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Results of a study reported last year indicated that a low protein (10.8%) corn-soy diet supplemented with methionine, lysine, tryptophan and isoleucine could support about 69% hen-day egg production over a 16-week period. Additions of different levels of valine or threonine with isoleucine did not show any marked improvement over the supplementation of isoleucine alone. An approach was therefore made to determine which amino acids besides the above are further limiting production with this low protein diet.

Glycine, a two carbon dispensible amino acid, is required for maximum chick growth, whereas hens on a 16% protein practical diet have not been shown to require glycine. However, because of its ionic neutrality and its interrelationship with serine and threonine, it was hypothesized that glycine supplementation in the low protein layer diet could be beneficial in threonine utilization and improved production.

DeKalb 161 pullets, housed in 8-inch cages, were fed the 10.8% protein diet supplemented with methionine, lysine, tryptophan and isoleucine for a period of 24 to 40 weeks of age.

Supplemental effects of valine and threonine at 0.05 and 0.1% levels and glycine at 0, 0.25 and 0.5% levels were studied in a factorial design. Each treatment was replicated four times using two hens per replicate and fed for a further period of 16 weeks. A summary of the results obtained in this study are presented in table 1.

The supplements of both the low and high level of glycine did not show any improvement in the percent hen-day egg production, feed consumption or feed efficiency per dozen eggs produced. Results from this study indicated that the low level combined supplementation of glycine and valine was quite effective in increasing egg production. Feed consumption was not altered, but the feed requirement per dozen eggs produced was reduced. On the other hand, hens on the high levels of glycine and threonine laid at a rate of 10% over that of hens on the basal diet and feed consumption was reduced. As a result, feed efficiency was considerably superior. Hens fed a 16% protein corn-soy diet should produce eggs at an average of 70% during the period of 42 to 62 weeks of age. In this study, the 77% hen-day egg production observed for the group of hens receiving the 0.5% glycine and 0.1% threonine seems quite significant.

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Table 1. Amino Acid Supplementation of Low Protein Diets: Effects on Egg Production and Feed Efficiency

Treatments	Hen-day egg production	Hen day feed cons.	Feed cons. per dozen eggs
	%	gm	kg
Basal[a]	67	87	1.6
Glycine[b]	67	83	1.5
Glycine[c]	65	87	1.6
Gly[b] Threonine[b]	63	83	1.6
Gly[b] Threo[b] Val[b]	68	87	1.5
Gly[b] Threo[b] Val[c]	63	88	1.7
Gly[b] Valine[b]	74	87	1.4
Gly[b] Threo[c]	67	88	1.6
Gly[b] Threo[c] Val[c]	65	84	1.6
Gly[b] Threo[c] Val[c]	72	83	1.4
Gly[b] Val[c]	66	88	1.6
Gly[c] Threo[b]	67	83	1.5
Gly[c] Threo[b] Val[b]	66	85	1.5
Gly[c] Threo[b] Val[b]	71	88	1.5
Gly[c] Val[b]	72	83	1.4
Gly[c] Threo[c]	77	86	1.3
Gly[c] Threo[c] Val[b]	68	82	1.5
Gly[c] Threo[c] Val[c]	62	82	1.6
Gly[c] Val[c]	61	84	1.7

[a] 10.8% protein diet with 0.25% methionine, 0.19% lysine, 0.04% tryptophan and 0.1% isoleucine.
[b] 0.25% glycine and 0.05% threonine and valine.
[c] 0.5% glycine and 0.1% threonine and valine.