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THE INFLUENCE OF THE RELATIONSHIP BETWEEN ENERGY AND THE MAIN ESSENTIAL AMINO ACIDS OVER THE PRODUCTIV PERFORMANCES OF THE LAYING HENS

INFLUENŢA RAPORTULUI DINRE ENERGIE ŞI PRINCIPALII AMINOACIZI ESENŢIALI DIN HRANĂ ASUPRA PERFORMANŢELOR PRODUCTIVE ALE GĂINILOR OUĂTOARE

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It is recommended to correlate the energetic level with the protein level in order to establish the nutritious characteristics of a mix forage (MF) and moreover its correlation to the essential aminoacids level. To establish the influence of the relationship of an essential aminoacid (AAe) to the metabolisable energy (ME), there was carried out an experiment at the Didactic Station of USAMVB Timisoara on 100 Shaver 579 hibrid layer hens. The hens were divided in four experimental groups and were administered diverse versions of the MF with an optimum level of metabolizable energy (to the NRC, 1994), but with different levels of crude protein (CP) and essential aminoacids, achieving various energo-proteic and energo-aminoacids relations. The best results, materialized by the weight mass-egg (50.07±2.33) but also by the specific intake obtain (2.55 kg /kg MF mass-egg)were observed to the group that had a reduced level of protein (15.2%) but supplemented with L-lisine and DL-metionin, having as a result the following data: 182 kcal ME/%CP, 2.96 g lisine/1000 kcal ME and 1.51 g metionine/1000 kcal ME.

Keywords: laying hens, energy level, amino acids, energo-proteic relation, energo-aminoacids relation

Introduction

The energo-proteic relation showed in ME/1% CP, correlate the two basic indexes of a MF. The energo-proteic relation is a precept brought in poultry nutrion field by Combs and Remoser [4, 5]. Combs considered that this relation should vary according to the mean weight and productiv level of the hen, to the quality of

the protein, to the way the forage is given, the price of the energy and proteine sources, etc. [1, 2].

It was observed that if the energo-proteic and also the energo-aminoacid relations are maintained (stated by g aminoacid / 1000 kcal ME), it is more important to provide a scientific nutritional and better productive results.

HALGA (2000) suggests a correlation of the proteic level with the energetic level estimating approximative 5.3 g of CP/1000 kcal ME for the light breeds and a 5.1-5.2 g CP/1000 kcal ME for the heavy breeds; in the same time with the proteic level it should be provided the essential amino acids level too, and this one also should be correlated witht he energetic concentration of the forage, so for 1000 kcal ME it should be provided 2.1 – 2.6 g of lisine, 1.5 – 1.75 g of treonine, etc.

Increasing the energetic level of the forage with 25% leads to a decrease of digestible nitrogen factor usage by growing the amonoacal nitrogen quantity eliminated by urine, deed that show an uneconomical use of the protein. By reducing the quantity of energy with 25% at the same proteic level, a diminuation of protein usage results and the ingested protein is directed to energetical purposes, 70-75% [5].

Materials and Methods

The experiment was carried out at the Didactical Station of USAMVB Timisoara, the poultry section, on 100 Shaver 579 hibrids layer hens, kept on a permanent litter for eight weeks, hens were of 32 weeks old at the begining of the experiment (on the laying plateau). The hens were divided into four experimental groups and were given MF with two levels of ME/CP. The first group received a type of forage according to the NRC (1994), and the following three groups were given a MF with approximative 2766 kcal ME and 15.2% CP. The levels of g Aae/kcal ME fluctuate to the four groups, according to the table 1.

Achieved date were statistically anlysed using EXCELL and for testing the disimilarities significance was used Mann-Withney test, by informational software MINITAB 1.4.

Table 1

The experimental organization scheme

Specification	Experimental group			
	L1	L2	L3	L4
Experimental conditions				
Lysine level (%)	0.77	0.70	0.70	0.70
Level of L-lysine supplemented (%)	-	0.05	-	0.12
Methionine level (%)	0.34	0.321	0.311	0.311
Level of DL-methionine supplemented (%)	0.039	0.059	0.029	0.11
Crude protein (CP%)	16.20	15.21	15.20	15.20
Nutritive characteristics of the combined fodder				
ME (kcal)	2769.2	2766.14	2768.92	2768.92
CP (%)	16.20	15.21	15.20	15.20
Lysine (%)	0.77	0.75	0.70	0.82
Methionine (%)	0.38	0.38	0.34	0.42
Ca (%)	3.41	3.65	3.64	3.62
P (%)	0.70	0.72	0.72	0.72
Relation ME/CP (kcal/%PB)	170,93	181,86	182,16	182,16
Relation lys/ME (g/1000 kcal)	2.78	2.71	2.52	2.96
Relation met/ME (g/1000 kcal)	1.37	1.37	1.22	1.51

Results and Discussion

Data about the performances of the Shaver 579 hibrids layer hens with an age ranged between 32 to 39 weeks, described by egg daily weight mass (g/hen/day) and of the specific consumption performed on this period (kg MF/kg egg mass) as well as their indexes are represented on the table 2 and expressed on hte diagram of figure 1.

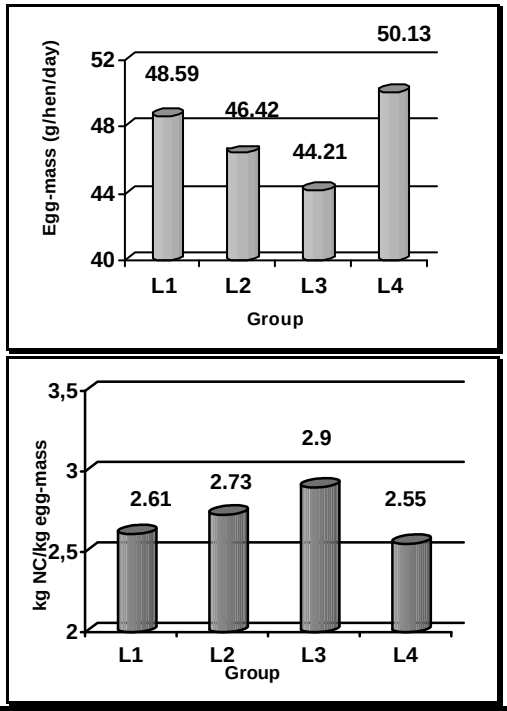
Table 2

Statistical indices of the productive performaces achived from the „Shaver 579" hens

Specification (g/1000 kcal)		Egg-mass* (g/hen/day)		Specific consumption** (kg NC/Kg egg-mass)	
Lis/ME	**Met/ME**	$\bar{x} \pm S\bar{x}$	**%**	$\bar{x} \pm S\bar{x}$	**%**
2.78	**1.37**	48.59±0.276	100	2.61±0.021	100
2.71	**1.37**	46.42±0.248	95	2.73±0.015	100
2.52	**1.22**	44.21±0.340	91	2.90±0.018	89
2.96	**1.51**	50.13±0.338	103	2.55±0.059	110

*CV -1.51-2.8%; ** CV-1.59-2.36

From data presented in the table 2 result the fact that the group four had the highest productive performances regarding the egg mass quantity obtained (50.13 g) but also by the specific intake (2.55 kg MF/kg egg mass). At a small difference but important from the statisticaly point of view ($p<0.01$) was the group 1 with 48.59 g egg mass/hen/day and a specific intake of 2.61 kg MF/kg egg mass ($p<0.05$). on the third place was the group two who ate a forage with reduced level of CP (15.20%) but where the level of the amino acids was maintained as the NRC 1994 requirements. The lowest productive performances were found to the group three (44.21 g egg mass/hen/day witha specific intake of 2.9 kg MF/kg egg mass), that was given a MF with a ME/CP relation of 182 kcal/%CP, having a tighter relation regarding the energo-amino acid relationship besides the experimental groups.



	L2	L3	L4		L2	L3	L4
L1	***	***	**	**L1**	***	***	*
L2	-	***	***	**L2**	-	**	***
L3	-	-	***	**L3**	-	-	***

*p<0.05, **p<0.01, ***p<0.001

Fig. 1. Graphic representation the performances of the Shaver 579 hibrids layer hens

On the figure 2 it is graphical represented, designed with the help of a grade 2 polinomial regresion the egg mass quantity related to the quantity of the specific consumption in order to obtain 1 kg egg mass at the Shaver 579 hybrid layer hens during the experiment.

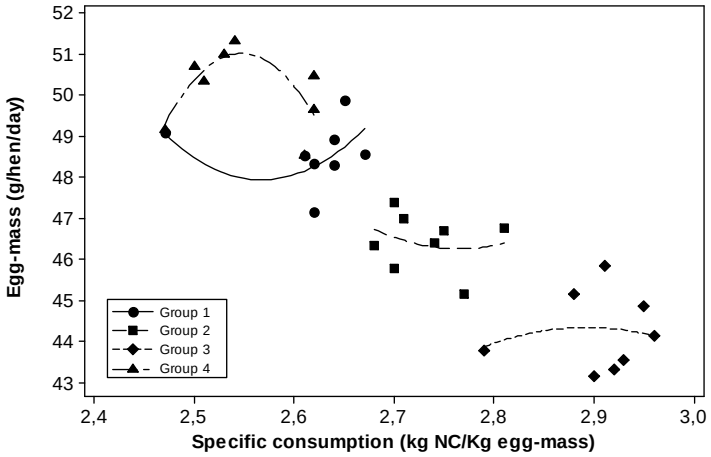


Fig. 2. Polynomial regression of two degree of egg mass quantity function of specific consumption

By analizing these regresions curves it is observed that the experimental group 4 that was feed a MF with an energo-proteic level of about 182 kcal ME/% CP but with the widest relation of energo-amino acids, 2.96 g lisine/1000 kcal ME, 1.51 g metionine/1000 kcal ME respectively, produced the highest daily egg mass at a lower specific intake. At the oposite pole is situated the group 3, that, although maintained the same energo-proteic relationship but had a changed energo-amino acids relationship, produced the lowest quantity of mass egg, but registered in the same time the hieghest specific consumption per product unit.

Conclusions

There can be draw the following conclusions:

-The level of MF can be reduced from 16.2 to 15.2% as long as we maintain the energetic level according to the NRC 1994 standards (aprox. 2750 kcal ME), and of an energo-proteic relationship of 182 kcal ME/%CP as long as we supplement the essential amino acids (lisine and methionin) in order to achieve an energo-amino acid relationship of 2.96 g lisine/1000 kcal ME, 1.51 g met/1000 ME respectively, with a ratio between the two amin acids of 1.95. it can, thereby, be obtained increased quantities of mass-egg (50.07g/hen/day) with lowest specific intake (2.55 kg MF/kg mass-egg).

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