From Coop to Table: How Genetics and Environment Influence Broiler Meat Quality

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The quality of poultry meat is shaped by genetics and rearing conditions.

This study examines how genotype (JA757, JA787) and housing system (free-range GR1 vs. indoor GR2) influence broiler breast meat quality.

While slaughter, carcass, and breast muscle weights showed no significant differences, key meat quality traits were affected by environmental factors. Housing conditions influenced pH at 48 hours post-slaughter ($p = 0.04$) and color parameters b and C ($p = 0.0001$), suggesting environmental effects on pigmentation and biochemical processes. Water retention properties varied, with JA757 exhibiting higher thaw loss, while cooking-related water loss was affected by both genotype and environment.

Texture analysis showed that genotype influenced Young's Modulus, while housing conditions affected the 20–80% range. Notably, Spaghetti Meat was significantly linked to genotype ($p = 0.0001$) and housing ($p = 0.01$), with JA787 and indoor birds showing a higher prevalence. However, Wooden Breast and White Striping were not influenced by these factors.

Fat content was significantly affected by housing and genotype-environment interactions, whereas protein and moisture content remained unchanged.

These findings indicate that genotype had a limited effect on carcass traits, while rearing conditions played a crucial role in pH, color, water retention, and fat deposition. Understanding these interactions can help optimize rearing systems to enhance meat quality while ensuring ethical and sustainable poultry production.

This study was conducted as part of the *mEATquality* project, funded by the EU's Horizon 2020 Research and Innovation Program (Grant No. 101000344).

28.08.2025