

Efficacy of the use of Hy-D® in laying hens

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Summary

A trial was run with the objective to determine the effect of using Hy-D® (a 25-hydroxycholecalciferol premix) at 500 or 300g per tonne, supplying 2.500 or 1.500 IU vitamin D₃/kg of diet, respectively, to partly replace vitamin D₃ in layer's feed on production parameters of Hy-Line W 98 White layers. Layers were 47-week-old at the start of the trial, and 63 weeks old at the end of the production period (16 weeks of trial). Four hundred and thirty two laying hens, 6 months old at the start of the adaptation period, were housed in battery cages (3 birds per cage), and received one of the three following treatments: the standard control diet used by the company, supplemented with 2.500 IU of vitamin D₃; supplemented with 500g of Hy-D® premix (supplying 2.500 IU/kg of vitamin D₃), or supplemented with 1.000 IU of vitamin D₃ and 300g of Hy-D® premix (supplying 1.500 IU vitamin D₃/kg) per tonne. Production parameters (laying percentage, egg weight, intake, feed conversion, and percentage of broken and dirty eggs) were monitored from 47 to 63 weeks of age.

Adding Hy-D® premix to the diet of the laying hens increased egg weight by 2% (63,52g for the control; 64,79g and 64,81g for the 500 and 300 Hy-D® premix, respectively). Egg mass was increased by 2.1% in the case of 500g Hy-D® premix as compared with the control, whereas the use of 300g Hy-D® premix increased egg mass by 1,0% (due to the lower laying percentage). Feed intake decreased with the use of Hy-D® premix; 2,3% for the Hy-D®-500g as compared with the control, 3,0% for the Hy-D®-300g as compared with the control. The combination of a lower intake and a better egg mass resulted in an improved feed conversion with the use of Hy-D® premix. The improvement was of 4,3% for the Hy-D®-500g, and of 3,9% for the Hy-D®-300g as compared with the control.

An economical evaluation, done for 100.000 hens, and taking into account the number of broken and dirty eggs, and the increase in egg size (using the official prices of two of the national markets), yielded a final benefit of more than 20.000 €/year when using Hy-D® in the diets.

Introduction

Numerous studies have shown that the use of some vitamin D₃ metabolites in poultry feeds elicits responses in the animal that cannot be obtained with the use of vitamin D₃ alone. The positive effects of 25-hydroxy-cholecalciferol on egg quality have been shown during the last decade (Soares *et al.*, 1995). Recently, Soto-Salanova and Hernandez (2004) reported that the combination of an Optimum Vitamin Nutrition (OVN™) and Hy-D® (25-hydroxycholecalciferol) had a beneficial effect on some production parameters and egg quality of Hisex Brown laying hens between 41 and 67 weeks of age. However, there is little information in the literature on the use of different levels of 25-hydroxy-cholecalciferol in replacement of vitamin D₃ and its effect on production parameters of laying hens.

Thus, a trial was run to evaluate the effect of adding 500 or 300 g (supplying 2,500 and 1,500 IU/kg, respectively) of 25-hydroxy-vitamin D₃ as Hy-D® premix on production parameters of Hy-Line W 98 white laying hens between 47 and 63 weeks of age (16 weeks of trial).

Materials and methods

Four hundred and thirty two laying hens, 6 month-old at the start of the trial, were housed in battery cages (3 hens per cage). The laying hens were distributed in three treatments, with 8 replicates per treatment and 18 hens per replicate. One hundred and forty four laying hens were fed the standard control diet used by the company, supplemented with 2,500 IU of vitamin D₃; another group of 144 hens were fed 500g of Hy-D® premix (supplying 2,500 IU/kg of vitamin D₃), and a third group of 144

hens were fed 1.000 IU of vitamin D₃ and 300g of Hy-D® premix (supplying 1,500 IU vitamin D₃/kg). The laying hens were fed these diets from 47 to 63 weeks of age. During that period, and every two weeks, the following parameters were monitored: laying percentage, egg weight, intake, feed conversion, and percentage of broken and dirty eggs.

Results and discussion

Table 1 summarizes the results of the production parameters of Hy-Line W 98 white laying hens between 47 and 63 weeks of age fed either a control diet (supplying 2,500 IU/kg vitamin D₃), or a diet containing 500g/T of Hy-D® premix. The use of 500g/T of Hy-D® premix (equivalent to 2,500 IU/kg of vitamin D₃) as the only source of vitamin D₃ increased egg weight by 2% as compared with that of control hens. Although no effect was observed on laying percentage (84.4% for the control vs. 84.5% for the Hy-D®-500 treatment), the increase in egg mass was similar to that observed for egg weight (+ 2.1%). This increase, concomitant to a decrease in feed intake observed with the use of 500g/T of Hy-D® (-2.3%), resulted in an improved feed conversion of around 4.3%: 2.148 for the control treatment, 2.055 for the Hy-D®-500 treatment. A decrease (- 22.9%) in the percentage of broken and dirty eggs was also observed, 4.6% for the control group, 1.9% in the group receiving 500g/T of Hy-D® premix.

Table 1 Production parameters of Hy-Line W98 laying hens fed a control diet, or a diet supplemented with 500 g/T Hy-D® premix between 47 and 63 weeks of age.

	CONTROL	HY-D®-500	DIFFERENCE, %
Egg weight, g	63.5	64.8	+ 2.0
Laying, %	84.4	84.5	+ 0.1
Egg mass, g	53.6	54.7	+ 2.1
Feed intake, g/day	115.2	112.5	- 2.3
Feed conversion, kg/kg	2.148	2.055	- 4.3
Broken + dirty eggs, %	4.6	1.9	- 22.9

The results shown in Table 2 compare the production parameters of Hy-Line W 98 white laying hens between 47 and 63 weeks of age fed a control diet (containing 2,500 IU/kg of vitamin D₃), or a diet supplemented with 1,000 IU/kg of vitamin D₃ and 300g/T of Hy-D® premix. The use of 300g/T of Hy-D® premix (equivalent to 1,500 IU/kg of vitamin D₃) as a partial source of vitamin D₃ increased egg weight by 2% as compared with the control diet. A slight decrease (-1.1%) in laying percentage was observed (84.4% for the control treatment, vs. 83.5% for the Hy-D®-300 treatment), but the increase in egg mass was of 1.0% for the group fed 300g/T of Hy-D® premix. This increase, together with a decrease in feed intake (-3.0%), resulted in an improvement of around 3.9% in feed conversion: 2.148 for the control group, 2.064 for the Hy-D®-300-treatment. A decrease (- 1.7%) in the percentage of broken and dirty eggs, 4.6% for the control group, and 4.5% for the group fed 300g/T of Hy-D® premix, was also observed.

Table 2 Production parameters of Hy-Line W98 laying hens fed a control diet or a diet supplemented with 300g/T of Hy-D® premix between 47 and 63 weeks of age.

	CONTROL	HY-D®-300	DIFFERENCE, %
Egg weight, g	63.5	64.8	+ 2.0
Laying, %	84.4	83.5	- 1.1
Egg mass, g	53.6	54.1	+ 1.0
Feed intake, g/day	115.2	111.7	- 3.0
Feed conversion, kg/kg	2.148	2.064	- 3.9
Broken + dirty eggs, %	4.6	4.5	- 1.7

Every two weeks, the evolution with time was monitored for egg weight (Figure 1), laying percentage (Figure 2), feed intake (Figure 3), and feed conversion (Figure 4) of Hy-Line W-98 laying hens fed a control diet, containing 2,500 IU/kg of vitamin D₃, or a diet supplemented with 500 or 300g/T of Hy-D® premix.

In Figure 1, it is shown that the egg weight of the control hens varies over-time differently to that of the laying hens supplemented with Hy-D®, both at 300 and 500g/T, thus resulting, at the end of the 16 week-trial, in an improvement of around 2% for the laying hens supplemented with Hy-D®. Although this difference is not observed in the laying percentage (Figure 2), the feed intake (Figure 3) and feed conversion (Figure 4) changes over-time follow a similar pattern to that observed for egg weight, resulting in a net improvement of 2.6 and 4.1%, respectively, of the Hy-D® treatments as compared with the control.

Results are similar to those obtained in the present trial were reported by Soto-Salanova and Hernandez (2004) when feeding brown laying hens between 41 and 67 weeks of age with an Optimum Vitamin Nutrition (OVN™) and Hy-D®. The differences observed between both trials may be due to the different laying hen strain (Hisex brown vs. Hy-Line white), and the time of the year in which the trial took place (summer vs. winter). Thus, an economical calculation (similar to that done by Soto-Salanova and Hernandez, 2004) was done, taking into account the increase in egg size and the decrease in the percentage of broken and dirty eggs with the use of Hy-D®. The price of the eggs used as a reference was extracted as the average price from two different Spanish markets (Reus and Toledo). The economical calculation showed that the use of Hy-D® as a total or partial source of vitamin D₃ to feed laying hens during the production cycle results in great benefit for the producer (around 5:1, that is, 5 euros of benefit for each euro invested).

References

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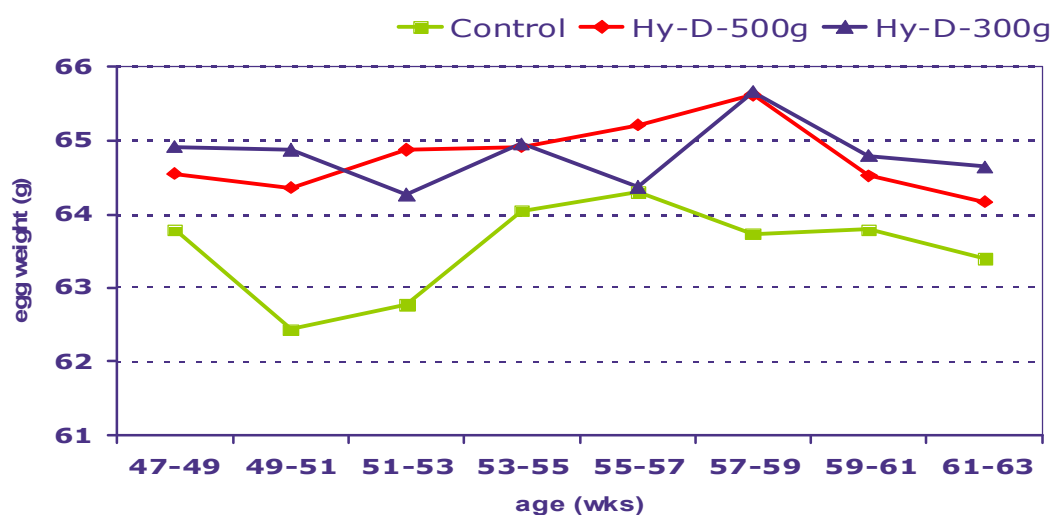


Figure 1 Egg weight (g) evolution of Hy-Line W98 laying hens between 47 and 63 weeks of age fed a control diet or a diet supplemented with 500 or 300g/T of Hy-D® premix.

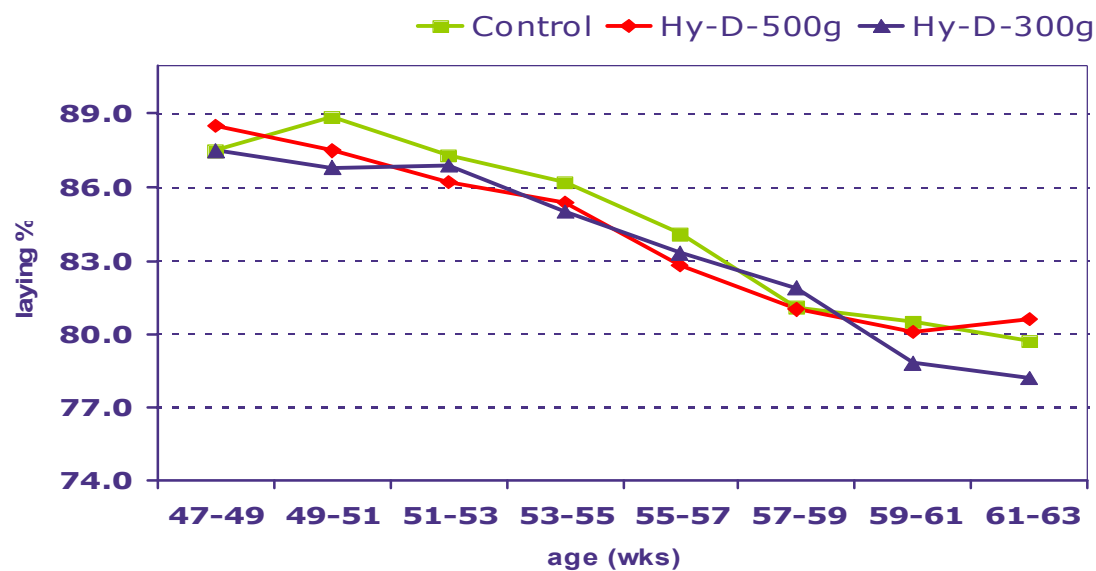


Figure 2 Laying percentage (%) evolution of Hy-Line W98 laying hens between 47 and 63 weeks of age fed a control diet or a diet supplemented with 500 or 300g/T of Hy-D® premix.

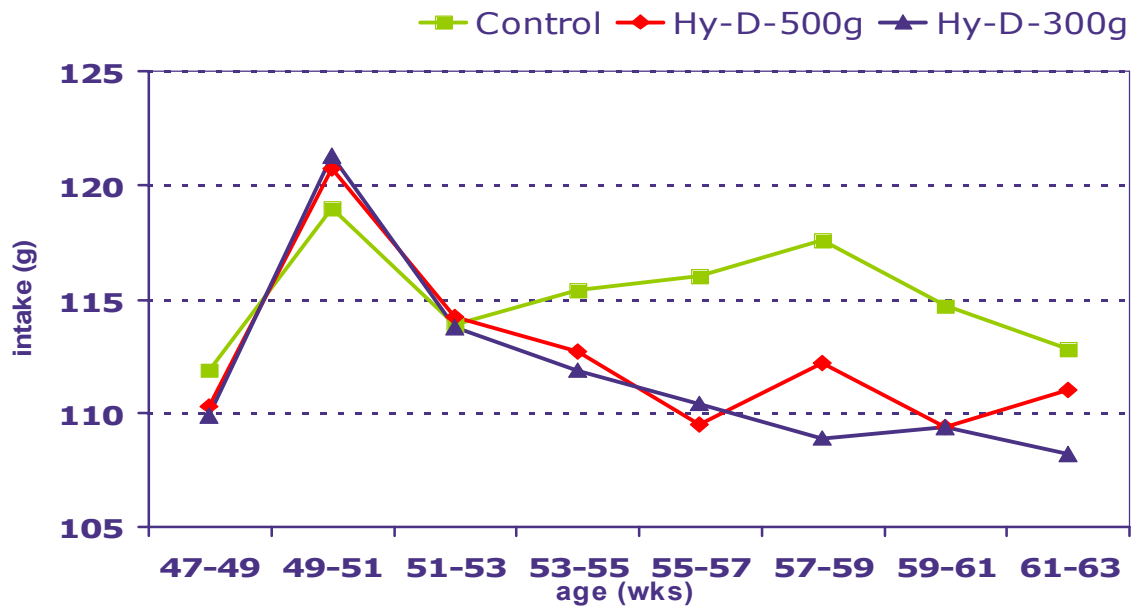


Figure 3 Feed intake (g) evolution of Hy-Line W98 laying hens between 47 and 63 weeks of age fed a control diet or a diet supplemented with 500 or 300g/T of Hy-D® premix.

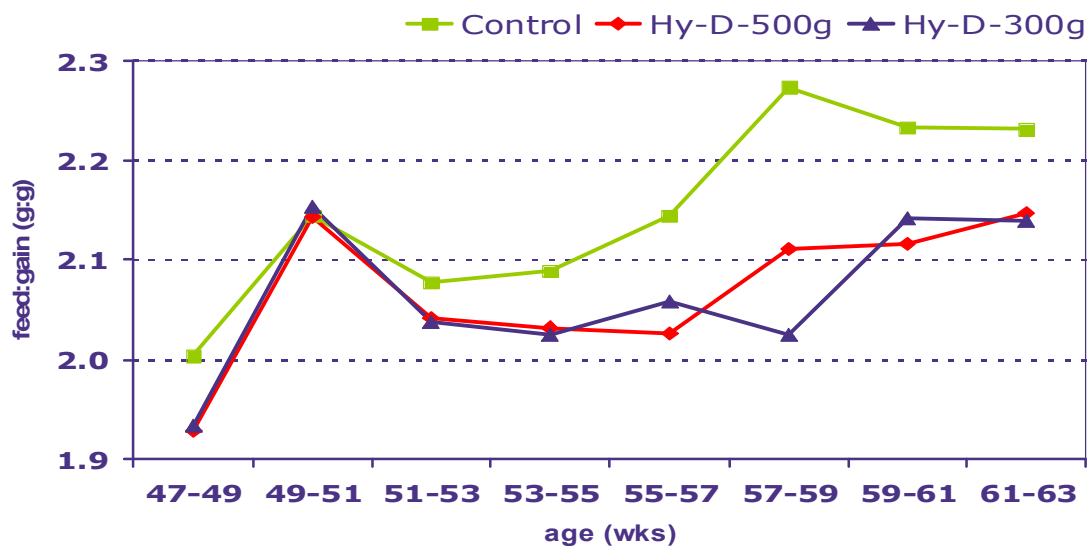


Figure 4 Feed conversion (g:g) evolution of Hy-Line W98 laying hens between 47 and 63 weeks of age fed a control diet or a diet supplemented with 500 or 300g/T of Hy-D® premix.