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Slaughter traits of Pharaoh Japanese quails

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Abstract. Slaughter traits and possibilities for production of manually deboned meat were investigated in Japanese quails. The study was conducted at the Poultry breeding unit of the Faculty of Agriculture, Trakia University – Stara Zagora. Slaughter yield and relative shares of the different cuts with bones and deboned breast and thigh meat were determined in 35-day-old Pharaoh Japanese quails. It was found out that the grill percentage (carcass without skin and giblets) was 58-64.5% of live weight. Breast with bone comprised 36.5-49.9% of grill weight, and thighs; 23.2-32.4%. From one quail, about 75.6-110 g deboned breast and thigh meat could be produced, e.g. 50-57% of grill weight. Breast meat yield was 47-72 g from one bird equal to 31.2-42.8% of grill weight. At 35 days of age, abdominal fat percentage was relatively low (0.8% of grill weight) with bird-to-bird variation of 0.12 and 2.1%. It could be concluded that Japanese quails are a promising species that could be marketed both as whole-body carcass (grill) or as manually deboned cuts (breast with bone and thighs). The ratio of deboned meat and bones plus remaining muscle tissue was 5.9 and 4.5 for breast and thighs, respectively.

Keywords: Japanese quails, productivity, slaughter traits, deboned meat

Introduction

The interest in Japanese quails has been continuously increasing during the last years at a global scale. In many countries, farming of Japanese quails is put on industrial grounds. China, Japan, England, France, Italy, Spain, Poland, Estonia, etc. occupy the leader positions in the branch (Kretov, 2012). Since 2014 this species has been included in programmes for financial support of young farmers in Bulgaria. Even though farmers included in these programmes are mainly oriented to egg production, concomitant production of meat from male quails could be organized at quail farms, although not at a large scale.

So far, there are no worldwide accepted standards for quail meat production. Some starting points could be found in the research literature for evaluation of carcasses offered at the retail market. These requirements relate mainly to egg-type quails which are not important for Bulgaria. According to them, the minimum weight of 1 quality grill carcass should be > 85 g, and slaughter yield – 65.5% (Rvankin, 1992).

Modern high-producing Japanese quail meat breeds and strains exceed substantially these requirements. Their live weight at 30-35 days of age is from 200 to 250 g (Afanasev et al., 2013). Carcasses could be sold either whole, frozen or cooled, or as cuts - frozen or cooled breast and thighs.

Japanese quails have high breast and thigh yields, and have meatiness coefficients of 6.1 and 3.3 for breast and thigh, respectively (Kretov, 2012). On average, breast with bone comprise 36.4-38.7% of live weight, the thighs - 21.9-24.8%, and the back, neck and wings together make up 35.9-37.8% (Panda and Singh, 1990; Alkan et al., 2010). The percentage of manually deboned meat is as follows: breast meat – 30.5-31% of carcass weight, thigh meat: 18.7-21% (Afanasev et al., 2013).

The aim of the present study was to analyse slaughter traits of the Pharaoh Japanese quail population raised at Trakia University – Stara Zagora with respect to its potential for production of manually deboned Japanese quail meat.

Material and methods

The study was conducted at the Poultry breeding unit of the Faculty of Agriculture, Trakia University – Stara Zagora. Slaughter analysis was performed with 33 male Pharaoh Japanese quails. They were fattened until 35 days of age with compound feed corresponding to biological requirements of the species (Genchev, 2014). The content of the used feed was as follows:

- starter (1-17 days of age) – 11.1 MJ/kg ME, 24% CP, 1.3% lysine, 0.52% methionine, 1.2% Ca, 0.5% available P;
- grower (18-24 days of age) – 11.2 MJ/kg ME, 20% CP, 1% lysine, 0.45% methionine, 1.1% Ca, 0.45% available P;
- finisher (25-35 days of age) – 11.5 MJ/kg ME, 18% CP, 0.9% lysine, 0.4% methionine, 1% Ca, 0.4% available P.

At 35 days of age, after 4-hour fasting, quails were slaughtered. The initial processing of carcasses was done by removal of the skin with feathers. Slaughter analysis was performed according to the detailed protocol for Japanese quails described by Genchev and Mihaylov (2008). Afterwards the carcasses were identified with personal ID numbers and weighed on a ACBplus-300 balance with precision of 0.01g. Weighed and numbered carcasses were arranged in polystyrene trays, packed with stretch wrap and cooled at 0-4°C for 24 h.

After the 24-hour cold storage, carcasses were cut and the weight of different cuts was determined with precision of 0.01g. Slaughter yield and relative weights ofcuts with bone and deboned breast and thigh meat were calculated.

All data were analysed by Statistica 13.0 software (Statistica for Windows; Stat – Soft, 2015). Mean (x) and standard error of mean (SEM) values were calculated.
Results and discussion

The grill percentage in Pharaoh Japanese quails was 61.8% with variations between 58 and 64.5% of the live weight (Table 1). These values are lower than other published percentages - from 65% (Panda and Singh, 1990) to 69.5% (Tavaniello et al., 2014). The cause for the lower slaughter yield in our study was the method for cleaning of carcasses, e.g. removal of the skin together with feathers.

Table 1. Slaughter traits of the investigated quails

<table>
<thead>
<tr>
<th>Traits</th>
<th>Weight, g</th>
<th>% of live weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=33</td>
<td>n=33</td>
</tr>
<tr>
<td>Live body weight</td>
<td>x±SEM</td>
<td>243.6±12.07</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grill</td>
<td>x±SEM</td>
<td>150.63±1.38</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drip loss</td>
<td>x±SEM</td>
<td>1.70±0.47</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bratfertig</td>
<td>x±SEM</td>
<td>170.0±15.1</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck</td>
<td>x±SEM</td>
<td>6.53±0.15</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart</td>
<td>x±SEM</td>
<td>2.10±0.07</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td>x±SEM</td>
<td>5.53±0.17</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spleen</td>
<td>x±SEM</td>
<td>0.19±0.01</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gizzard</td>
<td>x±SEM</td>
<td>5.01±0.14</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal fat</td>
<td>x±SEM</td>
<td>1.19±0.14</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After the initial processing, during the cooling of the carcass between the 4th hour (end of rigor mortis) and the 24th hour after slaughter, average drip loss amounted to 1.1% (from 0.5 to 2.9%).

The average weight of carcass without skin, with neck and gibelts (bratfertig) was 170 g, which corresponded to 66-72.5% of live weight of Pharaoh quails. A similar result was obtained by Kretov (2012) – 66.4% using a similar method of carcass processing. Higher bratfertig percentages were reported by Afanasiev et al. (2013) – 71.9-73.5% with inclusion of abdominal fat in bratfertig weight.

A more detailed analysis of the weight of share of the neck and other visceral organs showed that altogether they weighed 19.4g with variation from 15.9 to 24.3g. e.g. almost 8% of the live weight of the studied birds. The edible offal proportion was 5.27±0.09% from live weight.

At 35 days of age, abdominal fat in Pharaoh Japanese quails was very low: from 0.1 to 1.3% of live weight making carcasses very attractive from dietetic point of view. Similar results about abdominal fat content up to 7 weeks of age were reported by Afanasiev et al. (2013).

One of the meat traits in birds is the percentage of cuts with high relative percentage of edible meat (breast with bone and thighs), presented in Table 2. Their relative proportion in our study was from 66.7 and 78.7% of grill weight corresponding to 28.2±0.34% of live weight (breast with bone) and 17.6±0.14% (thighs). Similar to these results were established by Kretov (2012).

Table 2. Weight and relative shares of different quail cuts

<table>
<thead>
<tr>
<th>Traits</th>
<th>Weight, g</th>
<th>% of grill weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=33</td>
<td>n=33</td>
</tr>
<tr>
<td>Wings</td>
<td>x±SEM</td>
<td>12.19±0.18</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back</td>
<td>x±SEM</td>
<td>10.55±14.32</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast with bone</td>
<td>x±SEM</td>
<td>68.12±1.15</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thighs</td>
<td>x±SEM</td>
<td>42.61±0.49</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast meat</td>
<td>x±SEM</td>
<td>58.73±1.08</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>including superficial pectoral muscle</td>
<td>x±SEM</td>
<td>64.56±0.83</td>
</tr>
<tr>
<td>deep pectoral muscle</td>
<td>x±SEM</td>
<td>12.15±0.29</td>
</tr>
<tr>
<td>Thigh meat</td>
<td>x±SEM</td>
<td>35.17±0.49</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total breast+thigh meat</td>
<td>x±SEM</td>
<td>93.90±1.41</td>
</tr>
<tr>
<td>min÷max</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Low-value cuts – wings and back represented 8 and 17.8% of grill weight. Their meatiness is low – according to Kretov (2012), the relative meat percentage is about 1/3 of cut weight. Small size and low relative meat content make them non-attractive for consumers if sold as separate cuts. They could be potentially used either in mechanical separation of meat or in their use as a source for pet food production.

After manual deboning, about 76 to 110 g high-quality meat could be produced from a bird, half of which is breast meat. The relative proportion of breast meat was 31.2-42.8% of grill weight, and that of thigh meat: 23.2-32.4%. The relative proportion of the superficial pectoral muscle was 79.3% of breast meat weight.

A positive trait of Japanese quails is the very high meat to bones ratio of breast and thighs. The relative proportion of meat in breast with bone was 85.4% and in thighs: 81.4% giving coefficients of meatiness of 5.9 and 4.5, respectively. It could be therefore assumed that the manual deboning of meat from these two cuts could be a profitable business that could fill an empty niche in Bulgarian meat production industry.

Conclusion

Japanese quails are a promising species with excellent meat quality traits, high edible meat yield from breast and thighs and optimum meat composition from dietetic point of view. After manual deboning, about 76 to 110g high-quality meat could be produced.
from a bird, half of which breast meat. The meat to bone ratios of breast and thighs were 5.9 and 4.5, respectively, making Japanese quails suitable for production of manually deboned meat.

Reference

Genchev A, 2014. Production characteristics of Japanese quails (Coturnix coturnix japonica) from Pharaoh and Manchurian Golden breeds. Thesis for DSc, Trakia University, Stara Zagora, Bulgaria (Bg).
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