H&N
» technical «
TIPS

CAGE-FREE FORMULATION UPDATE FOR NICK CHICK

H&N is working towards to maximize egg production improving the genetic potential of the birds every year. Nowadays, the production in cage is not the only way of doing it, in Europe and United States of America are growing the production sites with hens out of the cages. Therefore, as an advance of the new management guide for cage-free production, we would like to give some nutritional advice for our H&N birds in cage-free productions.

TIP!

The layers produce kilograms of eggs and customers can "transform" them with management and nutrition to what the market requires.

In a cage-free production, we are going to have highly productive birds in a type of production where they will be free to move, and eating wherever they want. The high productive birds are defined as birds with a constant body weight once they achieve the peak of production and a high egg mass output. Layers have a genetic potential of laying kilograms of eggs, therefore customers can "transform" it with management and nutrition to whatever their market is requiring: more eggs of lower egg size or less eggs of higher egg size.

The different parameters of nutrition need to be adapted to the production targets and the cage-free production.

Energy

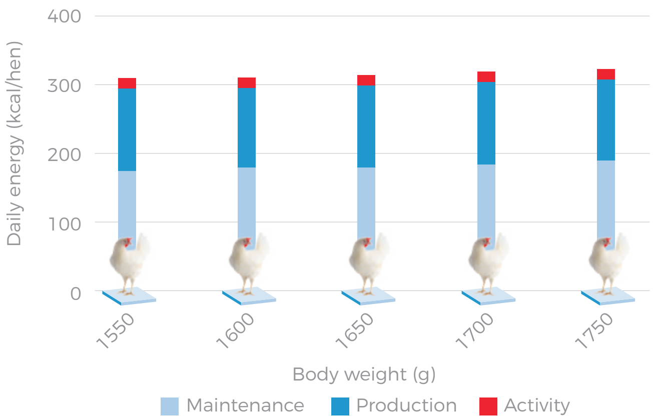
Energy is the most expensive parameter of the feed. The energy needs of the layers are driven mainly by the maintenance need, and it is determined by the body weight of the bird.

The body weight effect isn't usually considered when formulation is done but it has a huge impact in the eating behavior of the birds. A heavier bird in a cage-free production has higher needs, she will be searching for feed for longer time and will be unsatisfied if she doesn't get what she needs; while a small bird will need less time but she will eat the leftovers of what the big ones didn't want.

The egg mass production needs will also have an impact in the energy but it will have a lower impact than the body weight.

*In a cage-free production, we need to consider that the layer hens will have additional needs of energy due to the activity of being out of the cage. This additional need is affecting directly to the maintenance needs, we estimate it will increase around an 8% of the maintenance needs of the bird (**Graphic 1**).*

▼ ***Graphic 1.** Effect of body weight in energy needs*



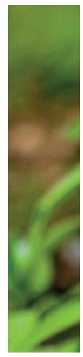
After the peak of production as the body weight of the birds will not change much, the energy needs will be flat during almost whole production.

There are differences among breeds and flocks in body weight, it is necessary to have information about it and adjust the formulation. Historically we haven't worried much about it, we relied on the capacity of the layer to self-regulate the feed intake based on its needs.

However in the cage-free production we can't rely that the bird will balanced itself when there is a lack of energy in the diet. As the birds have the freedom to eat wherever they want, they could have an unbalanced nutrient intake and it would impact the performance and would show unwanted behaviors.

TIP!

The cage-free production hens have an activity affecting directly to the maintenance needs, we estimate it will increase around an 8% the maintenance needs.

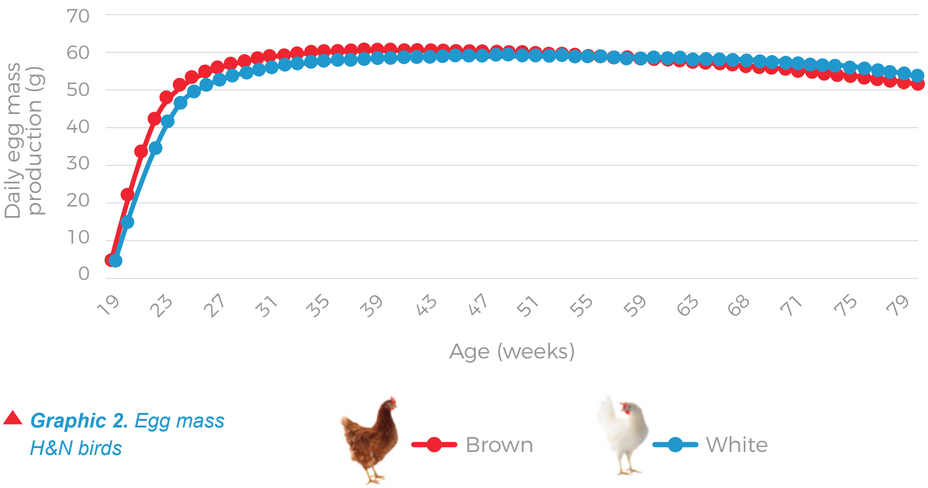


Amino acids

The amino acids needs are mainly driven by the egg mass production, so these means:

1 We shouldn't change the amino acid intake if the egg mass production doesn't drop

If we review the egg mass produced by the layer hens, we see that the egg mass starts dropping significantly beyond 50 weeks in brown birds and 60 weeks in white birds. (***Graphic 2***).



▲ ***Graphic 2.*** *Egg mass H&N birds*

The needs of this birds at 50 weeks isn't dropping as it was in the past; the work in longevity done by the geneticist has extended the high needs of amino acids because the egg mass production isn't dropping as it used to.

However, it is a common practice to change to a more diluted feed after week 45-50. With this practice, we hope the bird can get the nutrients by increasing the feed intake, but it doesn't need to happen and in a cage-free production could be even more difficult to make it happen.

If the bird isn't getting the right amino acid nutrition the bird will sacrifice body weight, drop egg size or even decrease egg production. Furthermore, we could see undesirable behavior like feather peaking or cannibalism.

2 We can control the size of the egg with the amino acids nutrition

Sometimes the market values more a specific size of eggs than others, so when the birds achieve the targeted egg weight and we want to avoid bigger eggs we need to adjust the whole amino acid intake.

Making a formulation based on egg mass production will allow to have same egg numbers but at the size we want. **The reduction of the whole profile of amino acids is a better way of controlling the egg size than just modifying the level of methionine. If only the level of methionine is adjusted then the ideal protein ration is changed and in longer term it has an impact in bird performance, wellfare and health.**

Feeding management

In a cage production, we can control what feed is offered to the layer hen and she can't make a big selection.

However, in a cage-free production the free movement takes from us the control of the feeding. Therefore, in the cage-free production there is a lot to do about how to make the layer hens eat what they need.

It will be about working on a combination of management practices at the farm and feed structure at the feed mill, to achieve the right nutrient intake. Please see our specific tech tip about it.

TIP!

We need to teach birds to eat what they need with a combination of management at the farm and feed structure so birds will have the right nutrient intake.

Please see our specific tech tip about it.

H&N recommendations in cage-free production

In H&N we believe that a nutrition based on egg mass and body weight is a method that can fit all birds, no matter the season or the flock, it will provide the producers the information to have the right nutrition for the actual high productive birds of H&N.

There are some points, “READ BEFORE USE”, about the recommendations:

1 Energy

It is given as a range of daily needs: due to the different systems and sources where the nutritionist can get information of the energy of the raw materials, (NRC, INRA, FEDNA, CVB, Additive companies…) we only can suggest a range and each nutritionist must make the necessary adjustments.

- **The needs are shown for a Nick Chick bird of 1600 grams body weight.**

If the body weight is different, the requirement must be adjusted. The adjustment should be done as ±4 kcal/bird/day, every time there is a ±50 grams in the body weight.

2 Protein

It is a recommendation in case:

- **There isn’t enough information about the composition of the raw materials.**
- **Formulations based on less than 6 amino acids.** In case of wheat based diets, it is recommended to include isoleucine.

3 Total amino acids

The values shown in the tables is a calculation from the digestible amino acids values. The calculation is based on a total digestibility of the diet of 85%.

For those that use total amino acids for layer formulation, you need to make the adjustments based on the available raw materials you work with.

Pullets

Nick Chick Cage-Free recommendations

Nutrient		0-5 weeks	6-10 weeks	11-17 weeks
MEn	kcal/kg	2825-2950	2725-2850	2600-2750
	MJ	11.83-12.35	11.41-11.93	10.89-11.51
Crude protein	%	20-19	18-17	15.5-14.5
Lysine	%	1.15	0.94	0.64
Dig Lysine	%	0.98	0.80	0.54
Methionine	%	0.51	0.42	0.30
Dig Methionine	%	0.43	0.36	0.25
Met. + Cysteine	%	0.86	0.75	0.54
Dig Met + Cys	%	0.74	0.64	0.46
Threonine	%	0.76	0.65	0.44
Dig Threonine	%	0.65	0.56	0.38
Tryptophane	%	0.22	0.20	0.15
Dig Tryptophane	%	0.19	0.17	0.13
Isoleucine	%	0.80	0.72	0.48
Dig Isoleucine	%	0.68	0.61	0.41
Valine	%	0.90	0.73	0.51
Dig Valine	%	0.76	0.62	0.43
Argenine	%	1.21	0.99	0.67
Dig Argenine	%	1.03	0.84	0.57
Calcium	%	1.05	1.00	0.90
Total Phosphorus	%	0.75	0.70	0.58
Available Phosphorus	%	0.48	0.45	0.37
Dig Phosphorus	%	0.41	0.38	0.32
Sodium, min	%	0.18	0.17	0.16
Potassium, min	%	0.50	0.50	0.50
Potassium, max	%	1.10	1.10	1.10
Chloride, min	%	0.20	0.18	0.16
Salt minimum	%	0.30	0.28	0.26
Choline total	mg/kg	1260	1240	1200

Production

Nick Chick in production

Egg mass	58-60 g/d				
MEn	kcal/hen/day	296	-	312	
	MJ/hen/day	1.239	-	1.306	
Crude Protein	g/hen/day	-	17	-	
Feed intake	g/hen/day	105	110	115	120
Lysine	941	0.896	0.856	0.818	0.784
Dig Lysine	800	0.762	0.727	0.696	0.667
Methionine	471	0.448	0.428	0.409	0.392
Dig Methionine	400	0.381	0.364	0.348	0.333
Met. + Cysteine	866	0.825	0.787	0.753	0.722
Dig Met + Cys	736	0.701	0.669	0.640	0.613
Threonine	659	0.627	0.599	0.573	0.549
Dig Threonine	560	0.533	0.509	0.487	0.467
Tryptophane	226	0.215	0.205	0.196	0.188
Dig Tryptophane	192	0.183	0.175	0.167	0.160
Isoleucine	753	0.717	0.684	0.655	0.627
Dig Isoleucine	640	0.610	0.582	0.557	0.533
Valine	824	0.784	0.749	0.716	0.686
Dig Valine	700	0.667	0.636	0.609	0.583
Argenine	980	0.934	0.891	0.853	0.817
Dig Argenine	833	0.794	0.758	0.725	0.694
Na	180	0.171	0.164	0.164	0.157
K	500	0.476	0.455	0.455	0.435
Cl min	180	0.171	0.164	0.164	0.157
Cl max	325	0.310	0.295	0.283	0.271
Linoleic acid	1550	1.476	1.409	1.409	1.348

Egg mass	55-57 g/d				
MEn	kcal/hen/day	291	-	306	
	MJ/hen/day	1.218	-	1.281	
Crude Protein	g/hen/day	-	16.5	-	
Feed intake	g/hen/day	105	110	115	120
Lysine	906	0.863	0.824	0.788	0.755
Dig Lysine	770	0.733	0.700	0.670	0.642
Methionine	453	0.431	0.412	0.394	0.377
Dig Methionine	385	0.367	0.350	0.335	0.321
Met. + Cysteine	833	0.794	0.758	0.725	0.695
Dig Met + Cys	708	0.675	0.644	0.616	0.590
Threonine	634	0.604	0.576	0.551	0.528
Dig Threonine	539	0.513	0.490	0.469	0.449
Tryptophane	217	0.207	0.198	0.189	0.181
Dig Tryptophane	185	0.176	0.168	0.161	0.154
Isoleucine	725	0.690	0.659	0.630	0.604
Dig Isoleucine	616	0.587	0.560	0.536	0.513
Valine	793	0.755	0.721	0.689	0.661
Dig Valine	674	0.642	0.613	0.586	0.561
Argenine	942	0.897	0.856	0.819	0.785
Dig Argenine	801	0.763	0.728	0.696	0.667
Na	170	0.162	0.155	0.155	0.148
K	500	0.476	0.455	0.455	0.435
Cl min	170	0.162	0.155	0.155	0.148
Cl max	320	0.305	0.291	0.278	0.267
Linoleic acid	1550	1.476	1.409	1.409	1.348

Production

Egg mass	52-54 g/d				
MEn	kcal/hen/day	283	-	298	
	MJ/hen/day	1.185	-	1.248	
Crude Protein	g/hen/day	-	16	-	
Feed intake	g/hen/day	105	110	115	120
Lysine	871	0.829	0.791	0.757	0.725
Dig Lysine	740	0.705	0.673	0.643	0.617
Methionine	435	0.415	0.396	0.379	0.363
Dig Methionine	370	0.352	0.336	0.322	0.308
Met. + Cysteine	801	0.763	0.728	0.696	0.667
Dig Met + Cys	681	0.648	0.619	0.592	0.567
Threonine	609	0.580	0.554	0.530	0.508
Dig Threonine	518	0.493	0.471	0.450	0.432
Tryptophane	209	0.199	0.190	0.182	0.174
Dig Tryptophane	178	0.169	0.161	0.154	0.148
Isoleucine	696	0.663	0.633	0.606	0.580
Dig Isoleucine	592	0.564	0.538	0.515	0.493
Valine	762	0.725	0.693	0.662	0.635
Dig Valine	648	0.617	0.589	0.563	0.540
Argenine	905	0.862	0.823	0.787	0.755
Dig Argenine	770	0.733	0.700	0.669	0.641
Na	160	0.152	0.145	0.145	0.139
K	500	0.476	0.455	0.455	0.435
Cl min	160	0.152	0.145	0.145	0.139
Cl max	310	0.295	0.282	0.270	0.258
Linoleic acid	1550	1.476	1.409	1.409	1.348

Egg mass	< 51 g/d				
MEn	kcal/hen/day	279	-	294	
	MJ/hen/day	1.168	-	1.231	
Crude Protein	g/hen/day	-	15.5	-	
Feed intake	g/hen/day	105	110	115	120
Lysine	847	0.807	0.770	0.737	0.706
Dig Lysine	720	0.686	0.655	0.626	0.600
Methionine	424	0.403	0.385	0.368	0.353
Dig Methionine	360	0.343	0.327	0.313	0.300
Met. + Cysteine	779	0.742	0.708	0.678	0.649
Dig Met + Cys	662	0.631	0.602	0.576	0.552
Threonine	593	0.565	0.539	0.516	0.494
Dig Threonine	504	0.480	0.458	0.438	0.420
Tryptophane	203	0.194	0.185	0.177	0.169
Dig Tryptophane	173	0.165	0.157	0.150	0.144
Isoleucine	678	0.645	0.616	0.589	0.565
Dig Isoleucine	576	0.549	0.524	0.501	0.480
Valine	741	0.706	0.674	0.645	0.618
Dig Valine	630	0.600	0.573	0.548	0.525
Argenine	881	0.839	0.801	0.766	0.734
Dig Argenine	749	0.713	0.681	0.651	0.624
Na	160	0.152	0.145	0.145	0.139
K	500	0.476	0.455	0.455	0.435
Cl min	160	0.152	0.145	0.145	0.139
Cl max	310	0.295	0.282	0.282	0.270
Linoleic acid	1550	1.476	1.409	1.409	1.348

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