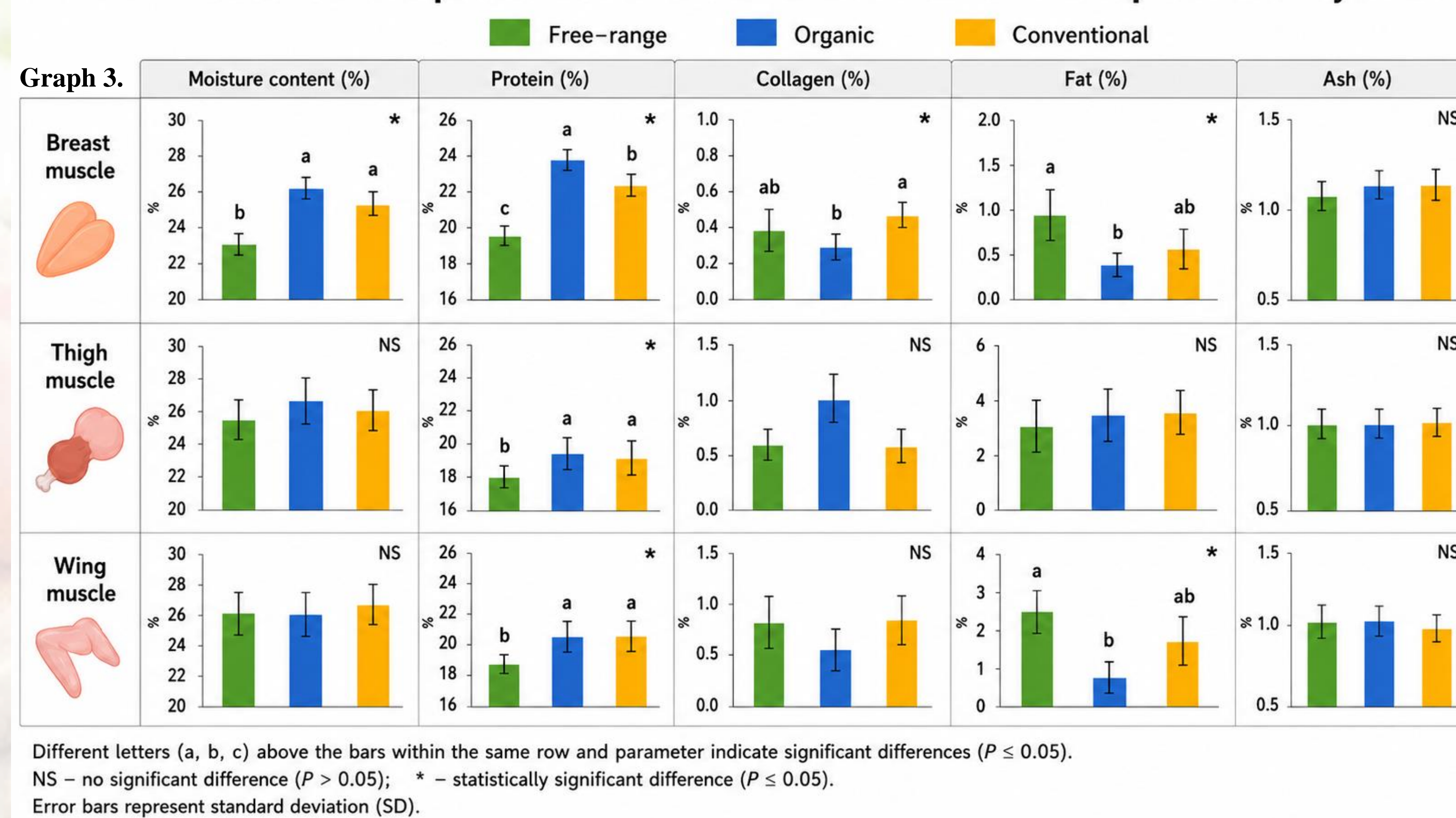
## ABSTRACT

This study evaluates selected physical (texture and colour) and chemical properties of chicken meat from three production systems: organic, free-range, and conventional. Samples from breast, thigh, and wing muscles were analysed. Texture analysis revealed significant differences among groups ( $P \leq 0.05$ ). Breast meat from free-range chickens exhibited significantly higher toughness and shear force compared to organic and conventional chickens. In thigh meat, shear force values of organic and free-range chickens did not differ significantly, but both were significantly higher than those of conventional chickens. Colour measurements ( $L^*$ ,  $a^*$ ,  $b^*$ ) showed that conventional chickens had darker breast muscle (lower  $L^*$  values), while organic chickens exhibited significantly higher redness ( $a^*$ ) in thigh muscle. Chemical analysis indicated that free-range chickens had the lowest protein content, particularly in breast muscle ( $P \leq 0.05$ ). In contrast, organic chickens had the highest protein content (significant in breast muscle) and lower fat levels in breast and wing muscles compared to free-range chickens. Collagen content in breast meat was higher in conventional chickens than in organic chickens. Overall, the results suggest that production system significantly influences both physical and chemical properties of chicken meat.

## RESULTS



## Chemical composition of chicken muscles from different production systems



## MATERIAL AND METHODS

**Sampling:** Five carcasses from each production system were analyzed: conventional chickens from, organic chickens from, and free-range chickens. All samples met relevant food quality and safety standard.

**Physical analysis:** Texture properties of breast and thigh muscles were measured using a Instron Universal Testing Machine (Model 5544, United Kingdom) according to the Warner–Bratzler shear test. Color parameters of raw skin and muscle surfaces ( $L^*$  = lightness,  $a^*$  = redness,  $b^*$  = yellowness) of breast, thigh, and wing samples were measured using the CIE Lab\* system with a Konica Minolta CM-5 spectrophotometer.

**Chemical analysis:** Dry matter was determined gravimetrically by drying at  $103 \pm 2$  °C. Protein content was analyzed using a FOSS Kjeltec 2300 analyzer according to ISO standards. Collagen content was calculated from hydroxyproline concentration measured spectrophotometrically at 550 nm. Fat content was determined using Soxhlet extraction with petroleum ether, while ash content was measured gravimetrically after combustion at 550 °C in a muffle furnace.

**Statistical analysis:** Data were expressed as mean  $\pm$  standard deviation (SD). Statistical significance ( $P < 0.05$ )

## DISCUSSION

Free-range chickens showed the toughest breast meat, while organic chickens had the toughest thigh meat. Conventional chickens had the most tender meat (graph 1). Texture was mainly influenced by genotype, age, physical activity, and collagen content. Conventional chickens had the darkest breast muscle, while organic chickens showed the reddest thigh muscle (graph 2). Muscle color is influenced by genotype, age, and myoglobin content. Free-range chickens showed the lowest dry matter and protein content, particularly in breast muscle, while organic chickens had the highest protein levels. Breast collagen content was highest in conventional chickens and lowest in organic chickens. Free-range chickens had the highest fat content in breast and wing muscles. No significant differences were found in ash content, although the lowest values were recorded in free-range chickens (graph 3). Chemical composition was influenced by genotype, age, physical activity, and feeding conditions.

## CONCLUSION

The study compared chicken meat from organic, free-range, and conventional production systems. Although free-range farms attempt to mimic organic rearing conditions through outdoor access, longer fattening periods, and reduced use of additives, the quality characteristics of free-range chicken meat were generally more similar to conventional meat. Organic chickens showed higher protein content and lower fat levels, indicating superior nutritional quality. The results demonstrate that production system significantly influences the physical and chemical properties of chicken meat.