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# EVALUATION OF QUANTITATIVE MEAT PRODUCTION IN TURKEY BROILERS RAISED IN DIFFERENT SYSTEMS

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***Abstract***

*This study evaluated quantitative meat production in turkey broilers reared under different systems during the finishing period (105-136 days): intensive (controlled environment, compound feed) and extensive (access to paddock, cereal-based diet). At slaughter, birds from the intensive system showed higher live weight (+5.70%) and superior slaughter yields (hot: +2.78%; cold: +2.41%). Carcass dissection revealed higher proportions of breast (+1.54%), thighs (+1.14%), and wings (+1.05%) in intensively reared broilers, whereas extensively reared birds exhibited a higher proportion of the back portion (+3.74%). The proportion of liver and gizzard was greater in the extensive system (+0.14% and +0.80%, respectively), while heart yield was higher in the intensive system (+0.13%). Overall, the intensive system improved quantitative production parameters, whereas the extensive system mainly influenced organ development and carcass distribution, with potential benefits for meat quality.*

***Key words:*** *anatomical portions, edible organs, rearing system, turkey broiler, slaughter yield.*

## INTRODUCTION

Turkey meat is appreciated for its low lipid content (lean meat), as well as for its important nutritional benefits and its positive effects on consumers' health (Costache et al., 2019; Üçtepe, 2025). Turkey meat production follows an upward trend due to the increasing demand, but also because of its higher profitability compared to chicken meat (Custură et al., 2012; Santos et al., 2005). Consequently, in addition to large commercial intensive turkey production complexes, an increasing number of backyard-type household farms have emerged in many regions of the world (Mottet & Tempio, 2017; Ghosh & Saha, 2023; Salgado-Pardo et al., 2025; Alemu et al., 2025).

Although the main concern of turkey breeders is to achieve high productivity and superior meat quality under conditions of the lowest possible production costs (Adhikari et al., 2024; Batkowska, 2026), they face complex and diverse challenges (disease prevention, biosecurity requirements, consumer concerns regarding food safety and animal welfare, environmental protection constraints, and rising feed costs), which significantly influence management practices, technological development, and the sustainability of the production chain (Bennett & Classen, 2003; Stadig et al., 2016; Hafez & Shehata, 2021).

One of the most important technological factors affecting productive performance in turkeys is the rearing system (Lungu et al., 2024). From this perspective, it is well known that intensive systems provide perfectly controlled environmental conditions and optimized nutrition, resulting in high body weight gains and superior carcass yield (Moise et al., 2024; Kaya et al., 2024), while extensive systems allow the expression of natural behaviors and improve welfare and meat quality, but are generally associated with lower performance and higher production costs (Vlad et al., 2025; Castellini et al., 2002; Castellini et al., 2006).

Experimental studies evaluating the effect of production systems on growth performance in turkeys have demonstrated that live weight gain, feed utilization efficiency, and production parameters differ significantly depending on management conditions (Gheorghe et al., 2021). Analyses based on repeated measurements have highlighted a strong statistical effect of the rearing system, age, and their interaction on growth dynamics, confirming the substantial influence of the

production environment on turkey development (Inci et al., 2020; Erener et al., 2006; Fanatico et al., 2007).

Studies conducted on a meat line belonging to the American Bronze breed, under different rearing systems (intensive, semi-intensive, and extensive), highlighted significant differences in live body weight and growth performance, especially in the later stages of life, emphasizing the importance of feeding level, access to pasture, and management conditions in determining productive outcomes (Arslan & Cetin, 2023).

In addition to growth performance, the production system directly influences carcass structure, the development of edible organs, and the qualitative characteristics of meat. This can be explained by differences in feeding regimes, birds' physical activity, and their exposure to natural environmental influences, technological factors that modify nutrient utilization, tissue deposition, and physiological development. These aspects determine variations in slaughter yield, the proportion of the main anatomical parts, and the weight of edible organs, which are considered essential indicators in evaluating the quantitative efficiency of poultry meat production systems (Ghosh & Saha, 2023; Vlad et al., 2025; Macovei et al., 2022).

Under these circumstances, the comparative evaluation of production systems has become essential for identifying optimal management strategies that ensure a balance between productivity, economic efficiency, animal welfare, and meat quality (Petracci & Cavani, 2012), especially in the context of the sustainable development of poultry production, where technological decisions must be supported by objective quantitative indicators related to live weight (Murawska, 2017; Inci et al., 2020; Vlad et al., 2025).

The present study aimed to evaluate the quantitative meat production in turkey broilers raised in two different production systems, intensive and extensive, in order to obtain scientifically substantiated data that would allow turkey breeders to optimize their production strategies so as to satisfy consumer demands while also improving the profitability of their activity.

## MATERIALS AND METHODS

### *Experimental design*

The study was conducted under production conditions in a unit specialized in turkey broiler rearing, using as biological material the commercial hybrid *Hybrid Converter*.

Day-old chicks were raised on permanent litter in a controlled-environment hall, with environmental factors (temperature, humidity, ventilation, and lighting program) and the quality conditions of compound feeds ensured at the levels recommended by the hybrid producing company; this was considered the "intensive system" of rearing.

At the beginning of the experimental period, a biological lot was formed consisting of a total stock of 150 turkey broilers. The birds were monitored throughout the experimental period, with weekly records of productive performance parameters, including body weight, feed consumption, water intake, feed conversion ratio, and mortality.

At the age of 105 days, a part of the birds was transferred to a free-range type hall with free access to an outdoor paddock, thus benefiting from natural environmental fluctuations as well as increased locomotor activity; this was the "extensive system" of rearing.

Until the moment of slaughter (136 days of age), the birds raised in the intensive system received a finishing compound feed in pellet form containing 18.5% C.P. and 3170 kcal M.E./kg, while the birds from the extensive system were fed a mixture of ground cereals containing 14.9% C.P. and 3220 kcal M.E./kg.

At the end of the rearing period (day 136), from both rearing systems (intensive and extensive), 6 (six) males and 6 (six) females, respectively, were selected, whose body weight was close to the average of the respective system/sex.

The selected birds were subjected to a 12-hour feed withdrawal to ensure carcass hygiene, after which they were slaughtered according to a standard procedure that included electrical stunning, bleeding for 10 minutes, scalding in water at +68°C, mechanical defeathering, and manual evisceration, thus resulting in the carcasses that constituted the subject of our study.

***Working methods***

Immediately after slaughter and evisceration, the carcasses (with head, neck, and claws) were individually weighed, and the obtained values were used to determine the hot carcass yield.

Subsequently, the carcasses were refrigerated (for 24 hours at +3.5°C), weighed again, and the cold carcass yield was determined.

The slaughter yield (hot and cold) was calculated as the percentage ratio between carcass weight (hot/cold) and live body weight.

The refrigerated carcasses were subjected to a uniform cutting procedure (performed by a single operator) into the four main regions (breast, thighs, wings, and back portion) (Figure 1).



Figure 1. Anatomical cutting of the carcasses (original source)

To determine the proportion in the carcass structure, each anatomical part was weighed individually, and the obtained value was related to the carcass weight.

After removal from the carcass, the edible organs (liver, heart, and gizzard) were cleaned of adhering tissues and then individually weighed; finally, the obtained weights were related to the weight of the carcass from which they originated, and the obtained data were used as quantitative indicators of physiological development under different rearing conditions (Figure 2).

***Statistical analysis***

The experimental data regarding live body weight, slaughter yield, carcass composition, and edible organ proportions were statistically processed using analysis of variance (ANOVA) to evaluate the differences between the intensive and extensive rearing systems.

The analysis was performed separately for males, females, and for both sexes combined. For each trait, the arithmetic mean (X), standard error of the mean ($s_x$), coefficient of variation (V%), as well as minimum and maximum values were calculated.

The significance of the differences between the compared groups was assessed based on probability values (p), and classified as follows: $p < 0.05$ (significant), $p < 0.01$ (distinctly significant), and $p < 0.001$ (highly significant), according to Field (2013).

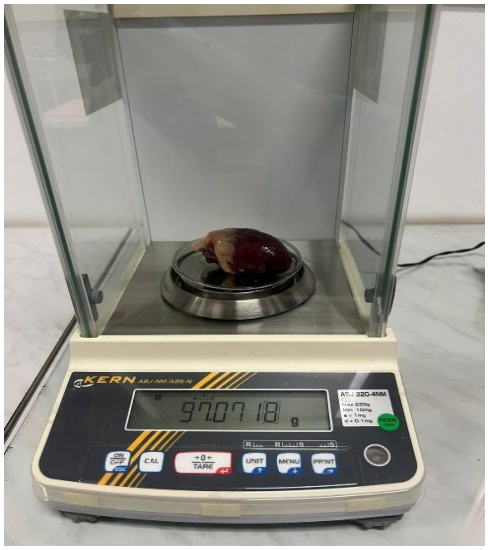


Figure 2. Determination of edible organ weight (original source)

**RESULTS AND DISCUSSIONS**

The quantitative evaluation of meat production in turkey broilers was based on the analysis of body weight at slaughter, slaughter yield (hot and cold), the anatomical structure of carcasses (the proportion of anatomical regions in carcass composition), and the weights of edible organs (heart, liver, and gizzard).

***Body weight at slaughter***

The comparative analysis of body weights at the time of slaughter highlighted differences both between the two sexes and between the tested rearing systems (Table 1).

Thus, males raised under intensive conditions reached an average body weight of 16.360±0.22 kg, compared to only 15.610±0.08

kg for those in the extensive system, the difference being statistically distinctly significant (p = 0.0053). In the case of females, the differences between groups were very statistically significant (p = 0.0004), against the background of average weights of 15.720±0.12 kg in the intensive system and only 14.641±0.12 kg in the extensive system. In both cases, the studied trait showed very good homogeneity, with coefficient of variation values ranging from 1.34-0.55% in males and 0.79-0.88% in females.

Table 1. Body weight at slaughter

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (kg) | V% | $X \pm s_x$ (kg) | V% |
| Males | 16.360±0.22 | 1.34 | 15.610±0.08 | 0.55 |
| | ** MI vs ME: p= 0.0053 | | | |
| Females | 15.720± 0.12 | 0.79 | 14.641±0,12 | 0.88 |
| | *** FI vs. FE: p= 0.0004 | | | |
| Both sexes | 16.040± 0.49 | 3.10 | 15.126±0,54 | 0.57 |
| | **I vs E: p= 0.0089 | | | |

Note: NS – non-significant; *significant differences (0.01 < p < 0.05); ** distinctly significant differences (0.001 < p < 0.01); *** very significant differences (p < 0.001)

From the comparative analysis of body weight (males + females) carried out within the two production systems, average values of 16.040±0.49 kg were obtained for the birds raised in the intensive system and 15.126±0.54 kg for those in the extensive system, leading to a statistically distinctly significant difference (p = 0.0089) between the two groups.

The studied trait was very homogeneous at the group level, an aspect validated by the very low values of the coefficient of variation (intensive system = 3.1%; extensive system = 0.57%).

The obtained results indicate a clear superiority of the intensive rearing system in terms of body weight at slaughter (16.04 kg vs. 15.13 kg). Similar findings were reported by Arslan & Cetin (2023), where higher final body weights were recorded in turkeys raised under intensive conditions compared to extensive systems (up to 7.79 kg vs. 6.71 kg in males). Ince et al. (2020) demonstrated that the rearing system has a significant effect on growth performance and body weight dynamics, confirming the strong influence of environmental and nutritional conditions.

***Slaughter yield***

The obtained data confirmed the same trend observed for body weight, namely that both carcass weights and slaughter yield were higher in birds raised under intensive conditions and, consistently, higher in males than in females.

For example, immediately after slaughter, the average weight of hot carcasses was 13.072±0.11 kg in males raised in the intensive system, compared to 12.046±0.05 kg in those raised in the extensive system, the difference being statistically distinctly significant (p = 0.004).

In the case of females, the average carcass weight was 12.197±0.16 kg in the intensive system and 10.946±0.04 kg in the extensive system, the difference between the two systems being very statistically significant (p = 0.0003).

The overall analysis of both sexes showed an average carcass weight of 12.635±0.21 kg in birds raised in the intensive system and 11.496±0.23 kg in those raised in the extensive system, the difference between systems being statistically distinctly significant (p = 0.006).

Regarding the hot slaughter yield, the values were also higher in birds raised in the intensive system. Thus, in males an average yield of 79.90±0.18% was recorded, compared to 77.15±0.14% in the extensive system, with distinctly significant differences (p = 0.003).

In females, the average yield was 77.59±0.90% in the intensive system and 74.76±0.13% in the extensive system, the difference being statistically distinctly significant (p = 0.001).

For the two sexes combined, the slaughter yield was 78.74±0.54% in the intensive system and 75.96±0.34% in the extensive system, the difference between systems being statistically distinctly significant (p = 0.002) (Table 2).

Table 2. Hot slaughter yield

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (kg) | V% | $X \pm s_x$ (kg) | V% |
| Hot carcass weight | | | | |
| Males | 13.072 ± 0.11 | 1.50 | 12.046 ± 0,05 | 1.02 |
| | **MI vs ME: p = 0.004 | | | |
| Females | 12.197 ± 0.16 | 3.27 | 10.946 ± 0.04 | 0.62 |
| | ***FI vs FE: p = 0.0003 | | | |
| Both sexes | 12.635 ± 0.21 | 2.54 | 11.496 ± 0.23 | 2.77 |
| | **I vs E: p = 0.006 | | | |
| Hot slaughter yield (%) | | | | |
| Males | 79.90 ± 0.18 | 0.40 | 77.15 ± 0.14 | 0.52 |
| | **MI vs ME: p = 0.003 | | | |
| Females | 77.59 ± 0.90 | 2.02 | 74.76 ± 0.13 | 0.30 |
| | **FI vs FE: p = 0.001 | | | |
| Both sexes | 78.74 ± 0.54 | 1.37 | 75.96 ± 0.34 | 0.89 |
| | **I vs E: p = 0.002 | | | |

Note: NS – non-significant; *significant differences (0.01 < p < 0.05); ** distinctly significant differences (0.001 < p < 0.01); *** very significant differences (p < 0.001)

The higher slaughter yield recorded in intensively reared birds (78.74% vs. 75.96%) confirms the superior efficiency of nutrient utilization under controlled conditions. These results are in agreement with those reported by Adhikari et al. (2024), who observed improved growth performance and feed efficiency in turkeys raised under intensive systems, which are directly associated with higher carcass yield.

After a 24-hour refrigeration period, the carcass weight was 12.854±0.11 kg in males raised in the intensive system, compared to 11.899±0.05 kg in those raised in the extensive system, the difference being statistically distinctly significant ($p = 0.004$).

In the case of females, the average cold carcass weight was 11.994±0.16 kg in the intensive system and 10.810±0.04 kg in the extensive system, the difference being very statistically significant ($p = 0.0003$).

The overall analysis of both sexes showed an average cold carcass weight of 12.424±0.21 kg in birds raised in the intensive system and 11.355±0.23 kg in those raised in the extensive system, the difference being statistically distinctly significant ($p = 0.006$) (Table 3).

Table 3. Cold slaughter yield

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (kg) | V% | $X \pm s_x$ (kg) | V% |
| Cold carcass weight | | | | |
| Males | 12.854 ± 0.11 | 1.20 | 11.899 ± 0.05 | 0.94 |
| | **MI vs ME: p = 0,004 | | | |
| Females | 11.994 ± 0.16 | 3.27 | 10.810 ± 0.04 | 0.69 |
| | ***FI vs FE: p = 0,0003 | | | |
| Both sexes | 12.424 ± 0.21 | 2.54 | 11.355 ± 0.23 | 2.77 |
| | **I vs E: p = 0,006 | | | |
| Cold slaughter yield (%) | | | | |
| Males | 78.57 ± 0.16 | 0.44 | 76.21 ± 0.14 | 0.56 |
| | **MI vs ME: p = 0.003 | | | |
| Females | 76.30 ± 0.88 | 2.04 | 73.83 ± 0.14 | 0.37 |
| | **FI vs FE: p = 0.001 | | | |
| Both sexes | 77.43 ± 0.52 | 1.38 | 75.02 ± 0.33 | 0.91 |
| | **I vs E: p = 0.002 | | | |

Note: NS – non-significant; *significant differences ($0.01<p<0.05$); ** distinctly significant differences ($0.001<p<0.01$); *** very significant differences ($p < 0.001$)

***Proportion of anatomical parts***

The distribution of the anatomical parts obtained from carcass cutting highlighted differences due to the experimental factors considered.

The proportion of the breast recorded the highest values among all carcass components and was higher in males raised under intensive conditions (33.62±0.18%), compared to those from the extensive system (32.07±0.24%), the statistical differences between the two groups being distinctly significant ($p < 0.001$).

A similar situation was also observed in females, where the breast proportion was 33.08±0.10% in the intensive system and 32.40±0.17% in the extensive system, the differences between systems also being statistically distinctly significant ($p < 0.001$).

Calculated as an average for the two sexes (males + females), the breast proportion was 33.35±0.11% in birds from the intensive system and only 31.81±0.17% in those from the extensive system, thus the statistical difference between groups was very significant (Table 4).

Table 4. Breast proportion in the carcass structure

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (%) | V% | $X \pm s_x$ (%) | V% |
| Males | 33.62 ± 0.18 | 0.55 | 32.07 ± 0.24 | 0.75 |
| | **MI vs ME: p < 0.0010 | | | |
| Females | 33.08 ± 0.10 | 0.30 | 32.40 ± 0.17 | 0.52 |
| | **FI vs FE: p < 0.0010 | | | |
| Both sexes | 33.35 ± 0.11 | 0.79 | 31.81 ± 0.17 | 1.31 |
| | *** I vs E: p = 0.0002 | | | |

Note: NS – non-significant; *significant differences ($0.01 < p < 0.05$); ** distinctly significant differences ($0.001 < p < 0.01$); *** very significant differences ($p < 0.001$)

The determinations carried out to establish the proportion of thighs in the carcass structure highlighted higher values in birds raised in the intensive system compared to those raised in the extensive system (Table 5).

Thus, in males, the proportion of thighs was 32.83±0.18% in the intensive system and 31.65±0.19% in the extensive system, the differences between the two systems being statistically distinctly significant ($p < 0.001$).

A similar situation was also observed in the case of females, where the proportion of thighs was 32.46±0.12% in the intensive system and 31.54±0.16% in the extensive system, the difference between groups also being statistically distinctly significant ($p < 0.001$).

Calculated as an average for both sexes (males + females), the proportion of thighs in the carcass structure was 32.59±0.05% in birds raised in the intensive system and 31.45±0.09% in those from the extensive system, the statistical difference between the two systems being very significant ($p < 0.0001$).

Table 5. Proportion of thighs in the carcass structure

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (%) | V% | $X \pm s_x$ (%) | V% |
| Males | 32.83 ± 0.18 | 0.55 | 31.65 ± 0.19 | 0.60 |
| | **MI vs ME: p < 0.001 | | | |
| Females | 32.46 ± 0.12 | 0.37 | 31.54 ± 0.16 | 0.52 |
| | **FI vs FE: p < 0.001 | | | |
| Both sexes | 32.59 ± 0.05 | 0.37 | 31.45 ± 0.09 | 0.69 |
| | *** I vs E: p < 0.0001 | | | |

Note: NS – non-significant; *significant differences (0.01 < p < 0.05); ** distinctly significant differences (0.001 < p < 0.01); *** very significant differences (p < 0.001)

The determinations carried out to establish the proportion of wings in the carcass structure revealed higher values in birds raised in the intensive system compared to those raised in the extensive system (Table 6).

Thus, in males, the proportion of wings was 12.20±0.18% in the intensive system and 11.25±0.54% in the extensive system, while in females the proportion of wings was 11.99±0.16% in the intensive system and 10.17±0.32% in the extensive system.

Calculated as an average for both sexes (males + females), the proportion of wings in the carcass structure was 12.13±0.08% in birds raised in the intensive system and 11.08±0.16% in those from the extensive system.

In all three situations presented, the statistical differences between the groups were distinctly significant.

Table 6. Proportion of wings in the carcass structure

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (%) | V% | $X \pm s_x$ (%) | V% |
| Males | 12.20 ± 0.18 | 1.47 | 11.25 ± 0.54 | 4.80 |
| | **MI vs ME: p < 0.01 | | | |
| Females | 11.99 ± 0.16 | 1.33 | 10.17 ± 0.32 | 3.14 |
| | **FI vs FE: p < 0.01 | | | |
| Both sexes | 12.13 ± 0.08 | 1.63 | 11.08 ± 0.16 | 3.59 |
| | ** I vs E: p = 0.0029 | | | |

**Note:** NS – non-significant; *significant differences (0.01 < p < 0.05); ** distinctly significant differences (0.001 < p < 0.01); *** very significant differences (p < 0.001)

The analysis of the anatomical structure of the carcass revealed that the proportion of the back portion was higher in birds raised in the extensive system compared to those raised in the intensive system (Table 7).

In the case of males, the back portion represented 21.34±0.34% of the carcass structure in birds raised intensively, while in birds raised in the extensive system the proportion was 25.03±0.26%, the difference between the two systems being very statistically significant (p < 0.001).

In females, the same trend was observed, the back-portion accounting for 22.47±0.18% in the intensive system and 25.89±0.44% in the extensive system, the difference between the groups also being very statistically significant (p < 0.001).

Considering the average values for both sexes (males + females), the back portion represented 21.92±0.20% of the carcass structure in birds raised in the intensive system and 25.66±0.23% in those raised in the extensive system, the difference between the two systems being very statistically significant (p < 0.0001).

Table 7. Proportion of the back portion in the carcass structure

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (%) | V% | $X \pm s_x$ (%) | V% |
| Males | 21.34 ± 0.34 | 1.59 | 25.03 ± 0.26 | 1.05 |
| | *** MI vs ME: p < 0.0001 | | | |
| Females | 22.47 ± 0.18 | 0.80 | 25.89 ± 0.44 | 1.70 |
| | *** FI vs FE: p < 0.0001 | | | |
| Both sexes | 21.92 ± 0.20 | 2.24 | 25.66 ± 0.23 | 2.17 |
| | *** I vs E: p < 0.0001 | | | |

Note: NS – non-significant; *significant differences (0.01 < p < 0.05); ** distinctly significant differences (0.001 < p < 0.01); *** very significant differences (p < 0.001)

The higher proportion of breast (33.35% vs. 31.81%), thighs (32.59% vs. 31.45%), and wings (12.13% vs. 11.08%) in intensively reared birds indicates enhanced muscle development under optimized feeding and management conditions. A similar influence of feeding system and nutrient availability on carcass composition was reported by Erener et al. (2006), who highlighted that feeding strategy significantly affects tissue deposition and carcass traits.

In contrast, the higher proportion of the back portion in extensively reared birds (25.66% vs. 21.92%) may be associated with increased locomotor activity and different patterns of energy utilization. This observation is consistent with the findings of Ghosh & Saha (2023), who reported that birds raised in extensive systems exhibit different growth patterns and lower muscle deposition in commercially valuable cuts.

### *Yield of edible organs*

The evaluation of the yield of edible organs highlighted distinct variations between turkey broilers raised in different systems, reflecting both metabolic adaptation and the physiological responses associated with

differences in rearing conditions, activity level, and feed utilization efficiency.

The liver yield showed moderate but statistically significant differences between the two production systems. Thus, males raised in the extensive system recorded a liver proportion of 1.44±0.06%, compared to 1.28±0.06% in those from the intensive system, the difference between the two groups being statistically significant ($p < 0.05$).

The same phenomenon was also observed in the case of females, in which the liver yield was 1.55±0.04% in the extensive system and 1.52±0.10% in the intensive system, the difference between systems also being statistically significant ($p < 0.05$).

The average liver proportion (males + females) was 1.50±0.04% in broilers raised in the extensive system, compared to 1.36±0.05% in birds raised in the intensive system, the difference being statistically significant ($p < 0.05$). This trend may be attributed to the increased metabolic activity associated with more intense locomotion and variable feed consumption patterns characteristic of extensive systems, which may stimulate hepatic development due to higher energy expenditure and physiological adaptation to fluctuating environmental conditions (Table 8).

Table 8. Liver proportion relative to carcass weight

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (%) | V% | $X \pm s_x$ (%) | V% |
| Males | 1.28 ± 0.06 | 8.60 | 1.44 ± 0.06 | 7.16 |
| | *MI vs ME: $p < 0.05$ | | | |
| Females | 1.52 ± 0.10 | 6.71 | 1.55 ± 0.04 | 2.38 |
| | *FI vs FE: $p < 0.05$ | | | |
| Both sexes | 1.36 ± 0.05 | 9.05 | 1.50 ± 0.04 | 6.72 |
| | * I vs E: $p < 0.041$ | | | |

Note: NS – non-significant; *significant differences ($0.01 < p < 0.05$); ** distinctly significant differences ($0.001 < p < 0.01$); *** very significant differences ($p < 0.001$)

The analysis of the proportion of the gizzard in the carcass structure revealed clear differences between the rearing systems, with higher values recorded in birds from the extensive system (Table 9).

In males, the gizzard represented 1.66±0.02% of the carcass weight in the intensive system, while in birds raised extensively its proportion was 2.44±0.06%, the difference between the two systems being statistically distinctly significant ($p < 0.001$).

A similar trend was observed in females, where the gizzard proportion was 1.72±0.02% in the intensive system and 2.57±0.06% in the extensive system, the difference between the groups being distinctly significant ($p < 0.001$).

Considering the average values for both sexes (males + females), the gizzard proportion was 1.69±0.02% in birds raised in the intensive system and 2.49±0.03% in those from the extensive system, the statistical difference between the two systems being very significant ($p < 0.0001$).

Table 9. Gizzard proportion relative to carcass weight

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (%) | V% | $X \pm s_x$ (%) | V% |
| Males | 1.66 ± 0.02 | 1.70 | 2.44 ± 0.06 | 2.45 |
| | **MI vs ME: $p < 0.001$ | | | |
| Females | 1.72 ± 0.02 | 1.40 | 2.57 ± 0.06 | 2.30 |
| | **FI vs FE: $p < 0.001$ | | | |
| Both sexes | 1.69 ± 0.02 | 2.61 | 2.49 ± 0.03 | 3.03 |
| | *** I vs E: $p < 0.0001$ | | | |

Note: NS – non-significant; *significant differences ($0.01 < p < 0.05$); ** distinctly significant differences ($0.001 < p < 0.01$); *** very significant differences ($p < 0.001$)

The evaluation of the proportion of the heart in the carcass structure revealed differences between the two rearing systems, with higher values recorded in birds raised in the intensive system (Table 10).

In the case of males, the heart proportion was 0.57±0.02% in the intensive system and 0.53±0.01% in birds raised in the extensive system, the difference between the two systems being statistically distinctly significant ($p < 0.01$).

In females, a similar trend was observed, the heart proportion being 0.67±0.02% in birds raised in the intensive system and 0.50±0.01% in those raised in the extensive system, the difference between groups also being statistically distinctly significant ($p < 0.01$).

Table 10. Heart proportion relative to carcass weight

| Specification | Intensive rearing (n=6) | | Extensive rearing (n=6) | |
|---|---|---|---|---|
| | $X \pm s_x$ (%) | V% | $X \pm s_x$ (%) | V% |
| Males | 0.57 ± 0.02 | 3.51 | 0.53 ± 0.01 | 1.89 |
| | **MI vs ME: $p < 0.001$ | | | |
| Females | 0.67 ± 0.02 | 2.99 | 0.50 ± 0.01 | 2.00 |
| | **FI vs FE: $p < 0.001$ | | | |
| Both sexes | 0.62 ± 0.02 | 7.49 | 0.49 ± 0.02 | 10.64 |
| | ** I vs E: $p < 0.003$ | | | |

Note: NS – non-significant; *significant differences ($0.01 < p < 0.05$); ** distinctly significant differences ($0.001 < p < 0.01$); *** very significant differences ($p < 0.001$)

Calculated as an average for both sexes (males + females), the heart proportion in the carcass structure was 0.62±0.02% in birds from the intensive system and 0.49±0.02% in those raised in the extensive system, the statistical difference between the two systems being distinctly significant ($p < 0.003$).

The higher proportions of liver (1.50% vs. 1.36%) and gizzard (2.49% vs. 1.69%) in the extensive system reflect increased digestive activity and adaptation to less processed diets. Similar trends were reported by Macovei et al. (2022), who showed that alternative production systems influence metabolic activity and physiological development. Conversely, the higher heart proportion in intensively reared birds (0.62% vs. 0.49%) may be associated with accelerated growth rate and increased metabolic demands.

## CONCLUSIONS

The obtained results demonstrate that the rearing system exerts a significant influence on the quantitative meat production in turkey broilers, with direct repercussions on body weight at slaughter, slaughter yield, carcass anatomical structure, and the development of internal organs.

The performed analysis highlighted that birds raised under intensive conditions reached significantly higher body weights at slaughter, both in males (by 4.58%) and in females (by 6.86%), confirming the superior efficiency of controlled rearing conditions, balanced feeding regimes, and optimized technological management.

The data obtained at slaughter followed the same trend, intensively raised broilers recording higher carcass weights, both hot (by 9.01%) and cold (by 8.60%), as well as higher slaughter yield values (by 2.78% – hot yield and by 2.41% – cold yield) compared to birds raised in the extensive system. These results highlight the direct relationship between growth rate, nutrient utilization efficiency, and muscle mass development under intensive management conditions.

The evaluation of the anatomical structure of the carcass also highlighted the influence of the rearing system on the distribution of carcass components. The intensive system favored the development of components with high commercial value, especially the breast (by 1.54%) and the thighs (by 1.14%). In contrast, birds raised in the extensive system showed higher proportions of the back portion (by 3.74%), an aspect associated with more intense locomotor activity and different utilization of energy resources.

The analysis of the yield of edible organs revealed additional differences between the two rearing systems. The extensive system was associated with a more pronounced development of the gizzard, suggesting more intense digestive activity, while birds raised in the intensive system showed a higher proportion of the heart, possibly as a result of the accelerated growth rate. The liver yield showed moderate but statistically significant variations, indicating metabolic adaptations to different rearing conditions and energy consumption.

The results of the study confirm that the rearing system significantly influences the productivity of turkey broilers. Thus, the intensive system maximizes productive performance and yield in meat production, while the extensive system leads to certain physiological adaptations reflected in the development of internal organs and less in carcass structure, but which will certainly be reflected in the quality of the obtained meat.

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