Comparison of the slaughter characteristics of meat-type chicks hatched from eggs with different composition

Gábor Milisits, Olga Pőcze, Jolán Ujvári, Emese Kovács, Gabriella Jekkel, Zoltán Sütő

Kaposvár University, Hungary

ABSTRACT - Using the so-called TOBEC (Total Body Electrical Conductivity) method for the in vivo determination of egg composition, the effect of egg composition on the slaughter characteristics of hatched chicks was examined in the ROSS-308 meat-type genotype. Chicks hatched from eggs with low, average and high electrical conductivity were slaughtered at 42 days of age. It was found that the weight of all of the examined traits showed highest values in the case of chicks hatched from eggs with low electrical conductivity, while the lowest values could be observed in the case of chicks hatched from eggs with high electrical conductivity. Similar tendencies were observed also in the case of the ratio of the examined slaughter traits to the slaughter weight, but in this case the differences were not statistically proven (P>0.05).

Key words: Egg composition, Hatching, chicks, Slaughter characteristics.

Introduction – In some former experiments it was already established that the embryonic development is slower in the eggs of younger hens than in the eggs of older ones (Applegate, 2002). It was supposed that the reason for this could be the lower proportion of yolk in the eggs of the younger hens. However, the clarification of the effect of egg composition on the hatchability and hatched bird's development was mainly hindered by the lack of a reliable technique/equipment, capable of determining the egg composition in vivo. Using the so-called TOBEC (Total Body Electrical Conductivity) method in a former study it was pointed out that the eggs’ composition has a significant effect on the hatchability and also on the body composition of the hatched chicks (Milisits et al., 2008). Based on these former results the aim of the present study was to examine the effect of egg composition on the slaughter characteristics of the hatched chicks in a meat-type genotype.

Material and methods – The experiment was carried out with 1,500 hen’s eggs originated from a 36 weeks old ROSS-308 hybrid parent stock and collected on the same day. For predicting their composition in vivo their electrical conductivity (E-value) was measured by means of the so-called TOBEC method (EM-SCAN SA-2 type Small Animal Body Composi-
tion Analyser). Based on the measured values eggs with extreme high, extreme low and average electrical conductivity values (10-10%) were chosen for further examinations.

After the TOBEC measurements 15-15 eggs from each of the experimental groups were broken and their albumen/yolk ratio was determined. Their dry matter, crude protein and crude fat content was chemically analysed by the instructions of the Hungarian Standards (dry matter: MSZ ISO 1442, crude protein: MSZ EN ISO 5983-1:2005, crude fat: MSZ 6369-15:1982). Remaining eggs were incubated thereafter in the hatchery of the Kaposvár University.

Hatched chicks were then reared in a closed building till 6 weeks of age and slaughtered thereafter. During the slaughter procedure, the following traits were recorded: liveweight at slaughter, grill-ready weight, the weight of breast with skin and bones, the weight of thighs with skin and bones, the weight of breast muscle and the weight of abdominal fat.

For the evaluation of the effect of separation on the eggs’ composition the One-Way ANOVA model was used. The significance of between group differences was tested by the LSD post hoc test. The effect of electrical conductivity of eggs of origin and sex on the slaughter traits was evaluated by the following general linear model: \( Y_{ij} = \mu + E_i + S_j + e_{ijk} \), where \( \mu \) = overall mean, \( E_i \) = the effect of electrical conductivity of eggs of origin (\( i = 1-3 \)), \( S_j \) = the effect of sex (\( j = 1-2 \)) and \( e_{ijk} \) = random error. All of these statistical analyses were performed by the SPSS statistical software package (SPSS for Windows, 1999).

**Results and conclusions** – In Table 1 it is well visible that eggs with extreme low and extreme high electrical conductivity differ significantly from each other also in their chemical composition. The values of eggs with average electrical conductivity varied between the values of the two extreme groups in each case, but they were mainly closer to that of eggs with low electrical conductivity.

|                          | Eggs with low electrical conductivity | Eggs with average electrical conductivity | Eggs with high electrical conductivity |
|--------------------------|--------------------------------------|------------------------------------------|---------------------------------------|
| Albumen/yolk ratio       | 2.34±0.33                            | 2.44±0.24                                | 2.65±0.41                            |
| Dry matter (g/kg)        | 23.5±1.3                             | 23.3±0.8                                | 21.8±1.2                             |
| Crude protein (g/kg)     | 12.0±0.3                             | 11.9±0.4                                | 10.9±0.6                             |
| Crude fat (g/kg)         | 9.5±0.8                              | 9.3±0.7                                 | 8.9±1.0                              |

Different letters in the same row indicate significant differences (\( P<0.05 \)).

It was interesting to see that the composition of eggs of origin had a significant effect on the most of the slaughter traits of the hatched chicks (Table 2). The weight of all of the examined traits showed highest values in the case of chicks hatched from eggs with low electrical conductivity, while the lowest values could be observed in the case of chicks hatched from eggs with high electrical conductivity. The differences between the two extreme groups were also statistically proven almost in all cases.
Similar tendencies were observed also in the case of the ratio of the examined slaughter traits to the slaughter weight, but in this case the differences were not statistically proven (P>0.05). This research project was supported by the Hungarian OTKA grant (F049203) and the National Office for Research and Technology (Öveges József program).

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