

STUDIES REGARDING THE CHEMICAL COMPOSITION OF EGGS PROVIDED BY THE GRAY GUINEA FOWL *NUMIDA MELEAGRIS*

Alina Teodorescu^{1*}, Gabriela Atudosiei¹, D.C. Roșca¹,
R.M. Radu-Rusu¹, M.G. Usturoi¹

¹Faculty of Animal Sciences, University of Agricultural Sciences and Veterinary Medicine of Iasi, Romania

Abstract

Consumption of eggs and poultry is very important for the proper functioning of the body. Guinea fowl eggs are seen as a dietary product due to the high digestibility of all nutrients. Today, in order to prevent the appearance of diseases or illnesses, for the educated consumer, healthy eating appears as a problem of significant interest, both socially and economically.

Therefore, the objective of the research was to evaluate the chemical composition of the guinea fowl eggs from both the extensive and intensive system. The indicators followed were represented by the water and dry matter content, the amount of protein, the lipid content, the amount of microelements and macroelements and the amount of mineral substances.

Guinea fowl eggs are a complete food with high biological value, so the intensive breeding of these birds can become a significant sector in poultry practice.

Key words: guinea fowl, minerals, potassium, proteins

INTRODUCTION

Over time, poultry production has grown rapidly, which has meant that eggs and poultry have always been present on the market, in increasing quantities and at cost-effective prices, compared to other animal products [2].

In a smaller amount, the egg contains all the nutrients needed by the human body, and its biological value is estimated at 96%, compared to 90% in milk [3].

Vitamins in eggs help to meet human requirements in an amount of 5% and up to 100%, which is influenced by the nutritional conditions provided to birds throughout the exploitation period [5]; the vitamins existing in the composition of the egg are resistant both to the action of cold (it lasts up to 6 months when stored in refrigerated conditions) and to heat (it is kept completely when the egg is boiled for 15-20 minutes) [1].

From the point of view of calorificity, chicken eggs have a content of 80 - 90 kcal /

piece, turkey and duck eggs of 131 kcal / piece, goose eggs of 286 kcal / piece, and guinea fowl eggs of 65 kcal / piece [4].

These aspects demonstrate the role and importance of eggs in maintaining a proper human nutritional balance, so that everyone is in optimal health at all ages.

MATERIAL AND METHODS

The biological material was represented by 246 guinea fowl eggs harvested from gray guinea fowl (*Numida Meleagris*).

The analysis was performed on eggs harvested from guinea fowls reared both extensively and intensively and came from 6 private households. To facilitate the presentation of the data, the batches were numbered as follows: batch 1 (L1), batch 2 (L2), batch 3 (L3), batch 4 (L4), batch 5 (L5), and batch 6 (L6).

During the research, the indicators followed were represented by the water and dry matter content, the amount of protein, the lipid content, the amount of microelements and macroelements, the amount of mineral substances.

*Corresponding author:

teodorescu_alina2008@yahoo.com

The manuscript was received: 19.10.2020

Accepted for publication: 25.10.2020

The amount of water and the dry matter were evaluated by the oven drying method.

In order to measure the amount of mineral substances present in the studied eggs, the calcination method was used.

Evaluation of lipid content in the studied pieces were made using the Soxhlet method in the extraction apparatus for the quantitative separation of substances in a mixture using an organic solvent. The Kjeldahl method was used to determine the protein content of the analyzed samples.

The method for the determination of fatty acids is in accordance with SR CEN ISO / TS 17764-1: 2008 (preparation of methyl esters) and SR CEN ISO / TS 17764-2: 2008 (gas chromatographic method). Calcium and magnesium concentrations were determined according to the method presented in SR EN ISO 6869: 2002, and sodium and potassium according to SR ISO 7485: 2001. The amount of phosphorus was determined according to the method presented in Regulation (EC) no. 152/2009. The concentrations of copper, iron,

manganese and zinc were determined according to Regulation (EC) no. 152/2009.

Data were processed and statistically interpreted using Anova software (Variance Analysis)

RESULTS AND DISCUSSIONS

The water content of egg whites ranged around 74-75%, the highest amount being obtained in eggs belonging to batch 3 (75.29%), and the lowest amount of water was observed in batch 4, more exactly 73.77%.

Regarding the egg white content in dry matter, the lowest content was present in batch 3 (24.71%), batches 1, 2, 5 and 6 had values in the range of 25.04-25.86%, and the highest content was present in batch 4 with a percentage value of 26.23%.

The protein level for all the studied batches oscillated around 10%, a higher content being registered by the egg white from the eggs of batch 4 (10.89%).

And finally, the lipid level present in the egg whites had values between 1.39% (L1 and L5) and 1.56% (L6) (Figure 1).

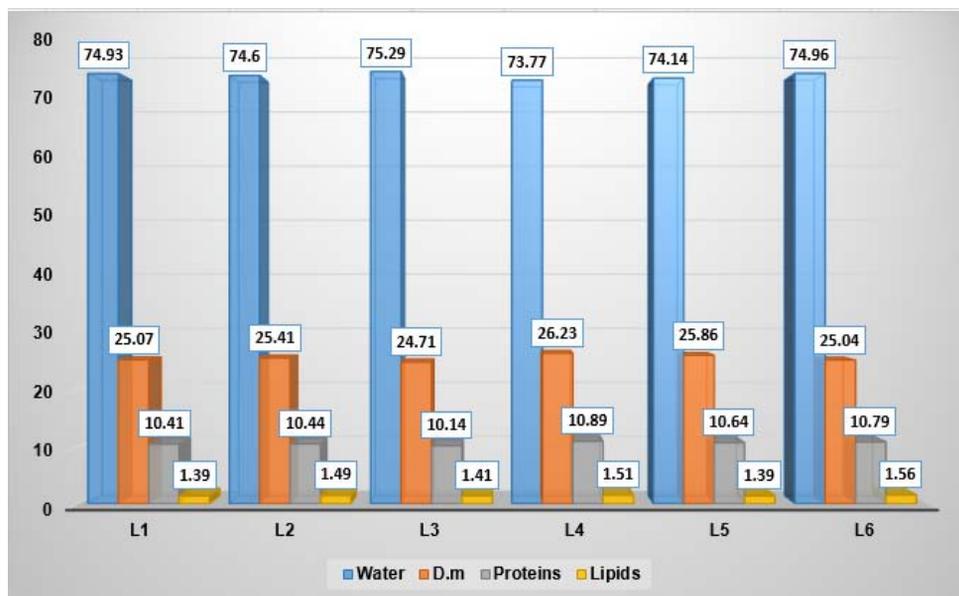


Fig. 1 The chemical composition of the egg white

The chemical composition of the yolk was as follows: **water content** values were included in the range of 47.52% (L5) and

48.40% (L3); Obviously the dry matter had the lowest results at L3 (51.48%) and the highest values at L5 (52.75%).

Proteins fluctuated around 17%, this threshold being exceeded only by the yolk of L6 eggs. And the lipid level existing in the

yolk showed the lowest values at L3 (31.25%), and the highest values at L4 (33.92%) (Figure 2).

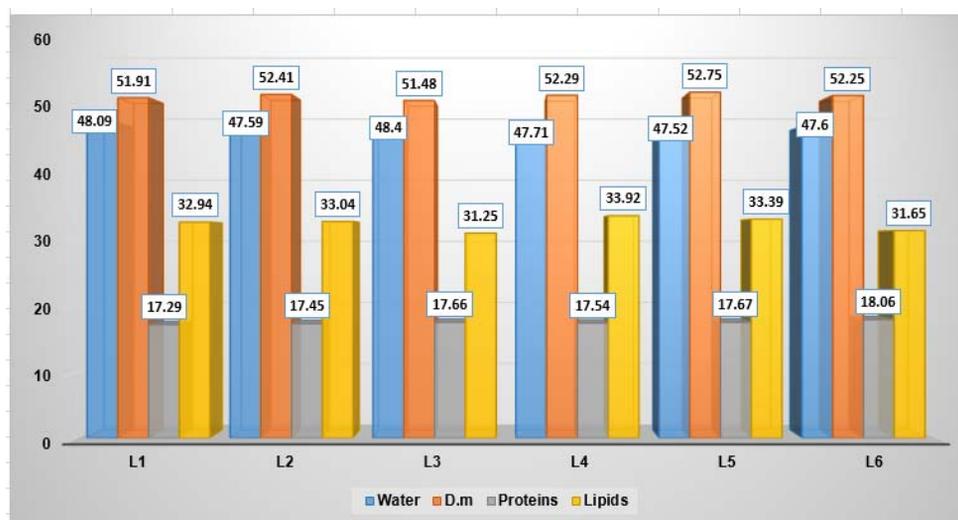


Fig. 2 The chemical composition of the yolk

The macroelements found in egg whites were calcium, phosphorus, magnesium, sodium and potassium.

The amount of calcium in egg whites ranged from 0.11% (L2) to 0.14% (L6). Phosphorus was found in 0.15% (L1 and L3) and 0.17% for L2, L5 and L6; For magnesium, average values of 0.12% were

recorded for L3, 0.13% for L1, 0.14% for L2, L4 and L6 and 0.15% for L5. In terms of sodium, L2 showed the lowest average values of 1.50%, and L5 the highest values of 1.63%. The last macroelement was potassium, which was found in an average amount of 1.22% (L1), 1.23 % (L2), 1.20% (L3), 1.28% (L4), 1.31% (L5) și 1.26% (L6).

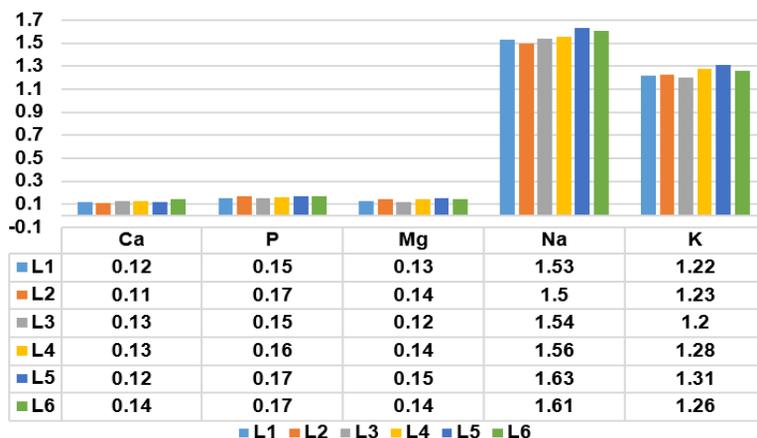


Fig. 3 The content in macroelements of the egg white

Calcium in the case of yolks ranged from 0.29% (L1, L3, L4 and L6) to 0.31 (L2 and L5). Regarding the content of yolks in magnesium, the lowest values were found in

L1 and L4 (0.04%), and the highest in L3 and L6 (0.07%). about 0.12-0.13%, and for potassium the results were 0.26-0.27%.

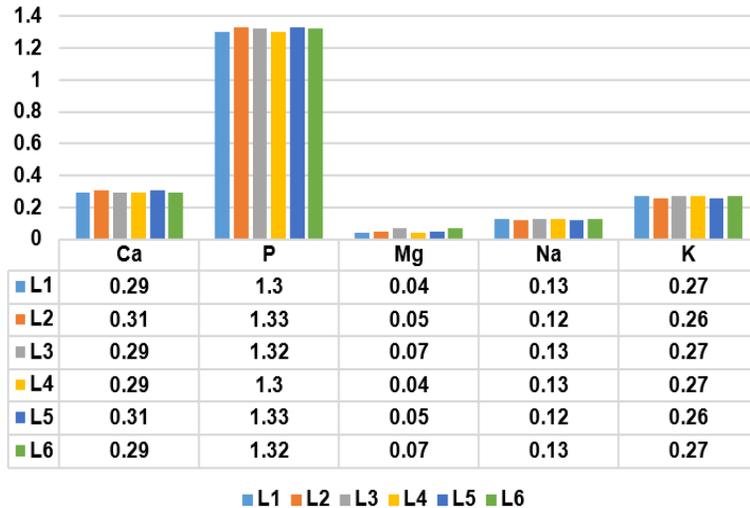


Fig. 4 The content in macroelements of the yolk

The microelements analyzed in the chemical composition of the egg white were Cu, Fe and Zn. Thus, the amount of copper found in the egg whites of the analyzed eggs had the lowest values in the case of L4, ie 0.19 mg / kg, and the highest were seen at

L6, more precisely 0.25 mg / kg. The iron content of the guinea fowl egg had values between 18.54 mg / kg (L2) and 19.28 mg / kg (L5). Finally, zinc was observed in lower proportions at L4 (2.55 mg / kg) and higher at L5 (2.88 mg / kg) (Figure 5).

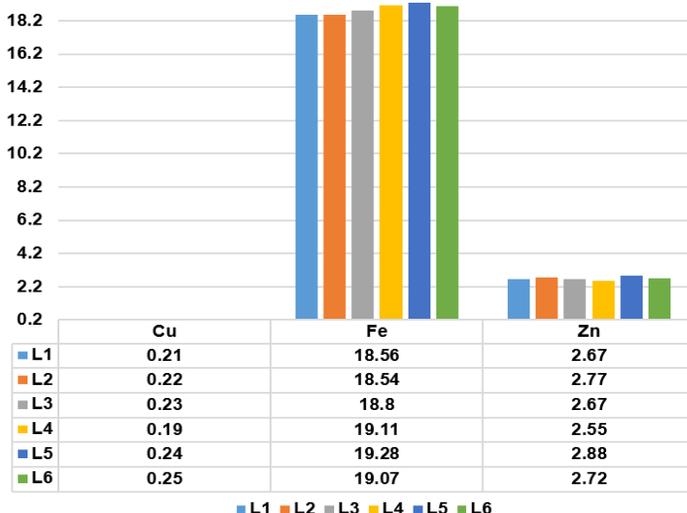


Fig. 5 The content in microelements of the egg white

Copper was found in amounts of 1.81 mg / kg (L1 and L4); 1.83 mg / kg (L2 and L5) and 1.89 mg / kg (L3 and L6). The highest results in terms of iron yolk content were found in L1 and L4 (136.81 mg / kg), followed by L2 and

L5 (135.15 mg / kg), and L3 and L6 with average 134.85 mg / kg. Mean zinc contents ranged from 94.95 mg / kg (L1, L4) to 96.15 mg / kg (L3, L6) (Figure 6).

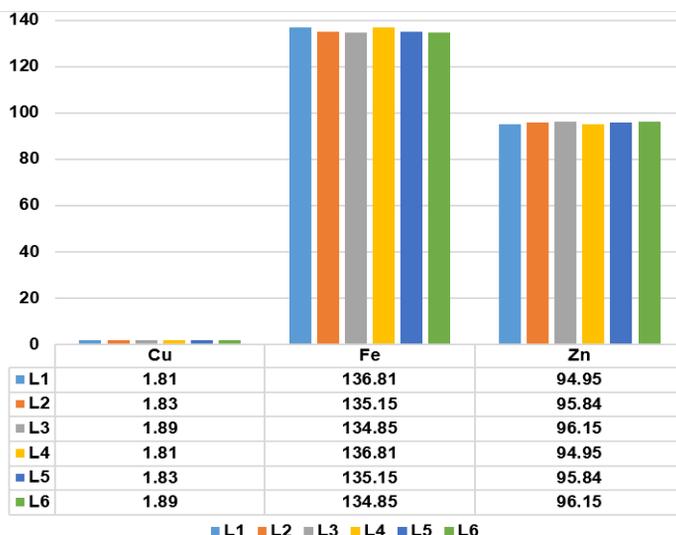


Fig. 6 The content in macroelements of the yolk

CONCLUSIONS

Following the research, we recommend the consumption of guinea fowl eggs reared in an intensive system, because they were noted for a higher protein content, better values of concentration in potassium, iron and zinc.

REFERENCES

- [1] Lissot ,G. (1965): Poules et Oeufs. Flammarion, Paris.
- [2] Ștefănescu, Gh., Bălășescu, M., Severin, V., 1961 – Avicultura. Vol. I și II. Editura Agro-Silvică, București.
- [3] Usturoi, M.G., 2005 – Influența condițiilor de depozitare asupra calității ouălor destinate consumului. Știința Agricolă, nr. 1, pg. 39-44, Chișinău, Republica Moldova.
- [4] Vacaru-Opris, I. și colab., 2000 – Tratat de avicultură. Vol. I. Editura Ceres, București.
- [5] Vancea, I., 1978 – Tehnologia creșterii intensive a păsărilor. Editura Ceres, București.