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H&N INTERNATIONAL EXCLUSIVE

FEEDING **INSIGHTS**

Turning H&N R&D feed trials into practical results for your flock



EGG SIZE VERSATILITY IN NICK CHICK

CHAPTER II

OPTIMIZING DIETS
FOR PERFORMANCE
FROM 57 – 93 WEEKS



H&N NUTRITION TEAM

Optimizing Diets for Performance from 57–93 Weeks



At H&N International, we continuously evaluate how nutrition strategies impact laying performance, egg size, and overall flock efficiency. A recent trial with **Nick Chick layers** explored the effect of **four dietary protein and amino acid levels** while maintaining constant energy.

Material and Methods

After the Nick Chick egg size versatility trial in 26 – 56 week old hens presented in chapter 1, treatments and hen numbers were adjusted for the 57 – 93 week production period. The trial continued with fewer Nick Chick hens (256 birds, 54 cages) and three treatments of varying amino acid levels set at Very Low (VL), Low (L), and High (H).

Trial diets were formulated by the H&N nutrition team and produced in a local facility. Raw material analysis was conducted with the support of EVONIK and the diets were a combination of corn, soya bean meal, wheat bran, and soya oil (**Table 1**). However, in this trial amount of synthetic amino acids used was increased to six as compared to three in the previous trial. Diets were formulated to target a 110g feed intake, with energy remaining constant at 2,810 kcal and the ideal protein ratio kept consistent across the three treatments (**Table 1**).

Nutrient specifications	VL	L	H
Crude protein (%)	11.16	12.38	13.61
ME birds (Kcal/Kg)	2,810	2,810	2,810
Starch (%)	45.2	44	42.7
Sugars (%)	3.12	3.31	3.50
Crude fiber (%)	2.3	2.21	2.12
Neutral detergent fiber (%)	10.64	9.87	9.1
Ash (%)	11.7	11.8	11.9
Fat (%)	4.66	4.60	4.53
Linoleic acid (%)	2.47	2.440	2.410
Digestible Lys poultry (%)	0.56	0.64	0.71
Digestible Met poultry (%)	0.35	0.41	0.47
Digestible M+C poultry (%)	0.52	0.59	0.66
Digestible Thr poultry (%)	0.405	0.46	0.51
Digestible Trp poultry (%)	0.135	0.15	0.17
Digestible Arg poultry (%)	0.60	0.52	0.585
Digestible Val poultry (%)	0.51	0.57	0.64
Digestible Ileu poultry (%)	0.46	0.68	0.76
Calcium (%)	4.1	4.1	4.1
Total Phosphorus (%)	0.59	0.58	0.58
Phytic Phosphorus (%)	0.24	0.22	0.22
Available Phosphorus (%)	0.33	0.33	0.33
Digestible Phosphorus poultry (%)	0.17	0.18	0.18

	VL	L	H
Corn	64.44	63.41	62.38
SBM	10.72	14.07	17.43
Wheat bran	11.10	8.69	6.28
Calcium carbonate mix	9.74	9.71	9.69
Soya oil	2.00	2.00	2.00
Dicalcium phosphate	0.37	0.38	0.40
DL Met	0.20	0.24	0.29
L-Lysine Cl	0.142	0.146	0.149
L-Isoleucine	0.091	0.103	0.114
L-Threonine	0.077	0.092	0.106
Valine	0.066	0.086	0.105
L-Tryptophane	0.023	0.028	0.033
Salt	0.28	0.28	0.28
Sodium bicarbonate	0.16	0.16	0.16
Premix	0.25	0.25	0.25
Acids	0.20	0.20	0.20
Enzymes	0.10	0.10	0.10
Micotoxin binder	0.05	0.05	0.05



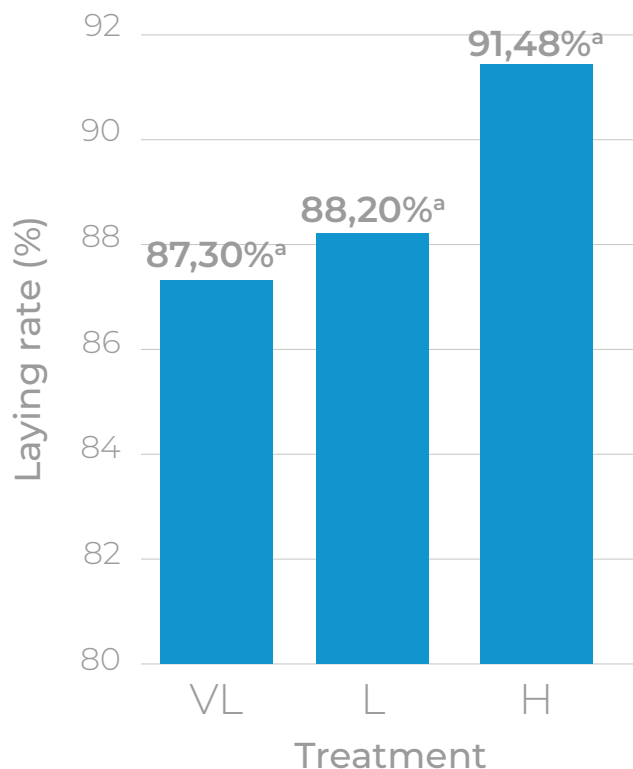
Table 1: Nutrient specifications and diet composition for the dietary treatments with Very Low (VL), Low (L), and High (H) amino acid levels.

Results

Laying Rate

The Laying rate was not significantly affected by the level of dietary amino acids. Although egg production in hens from the High diet was numerically higher, the difference was not significant (p=0.08).

Laying rate (%) by Treatment (57–93 weeks)



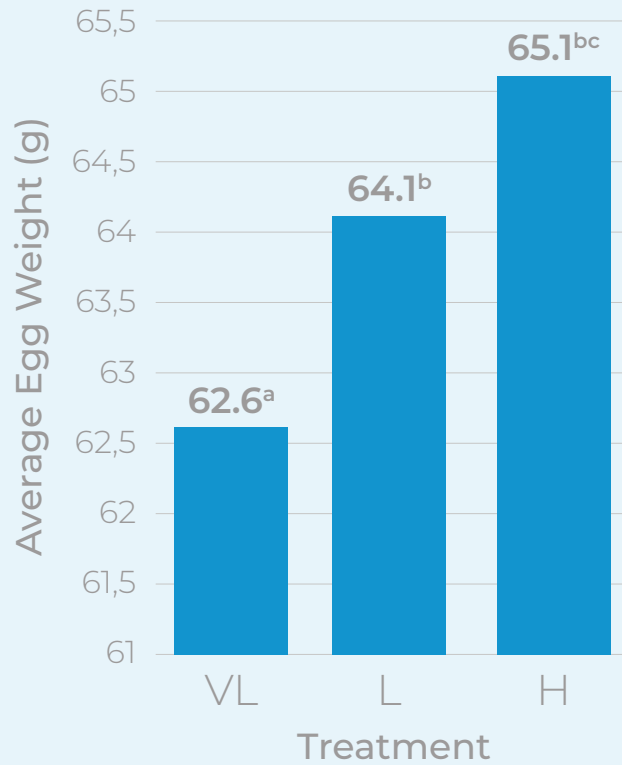
Graph 1: Laying rate (%) as influenced by diets of different amino acid levels, from Very Low (VL), Low (L), to High (H).

Egg Weight

Egg weight was significantly affected by dietary amino acids levels. As shown in **Graph 2**, increases in egg size coincide with higher levels of amino acid intake. Egg size in the Low treatment was similar to the standard for Nick Chick hens.

Graph 2. Average egg weight as influenced by different dietary levels of amino acids defined as Very Low (VL), Low (L), and High (H).

Average Egg Weight by Treatment (57-93 weeks)

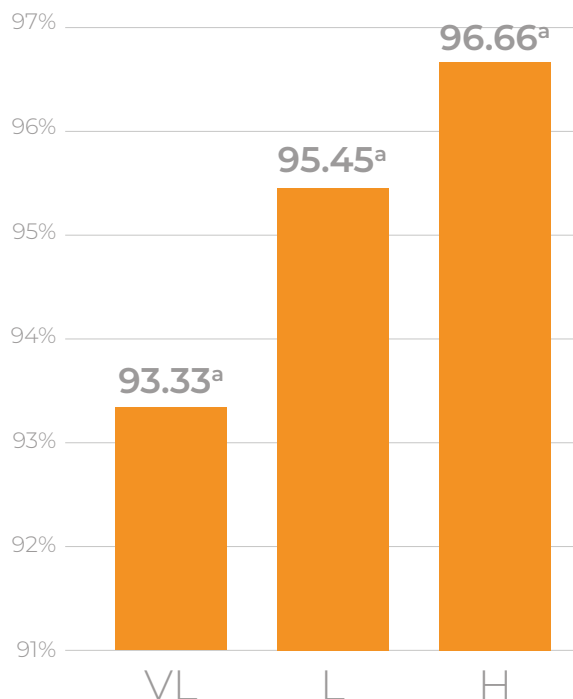


Total Eggs per Hen Housed (EHH)

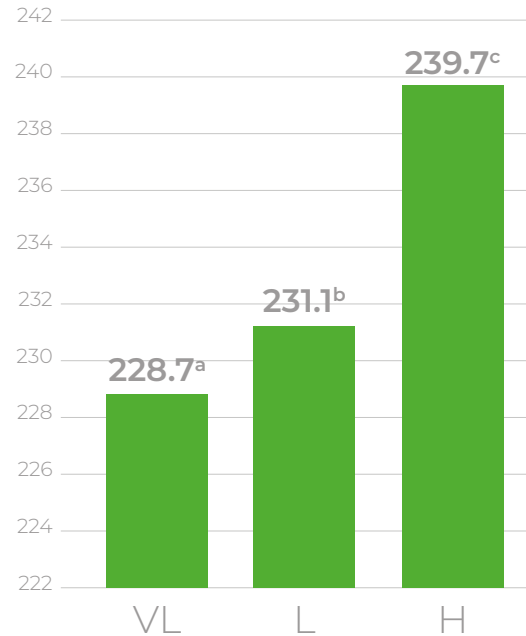
All the birds performed above the standard for the period of age the trial was done. There was a clear effect of amino acid levels on EHH, which increased significantly with higher amino acid intakes (**Graph 3**). This effect contributed to the rate of lay results (**Graph 1**) and was positively influenced by liveability (**Graph 4**), however the differences between treatments were only significant for EHH.

Graph 3: Liveability as influenced by dietary amino acids at Very Low (VL), Low (L), and High (H) levels.

% Liveability (57-93 weeks)



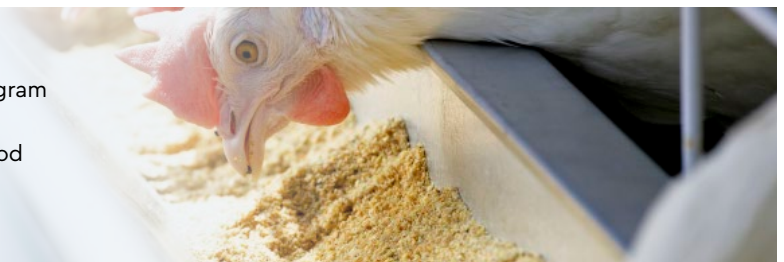
Eggs Hen Housed (57-93 weeks)



Graph 4: Eggs per hen housed for diets varying in amino acid levels from Very Low (VL), Low (L), to High (H).

Feed Intake

There was not an effect on feed intake (106–107 gram range), as all the diets had the same energy and all the birds had similar body weight. In this period the feed intake was lower than expected as part of the trial was conducted during the summer.



Cost Analysis of Egg Production

It is important to understand the cost implications of using all these diets in different scenarios. Based on the cost of feed at the time of the trial and applying the same feed intake, the cost per egg was not significant different (Table 2). However there was a numerically higher cost associated with the increase egg production. This analysis does not include the price producers can receive for the different egg sizes produced by each treatment, which could help offset production costs.

Feed consumption for the period

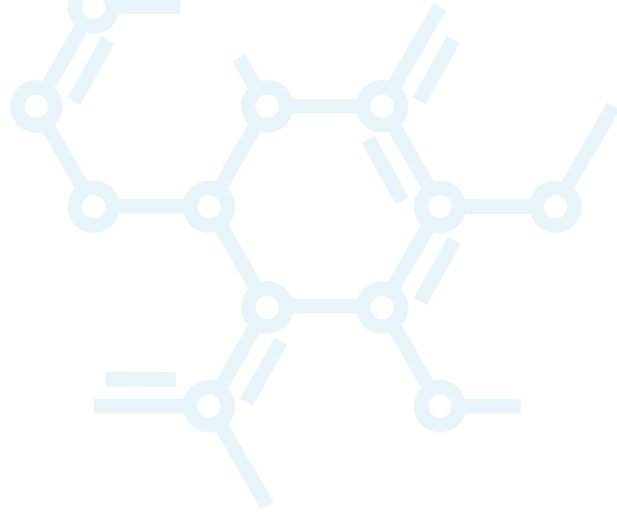
37 week x 7 days x 106 grams = 27.45 kilo grams

$$\frac{\text{Cost}}{\text{egg}} = \frac{\text{Feed cost} \times \text{Feed consumption}}{\text{Eggs Hen housed}}$$

Here's the table alone, ready for you to copy into Word or Excel:

Label	Feed price (€/TN)	Feed cost/hen (€)	Eggs/HH	Cost/egg (€)
VL	283,8	7,79	228,7	0,0340
L	293,9	8,07	231,1	0,0349
H	304,0	8,34	239,7	0,0347

Table 2: Comparison between costs associated with diets of different amino acid levels and egg production. This table is ready to copy into Word or Excel.



Amino acids drive egg size

Increasing digestible Lys increased the egg size in the different groups for the second part of the production (57–93 weeks).

Excess nitrogen

Feeding hens with low levels of protein and including synthetic amino acids increases amino acid utilization. The amino acid levels formulated in these diets can be used when this combination is applied.

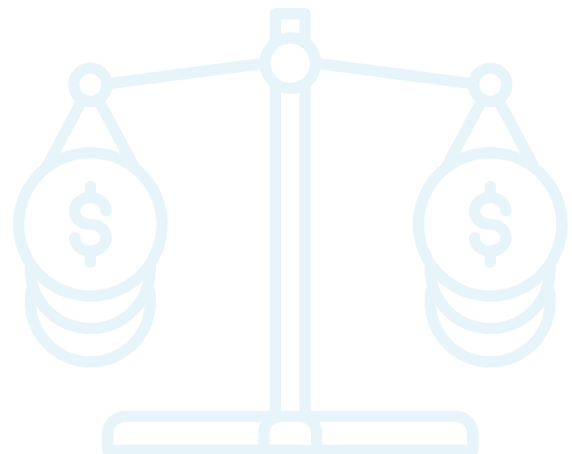
Practical Takeaways

Productivity

These results suggest that formulating to such low levels of crude protein could have an impact on productivity. The impact may not be directly on one production parameter, but may be the sum of several variables that were affected. Therefore, **it might be important to define a minimum for Crude Protein when pushing to very low levels.** (Check Chapter III)

Economic balance

The increased performance achieved in the High group can reduce the cost of egg production below that of the Low group.



Nutritional discussion

Amino acids drive egg size

The sensitivity of egg size to amino acid intake in Nick Chick hens is very clear from these results. Therefore, when challenges with achieving egg size arise, one of the first points to examine should be if the birds have a sufficient level of amino acid intake and if this intake is being used for egg production.

Crude protein

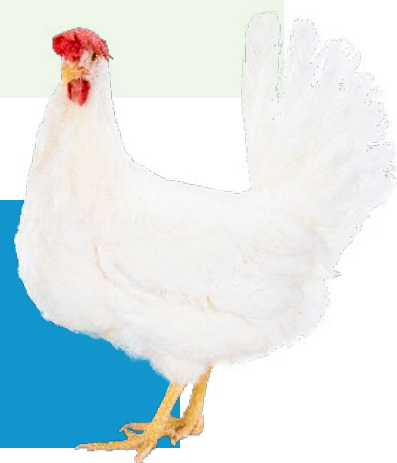
If the intake of crude protein is below certain level, there could be some effect on the productivity of the birds. It seems lower levels of crude protein may boost egg size when combined with synthetic amino acids, however going too low may have consequences for production. As per the literature, we can assume that the nonessential amino acids play a role in egg production that is only influential when diets are excessively low in crude protein.

Synthetic amino acids

The performance of the birds didn't collapse, even at very low levels of crude protein with high levels of synthetic amino acids. This opens the door to the use of local raw materials, so long as the synthetic amino acid price is competitive against the soya bean meal prices.

Conclusion for Nick Chick supporters

Nick Chick hens respond positively to different levels of amino acids; the versatility of Nick Chick allows egg producers to aim for different egg markets with the same bird.





*The key
to your profit*