S U M M A R Y

RESEARCH ON THE INTERRELATIONS BETWEEN GROWTH SYSTEMS AND THE QUALITY CHARACTERISTICS OF POULTRY MEAT

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The paper aims to investigate and analyze in detail the influence of different poultry farming systems (industrial intensive, organic, and free-range) on the quality characteristics of poultry meat, including aspects related to chemical composition, organoleptic properties, carcass structure, and growth performance. Through these studies, the aim is to identify the most effective methods for improving meat quality and animal welfare.

The main objective of the research was (1) to evaluate the growth performance of the meat hybrid in both intensive and extensive farming systems, as well as (2) to assess the impact of specific combined feeds for each system on meat quality, including organoleptic aspects, chemical composition, and the anatomical structure of the birds.

This paper has been divided into two parts in accordance with the writing rules. The first part consists of the bibliographic study that addresses the general framework of the thesis topic and is made up of two chapters. The second part consists of the author's own research, structured into six chapters.

Part I

Chapter I is titled **THE MAIN TECHNOLOGICAL SYSTEMS USED IN POULTRY PRODUCTION FOR MEAT** and provides a detailed description of the main technological systems used in poultry farming for meat, with a special focus on the characteristics of each system. Both intensive, semi-intensive, and extensive ecological systems are presented, highlighting their advantages and disadvantages. The chapter addresses the welfare of birds, meat quality, production costs, and environmental impact in each farming system, including challenges related to efficiency and production control. It also provides detailed classifications of these systems based on bird species, flock size, and type of housing, as well as the prospects of each system in the context of current trends in the poultry industry.

In addition, the chapter examines current trends in poultry meat production, emphasizing the evolution of market demands and consumer preferences for sustainable and high-quality products. Additionally, the challenges of each system are discussed, such as the need for innovative solutions to optimize costs in extensive systems or to manage environmental impact in intensive systems.

Chapter II is titled **NUTRITIONAL AND DIETARY PARTICULARITIES OF BROILER CHICKENS (MEAT)** and provides a detailed analysis of the anatomical and physiological structure of the digestive system of meat chickens and how these particularities influence their feeding. Subchapter 2.1 explores in detail the main components of the digestive tract, such as the oral cavity, throat, esophagus, stomach, intestines, and cloaca. Each segment of the digestive tube is explained according to its role in the processes of food intake and digestion, describing how the specific structure of broiler chicks allows for efficient digestion and absorption of essential nutrients for rapid growth.

Attention then focuses on the classification and composition of the feed used in broiler chicken nutrition. This subsection explains the division of feed into categories such as starter feed (for the beginning of chicks' lives), grower feed, and finisher feed, each having a specific role in the developmental stages of birds. Emphasis is placed on the importance of optimizing nutrition to ensure healthy and efficient growth of chicks, as well as the advantages of using these types of feed.

The chapter continues with a series of essential information about bird metabolism, explaining metabolic processes such as the metabolism of carbohydrates, lipids, and proteins. In this context, it is emphasized how chicks' bodies process and transform food into energy, what nutrients are necessary for their development and growth, and how nutrition influences the metabolic efficiency of birds.
At the end of this chapter, the nutritional requirements of broilers are addressed by presenting the main nutritional components used in raising chickens and their role in supporting healthy growth.

Second part

Chapter III is titled **THE PURPOSE AND IMPORTANCE OF THE WORK** and analyzes and characterizes the main technological systems used in poultry farming for meat production, with a special emphasis on the nutrition and feeding of broiler chicks. The main objective was to highlight the advantages and disadvantages of each breeding system, providing an insight into current and future trends in the field of poultry farming. In particular, the paper focuses on how nutrition and growing conditions influence the health and well-being of chicks, requiring a balanced diet for optimal development.

Additionally, the paper provides solutions for improving the yield and final quality of the chicks through a comparative analysis of different rearing methods

(intensive and extensive). There is an emphasis on sustainable practices and environmental protection, through the promotion of ecological and extensive farming systems. Additionally, the importance of consuming chicken meat is emphasized, as it is a source of high-quality, digestible protein with low fat content, making it ideal for a balanced and healthy diet.

The experimental activities took place between 2021 and 2024, analyzing three different broiler chicken rearing systems (industrial intensive, extensive organic, and free-range), each with specific growing conditions and feed. The research included three series of 20 chicks from the Ross-308 breed and was conducted in three main directions: (S1) evaluating growth and slaughter performance, (S2) sampling and analyzing meat in terms of organoleptic and physicochemical properties, and (S3) statistical processing of data for comparing breeding systems.

The evaluations were conducted weekly, and at the end of the growth technology for each system, 60 chicks from each system were sacrificed, which allowed for the determination of slaughter performance and the assessment of meat quality.

Chapter IV is titled **MATERIALS AND METHODS** and presents the general structure and organization of the research conducted, providing details about the institutional framework in which the experiments took place and describing the working unit. In this chapter, the three analyzed growth systems (industrial intensive, ecological extensive, and free-range) are presented, along with a description of the types of combined feed used in each of them. Additionally, the characteristics of the biological material studied and the working methods used in the experiment are detailed, providing a solid methodological foundation for interpreting the results obtained in the research.

Chapter V titled **RESULTS OBTAINED AND DISCUSSIONS** describes the results achieved in each growth system regarding growth performance, slaughtering, determination of the sensory properties of meat, and chemical composition. Within the intensive industrial system, data has been obtained regarding weight gain, specific daily consumption, and final weight, while the quality of the carcasses has also been analyzed by determining the proportion of the main anatomical structures, such as the breast and thighs, as well as their chemical composition. In the ecological and free-range systems, the same production and chemical composition parameters were monitored to highlight the differences in performance and quality between the farming systems. These data were then analyzed and discussed to provide a comparative assessment of each system individually.

Chapter VI, titled **RESULTS OBTAINED AND DISCUSSIONS FOLLOWING COMPARISONS BETWEEN GROWTH SYSTEMS**, presents a detailed analysis of the performance and quality of meat obtained from the three broiler chicken growth systems: industrial intensive, organic, and free-range. Each system was evaluated in terms of daily weight gain, specific daily consumption, and final weight. In addition, the

components of the carcass, such as the breast and thighs, were analyzed to determine the chemical composition and the proportion of various anatomical structures. Comparing the intensive industrial system with ecological and free-range systems, significant differences have emerged regarding weight gain and meat quality. The intensive system showed greater efficiency in terms of growth and feed conversion, however, the ecological and free-range systems demonstrated advantages regarding meat quality, having a superior nutritional profile and a smaller environmental impact. This chapter also analyzes and compares the differences in the chemical composition and sensory qualities of chicken meat, depending on industrial intensive, organic, and free-range farming systems. The studies evaluated the sensory properties of meat, such as pH and color, alongside physicochemical parameters, mineral composition, and amino acids.

The results highlighted significant differences between the growth systems. For example, the industrial intensive system showed a higher content of crude protein and iron, while the organic and free-range systems had a higher content of magnesium and unsaturated fatty acids. The free-range system had the highest values for unsaturated fat and minerals in abdominal fat, while the organic system provided advantages in terms of the balance between n-6 and n-3 fatty acids.

Applied statistical analysis highlighted the differences in the chemical composition, proteins, amino acids, and mineral content of the meat, revealing the significant impact of each farming system on the quality of the final product.

The conclusions highlighted the quality characteristics of the meat and the performance of the chickens based on the rearing methods, namely:

The intensive industrial system has demonstrated significant uniformity regarding body weight, weight gain, and carcass yield among the studied batches. This system promotes a steady and efficient growth, with better control over the quality of the meat, including the protein content and minerals such as iron and copper. The differences in fat composition and amino acid profile were minor, confirming that the industrial system provides consistency in meat production.

The ecological system showed moderate growth performance and a balanced distribution of carcass components, although there was a slight variation in daily gain between batches. The ecological system has favored a good quality of meat, with a high magnesium content and a healthy balance of unsaturated fatty acids, compared to the intensive system. This suggests that ecological farming methods contribute to obtaining higher quality meat in terms of nutrition, but with a slight variation in growth performance.

The free-range system has stood out with a growth comparable to other systems, but with an emphasis on the sensory and nutritional quality of the meat. The elevated values for unsaturated fatty acids and essential minerals (magnesium and phosphorus) suggest that this growing system promotes healthier and more natural meat. The free-

range system has shown slight variability in the composition of fat and crude protein, reflecting the influences of environmental conditions on the characteristics of the meat.

In conclusion, each farming system offers distinct advantages: the industrial intensive system provides efficiency and consistency, the organic system promotes better nutritional balance, while the free-range system ensures superior quality meat in terms of sensory and nutritional aspects. Therefore, the choice of the growth system depends on economic priorities, sustainability, and consumer preferences.