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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 IV

CHANGING EGG SIZE
BY CHANGING DIETARY
AMINO ACIDS AT LOW
AND VERY LOW CRUDE
PROTEIN DIETS



H&N NUTRITION TEAM



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Changing egg size

by changing dietary amino acids at low and very low crude protein diets



Egg producers often need to adjust the egg profile of their flocks to meet market demands while flocks are in production. At H&N International, we wanted to test the reactivity of the **Nick Chick** layers to dietary changes to the amino acids and see how the variations impact egg production. Two experiments were conducted to evaluate the possibility.

Material and Methods (part 1)

Nick Chick hens (360 birds, 72 cages) were housed at 16 weeks of age. They were light-stimulated at a body weight of 1,250 g and received the same feed until the trial began at 26 weeks and ended at 56 weeks. The groups had same diets until 45 weeks and at 46 weeks diets were switched VL ate VH, L ate H, H ate L and VH ate VL. The birds were kept until 56 weeks of age.

The diets were produced in a local facility and formulated by the H&N nutritionist team and the raw materials were analysed with the support of EVONIK. The diets were a combination of corn, soya bean meal, wheat bran and soya oil as below. Four different treatments were formulated aiming 110 grams of feed intake, the energy was kept constant 2,810 kcal and the four different amino acids were defined, and ideal protein ratio remained constant. See below nutritional specifications and diets.

Nutrient specifications	VL	L	H	VH
Crude protein (%)	13	14.3	15.5	16.79
ME birds (Kcal/Kg)	2,810	2,810	2,810	2,810
Starch (%)	44.2	42.8	41.4	40
Sugars (%)	3.3	3.5	3.7	3.89
Crude fibre (%)	2.77	2.7	2.5	2.44
Neutral detergent fibre (%)	12.11	11.4	10.7	10.01
Ash (%)	11.36	11.5	11.6	11.68
Fat (%)	4.68	4.6	4.6	4.55
Linoleic acid (%)	2.45	2.4	2.4	2.36
Digestible Lys poultry (%)	0.56	0.64	0.71	0.79
Digestible Met poultry (%)	0.32	0.38	0.44	0.50
Digestible M+C poultry (%)	0.52	0.59	0.66	0.73
Digestible Thr poultry (%)	0.42	0.46	0.51	0.55
Digestible Trp poultry (%)	0.13	0.14	0.16	0.18
Digestible Arg poultry (%)	0.73	0.82	0.90	0.99
Digestible Val poultry (%)	0.53	0.58	0.63	0.68
Digestible Ileu poultry (%)	0.46	0.51	0.56	0.62
Calcium (%)	3.85	3.85	3.85	3.85
Total Phosphorus (%)	0.63	0.63	0.63	0.63
Phytic Phosphorus (%)	0.25	0.25	0.24	0.24
Available Phosphorus (%)	0.36	0.36	0.36	0.36
Digestible Phosphorus poultry (%)	0.19	0.19	0.20	0.20

The diets

	VL	L	H	VH
Corn	61.2	59.9	58.6	57.3
SBM	13.7	17.2	20.6	24.0
Wheat Bran	12.4	10.2	8.1	5.9
Calcium carbonate mix	9.0	9.0	8.9	8.9
Soya oil	2.0	2.0	2.0	2.0
Dicalcium phosphate	0.51	0.52	0.53	0.54
Salt	0.28	0.28	0.28	0.28
Mycotoxin binder	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25
Sodium bicarbonate	0.16	0.16	0.16	0.16
DL Met	0.14	0.18	0.22	0.27
Enzymes	0.10	0.10	0.10	0.10
L-Lysine Cl	0.03	0.03	0.03	0.03
L-Threonine	0.01	0.02	0.02	0.03
Premix	0.25	0.25	0.25	0.25
Acids	0.20	0.20	0.20	0.20
Enzymes	0.10	0.10	0.10	0.10
Micotoxin binder	0.05	0.05	0.05	0.05

Results

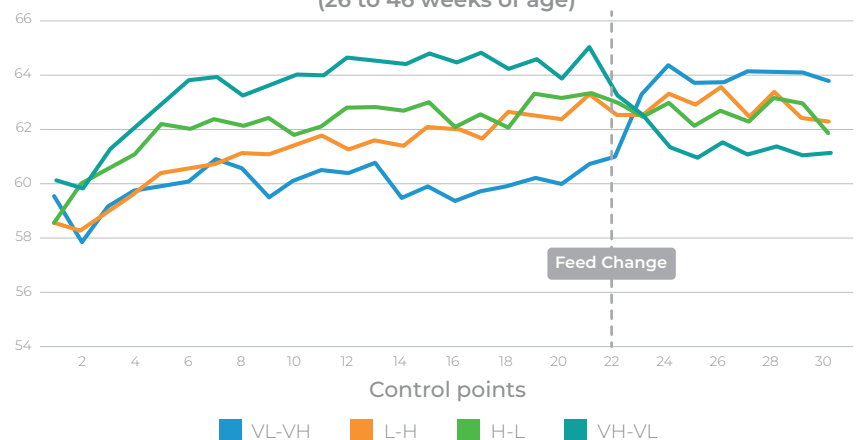
Egg Weight

There was a clear progression of egg size based on the levels of amino acid intake before making the change of the diets. After the feed change, egg size was altered both in daily production and in the overall analysis. Significant differences were observed between the VL and VH groups.

Laying Rate, EHH and Feed intake

None of these parameters were affected by the changes of the diets at this age.

Chart 2. Egg Weight
(26 to 46 weeks of age)



Material and Methods (part 2)

Nick chick hens were housed, (266 birds) at 56 weeks of age, they had 3 different treatments of very low crude protein diets from week 57, when diets were changed at 67 weeks and birds were kept until 86 weeks. The diets were switched VL ate VH, L ate H, H ate L.

The diets were produced in a local facility and formulated by the H&N nutritionist team and the raw materials were analysed with the support of EVONIK. The diets were a combination of corn, soya bean meal, wheat bran and soya oil as below. Four different treatments were formulated aiming 110 grams of feed intake, the energy was kept constant 2,810 kcal and 6 different type of synthetic amino acids were used. The ideal protein ratio remained constant. See below nutritional specifications and diets.

Nutrient specifications	VL	L	H	VH
Crude protein (%)	11.16	12.38	13.61	14.83
ME birds (Kcal/Kg)	2,810	2,810	2,810	2,810
Starch (%)	45.2	44	42.7	41.5
Sugars (%)	3.12	3.31	3.50	3.69
Crude fiber (%)	2.3	2.21	2.12	2.03
Neutral detergent fiber (%)	10.64	9.87	9.1	8.33
Ash (%)	11.7	11.8	11.9	12
Fat (%)	4.66	4.60	4.53	4.47
Linoleic acid (%)	2.47	2.440	2.410	2.38
Digestible Lys poultry (%)	0.56	0.64	0.71	0.79
Digestible Met poultry (%)	0.35	0.41	0.47	0.525
Digestible M+C poultry (%)	0.52	0.59	0.66	0.73
Digestible Thr poultry (%)	0.405	0.46	0.51	0.57
Digestible Trp poultry (%)	0.135	0.15	0.17	0.19
Digestible Arg poultry (%)	0.60	0.52	0.585	0.93
Digestible Val poultry (%)	0.51	0.57	0.64	0.71
Digestible Ileu poultry (%)	0.46	0.68	0.76	0.65
Calcium (%)	4.1	4.1	4.1	4.1
Total Phosphorus (%)	0.59	0.58	0.58	0.58
Phytic Phosphorus (%)	0.24	0.22	0.22	0.22
Available Phosphorus (%)	0.33	0.33	0.33	0.33
Digestible Phosphorus poultry (%)	0.17	0.18	0.18	0.18

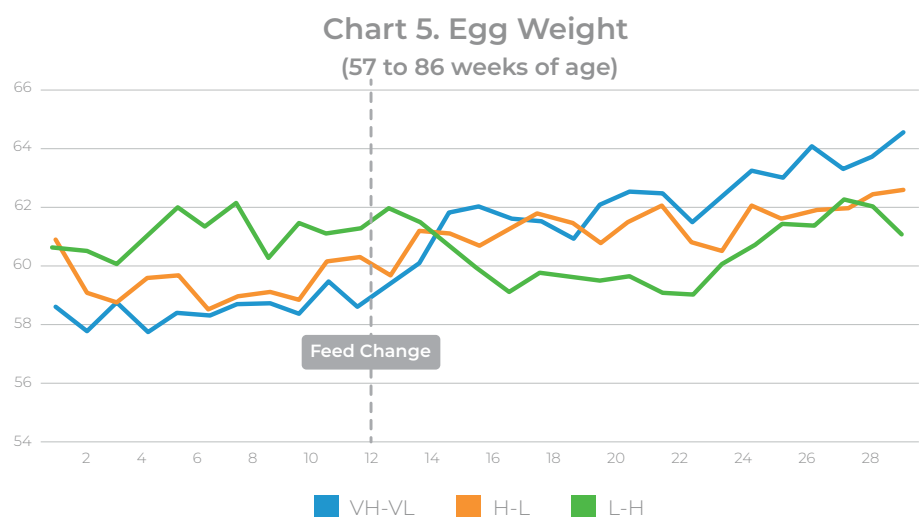
The diets

	VL	L	H	VH
Corn	64.44	63.41	62.38	61.34
SBM	10.72	14.07	17.43	20.78
Wheat bran	11.10	8.69	6.28	3.86
Calcium carbonate mix	9.74	9.71	9.69	9.66
Soya oil	2.00	2.00	2.00	2.00
Dicalcium phosphate	0.37	0.38	0.40	0.42
DL Met	0.20	0.24	0.29	0.33
L-Lysine Cl	0.142	0.146	0.149	0.153
L-Isoleucine	0.091	0.103	0.114	0.126
L-Threonine	0.077	0.092	0.106	0.121
Valine	0.066	0.086	0.105	0.125
L-Tryptophane	0.023	0.028	0.033	0.038
Salt	0.28	0.28	0.28	0.28
Sodium bicarbonate	0.16	0.16	0.16	0.16
Premix	0.25	0.25	0.25	0.25
Acids	0.20	0.20	0.20	0.20
Enzymes	0.10	0.10	0.10	0.10
Micotoxin binder	0.05	0.05	0.05	0.05

Results

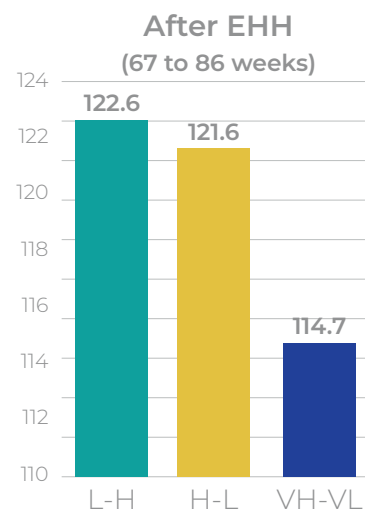
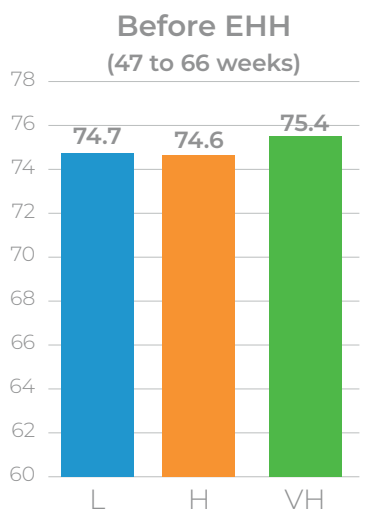
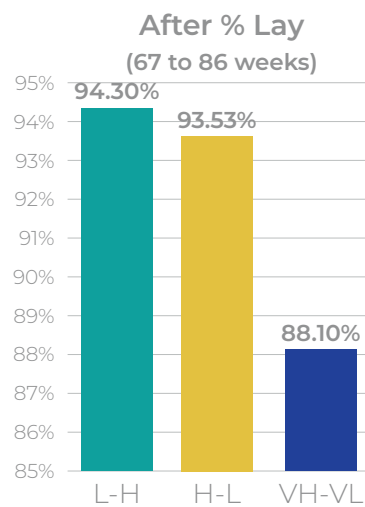
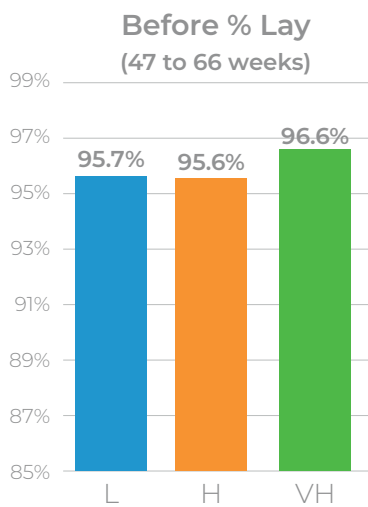
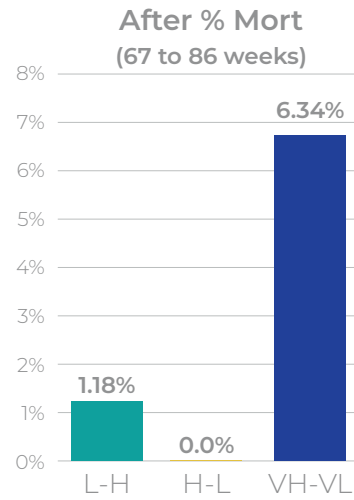
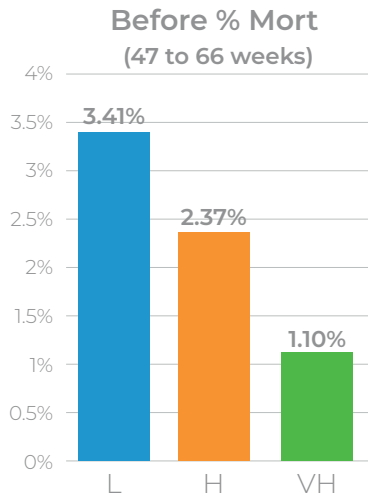
Egg Weight

There was a progression of egg size based on the levels of amino acid intake before making the change of the diets. Once the feed was changed, the egg size was modified in the daily production and in the overall analysis of the period after the change, the VL and VH groups showed significant difference.



Mortality, Laying Rate and EHH

These three parameters were stable before the diet change. However, after switching diets, mortality increased significantly and laying rate decreased in hens fed VL diets, which also reduced the number of eggs housed compared to the H and L groups.



Feed intake

This parameter wasn't affected by the changes of the diets.

Practical Takeaways

Amino acids drive egg size

We can modify the egg size while the hens are in production, and the production isn't affected.

Level of Crude Protein

It seems making egg size changes with very low levels of Crude Protein affects the production. **The minimum of 16 grams of daily intake** of Crude Protein must be implemented as explained in Chapter III.

Nutritional discussion

Amino acids drive egg size

The sensitivity to the amino acid intake in the actual breeds seen in Chapter I and II trials is seen too when we make changes of while the birds are producing with a targeted egg size.

Very low Crude protein

What it was seen at trial 2 explained in this Chapter IV supports what we saw in the Chapter II, it seems a minimum of Crude Protein is needed.

Impact of the feed changes

Birds maintained on high crude protein and amino acid levels experienced a sharp decline in performance once their diet was diluted. It could be an indication that birds at high level of productivity if they are heavily penalized in the diet, they will suffer a significant reduction of the production. Therefore, **the practice of reducing amino acids when the hens are still in high egg mass production need to be reconsidered** as they might impact the long-term productivity of the flock.

Conclusion for Nick Chick supporters

Nick Chick's versatility enables producers to target different egg markets with the same flock, adjusting egg size according to market demand.





*The key
to your profit*