

Performance and carcass quality of broiler chickens fed diets supplemented either with Biolys®60 or L-Lysine-HCL

R. Fontanillas*, D. Höhler**, S. Mack**, R. Neme*** and H.S. Rostagno***

*Degussa-Hüls, S.A., Paseo San Juan 75, 8º, 08009 Barcelona, Spain

**Degussa-Hüls AG, Feed Additives Division, Rodenbacher Chaussee 4, 63457 Hanau, Germany

***Universidade Federal de Viçosa, Avda. P.H. Rolfs s/n, Campus UFV, 36571-000 Viçosa, Minas Gerais, Brazil

SUMMARY – Biolys®60 is a new form of lysine containing a minimum of 46.8% L-Lysine plus other valuable nutrients. The biological efficacy of Biolys®60 as compared to L-Lysine-HCl was evaluated in broiler chickens. 840 day-old male broiler chickens were allotted to seven different treatment groups with increasing supplemented levels of either L-Lysine-HCl or Biolys®60. Weight gain, feed intake and feed conversion and breast meat yield were determined. There was no significant difference in performance and breast meat yield of broilers fed diets supplemented either with L-Lysine-HCl or Biolys®60. The nutritional efficacy of the lysine source Biolys®60 is equivalent to that of L-Lysine-HCl.

Key words: Lysine, amino acids, broiler, efficacy.

RESUME – "Performances et qualité de la carcasse chez des poulets d'élevage recevant des rations supplémentées soit avec Biolys®60, soit avec L-Lysine-HCL". Biolys®60 est une nouvelle forme de lysine avec au moins 46,8% de L-Lysine et d'autres nutriments de valeur. L'efficacité biologique de Biolys®60 par rapport à la L-Lysine-HCl a été évaluée chez le poulet. 840 poulets mâles de l'âge d'un jour ont été distribués dans sept traitements différents avec des additions croissantes de L-Lysine-HCl ou Biolys®60. L'augmentation de poids, la consommation alimentaire, l'indice de consommation et le pourcentage de blanc ont été étudiés. Il n'y avait pas de différences significatives en performances et pourcentage de blanc chez le poulet alimenté avec des aliments supplémentés avec L-Lysine-HCl ou Biolys®60. L'efficacité nutritionnelle de la source de lysine Biolys®60 est équivalente à celle de L-Lysine-HCl.

Mots-clés : Lysine, acides aminés, poulet, efficacité.

Objectives

Biolys®60 is a new form of lysine containing a minimum of 46.8% L-Lysine plus other valuable nutrients. Biolys®60 is produced by microbial fermentation, and the lysine substitution value is calculated as 60% of the value of L-Lysine-HCl [(46.8/78)100 = 60%].

In the present experiment the biological efficacy of Biolys®60 as compared to L-Lysine-HCl was evaluated in broiler chickens. The study was conducted at the Universidade Federal de Viçosa in Viçosa, Brazil.

Experimental design

A total of 840 male day-old broiler chickens were allotted to seven different treatment groups, each consisting of six replicates with 20 birds (Table 1). Treatment I received the basal corn-soy diet with a lysine content of 0.85% (starter, 1-21 days) and 0.79% (grower, 22-42 days, see Table 2), respectively. Three graded inclusion levels of lysine of 0.08, 0.16 and 0.24% were added to the treatment diets II, III and IV as well as to the treatment diets V, VI and VII, respectively. These supplement levels represent additions of 0.10, 0.21 and 0.31% L-Lysine-HCl (diets II to IV), and 0.17, 0.35 and 0.52% Biolys®60 (diets V to VII), respectively. The supplement levels of each lysine source

were confirmed by analysis. The birds were housed in floor pens, feed and water were supplied for *ad libitum* consumption. Weight gain, feed intake and feed conversion were determined on all birds, whereas breast meat yield was determined on 30 birds of each treatment.

Table 1. Experimental design

Treatment	Product	Added dose of lysine, calculated (%)	Added dose of lysine, analysed (%)	
			Starter	Grower
I	Basal diet	–	–	–
II	L-Lysine-HCl	0.08	0.08	0.10
III	L-Lysine-HCl	0.16	0.16	0.17
IV	L-Lysine-HCl	0.24	0.22	0.23
V	Biolys®60	0.08	0.10	0.10
VI	Biolys®60	0.16	0.17	0.19
VII	Biolys®60	0.24	0.25	0.29

Table 2. Ingredients, energy and nutrient composition of the basal starter and grower diets

	Starter	Grower		Starter	Grower
Ingredients (%)			Energy and nutrient content		
Corn	48.12	51.95	ME (kcal/kg)	3100	3205
Soybean meal	21.80	18.19	ME (MJ/kg)	13.0	13.4
Meat and bone meal	3.00	3.50	Crude protein (analysed) %	21.1	19.5
Sorghum (low tannin)	15.00	15.00	Amino acid content (analysed) %		
Corn gluten meal	8.00	6.50	Met	0.52	0.51
Corn starch	0.67	0.65	Met+Cys	0.89	0.83
Soybean oil	1.06	2.20	Lys	0.85	0.79
Calcium carbonate	0.60	0.50	Thr	0.79	0.72
Dicalcium phosphate	0.80	0.60	Arg	1.16	1.10
NaCl	0.35	0.35	Ile	0.84	0.79
Vit. and trace elements	0.39	0.33	Leu	2.31	2.25
DL-methionine	0.18	0.19	Val	0.98	0.89
L-threonine	0.03	0.02	Gly	1.00	0.87
L-tryptophan	–	0.02	Ser	1.09	0.95

Results

The broiler chickens responded significantly to the addition of the two lysine sources used in this experiment. Experimental data were subjected to a non-linear multiexponential statistical analysis. Such a non-linear model allows to evaluate the complete response curve (i.e. weight gain, feed conversion, breast meat yield) to graded supplements of a limiting essential nutrient. Therefore, it can be applied to determine the biological efficacy of different sources of the same nutrient. The response curves of weight gain, feed conversion, breast meat yield and breast meat percentage were almost identical for the two lysine supplements (Figs 1, 2, 3 and 4). The calculated relative efficacy of Biolys®60 was between 97 and 109% for the different parameters as compared to L-Lysine-HCl. Hence the biological efficacy of the two lysine sources in broiler chickens was identical.

Conclusions

There was no significant difference in performance and breast meat yield of broilers fed diets

supplemented either with L-Lysine-HCl or Biolys®60.

The nutritional efficacy of the lysine source Biolys®60 is equivalent to that of L-Lysine-HCl.

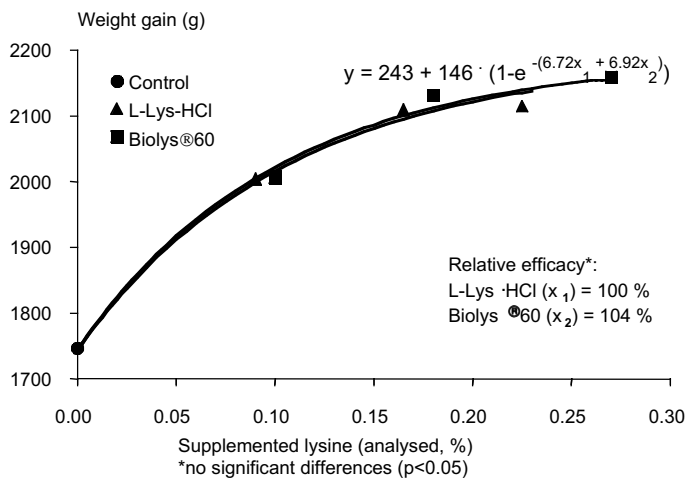


Fig. 1. Weight gain of broilers fed increasing levels of each L-Lysine-HCl and Biolys®60 from 1-42 days of age.

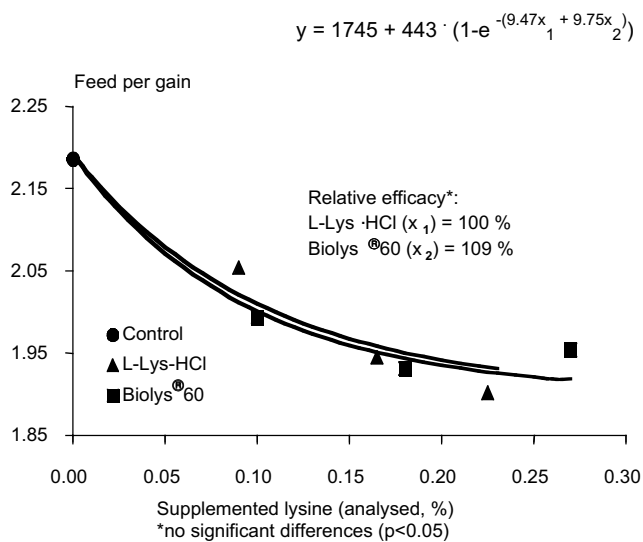


Fig. 2. Feed conversion efficiency of broilers fed increasing levels of each L-Lysine-HCl and Biolys®60 from 1-42 days of age.

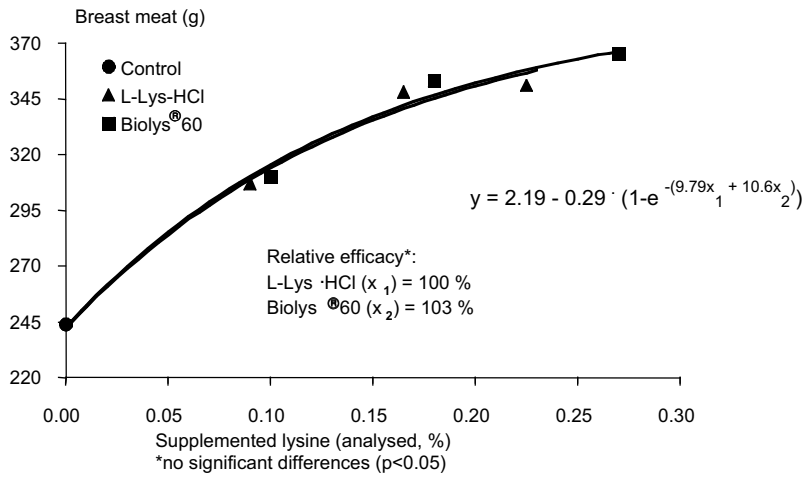


Fig. 3. Breast meat yield of broilers fed increasing levels of each L-Lysine-HCl and Biolys®60 (day 42 of age, $n = 7 \times 30$).

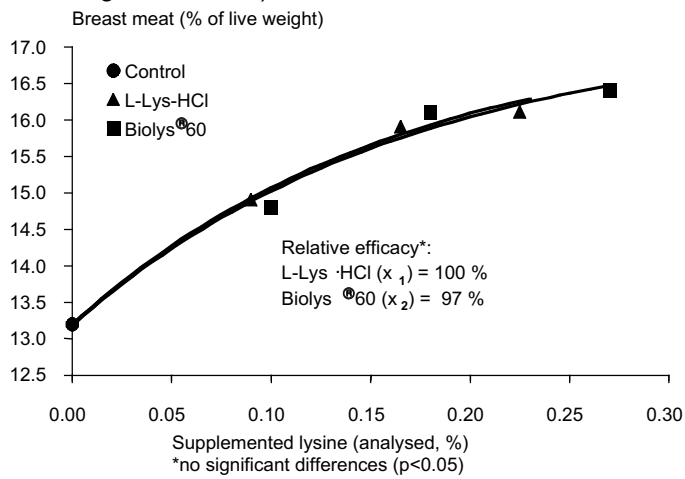


Fig. 4. Breast meat percentage of broilers fed increasing levels of each L-Lysine-HCl and Biolys®60 (day 42 of age, $n = 7 \times 30$).

$$y = 13.2 + 4.11 \cdot (1 - e^{-(6.10x_1 + 5.92x_2)})$$