AJINOMOTO

AJINOMOTO ANIMAL NUTRITION

AJINOMOTO HEARTLAND, INC.

POULTRY RESEARCH REPORT 19

Influence of Glutamic Acid on Broiler Carcass Quality

Objective

Examine the impact of feeding different dietary protein (CP) and glutamic acid (GLU) levels on the subsequent carcass quality of male broilers.

Experimental Procedures

Animals

Male broilers of a commercial strain (Ross & Ross) were utilized in the seven week study. A description of the experimental design plus live broiler performance for the diets supplemented with or without glutamic acid is provided in Heartland Lysine's Poultry Research Report 18.

Results

Table 1. Effect of dietary CP and GLU levels on broiler carcass quality

Treatment	Abdominal Fat	Carcass Wt. (w/o Fat)	Grade "A"
	(%)	(grams)	(%)
CP			
High	2.0	2021	38.0
Low	2.4	2041	36.7
	**[a]	NS[a]	NS
Glut. Acid			
High	2.2	2050	42.8
Low	2.2	2012	31.9
	NS	**	**

[a]NS=Not significant at P<.05

**= P <.05

Providing the high protein diets (Table 1) to male broilers reduced the abdominal fat level, however carcass weight and percent Grade "A" were not influenced. Abdominal fat level was not influenced by added GLU. Carcass weight (without fat) and the percent Grade "A" were significantly improved with the supplemental GLU.

Leclercq et al (1994) reported by supplementing glutamic acid plus aspartic acid to a low protein diet reduced the adiposity of genetically lean male chickens as compared to genetically fat ones. These two amino acids were added to a 14.4% CP diet, thus raising the protein content to 16.8%, however this was still lower than the control diet which contained 18.9% CP.

The incidence of carcass defects, which would affect carcass appearance (Table 2), was influenced by the dietary CP and GLU levels. Feeding the added GLU without altering CP resulted in reduced back bruising and less incidence of drumstick deformation, which is caused by misshapen musculature. These reduced incidences may partially be due to glutamic acid's central location in metabolism since it is readily convertible to other nonessential amino acids (Moran, 1994). The responses to added GLU indirectly suggests that it may be involved in connective tissue development. Collagen and elastin contain large proportions of nonessential amino acids

Table 2. Effect of dietary CP and GLU levels on broiler carcass defects				
	Bruising		Drumstick	
Treatment	Wing	Back	Deformation	Broken
	(% incidence)		(% incidence)	
CP				
High	13.3	19.7	3.0	2.3
Low	12.4	24.2	6.1	3.8
	NS[a]	NS	**[a]	NS
Glut. Acid				
High	11.4	17.8	2.9	2.3
Low	14.2	26.1	6.2	3.9
	NS	**	**	NS

[a]NS=Not significant at P > .05
** P<.05

Conclusion

1. Supplemental glutamic acid aided in reducing carcass defects and improving the % Grade "A".

2. Glutamic acid may be involved in connective tissue growth and collagen formation.

Bibliography

Leclercq, B., A.M. Chagneau, T. Cochard and J. Khoury, 1994. Comparative responses of genetically lean and fat chickens to lysine, arginine and non-essential amino acid supply. I. Growth and body composition. British Poul. Sci. 35:687-696.

Moran, Jr., E.T., 1994. Significance of dietary crude protein to broiler carcass quality. pg. 1-11 in Proc. 56th Maryland Nutrition Conference for Feed Manufacturers. Cornell University, Ithaca, NY.

*Moran, Jr., E.T. and H.L. Stilborn, 1994. Responses of broilers to glutamic acid when given reduced CP feeds high and low in potassium. Poultry Sci. 73 (Supp. 1): 74.

*Principal reference

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