

Effect of Hy-D[®] addition on performance and slaughterhouse results of broilers

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Abstract

A trial was run with the objective to determine the effect of using Hy-D[®] premix (at 300g/t feed, supplying 1,500 IU vitamin D₃/kg of diet) to partly replace vitamin D₃ in broiler feed on production and slaughterhouse parameters of Ross and Cobb broilers from 1 to 46 days of age. Eighty thousand broilers, 1 day-old at the start of the trial, were placed in four different houses (20,000 in each), and received one of the two following treatments: 40,000 broilers (20,000 in each of the two control houses) were fed the standard control diet used by the company, supplemented with 3,000 IU of vitamin D₃; the other two groups of 20,000 broilers were fed the same basal level of vitamin D₃ but were supplemented with 300g/t of Hy-D[®] premix (supplying 1,500 IU vitamin D₃/kg). Production parameters (body weight, feed intake, feed conversion and mortality) were monitored from 1 to 46 days of age, and slaughterhouse parameters (carcass yield, breast meat yield, drip losses on storage, and bone breaking strength) were measured at the end of the trial.

Adding Hy-D[®] premix to the diet of the broilers increased body weight by 1.7% (2,510g for the control; 2,563g for the broilers receiving 300 Hy-D[®] Hy-D[®] premix). Feed conversion was improved by 2.6% with the use of Hy-D[®] (1.994 for the control group, 1.943 for the Hy-D[®]-fed birds). Slaughterhouse parameters were also improved with Hy-D[®] addition; carcass drip losses were measured after 24 and 48 h of storage at 4°C. Using Hy-D[®] in the diet decreased drip losses by 40 and 20%, at 24 and 48 h, respectively. The same parameter was measured in breast meat at 3 and 24 h of storage. Again, the use of Hy-D[®] decreased drip losses by 27 and 55%, respectively. Breast meat drip losses averaged 0.45% for the control and 0.33% for the Hy-D[®] treatment at 3h, and 1 for the control and 0.56% for the treated birds at 24h. Tibia breaking strength was measured at 46 days of age in 60 birds per treatment using a texture analyzer. Hy-D[®] bones were 9.3% stronger than their control counterparts (20,892 g for the control, 22,862g for the treated birds).

An economical calculation, done for 10,000,000 broilers, and taking into account the improvement obtained in production parameters (body weight, feed conversion), yielded a final benefit of more than 600,000 euros when using Hy-D[®] in broiler diets.

Key words: broilers, 25-hydroxy-vitamin D₃, body weight, feed conversion, drip losses, bone breaking strength

Introduction

Vitamin D₃ is an essential nutrient, which stimulates the absorption of calcium and phosphorus from the intestinal lumen and also increases the re-absorption of Ca and P from the renal tubules. This homeostatic function of vitamin D₃ is important to provide sufficient minerals for incorporation into the bone matrix and to avoid bone disorders of various origins. Recent research has demonstrated that the use of vitamin D metabolites such as 25-hydroxycholecalciferol (25-OH-D₃, Hy-D[®]) and 1,25-dihydroxycholecalciferol (1,25-OH-D₃) can reduce the incidence of tibial dyschondroplasia (Rennie and Whitehead, 1996). Skeletal problems are of continuous concern for the poultry industry worldwide, because they are responsible for important losses both in performance and at the slaughterhouse. Thus, the present trial was run with the objective to determine the effect of using Hy-D[®] premix (at 300g/t feed, supplying 1,500 IU vitamin D₃/kg of diet) to partly replace vitamin D₃ in broiler feed on production and slaughterhouse parameters of Ross and Cobb broilers from 1 to 46 days of age.

Materials and Methods

Eighty thousand broilers, one-day-old at the start of the trial, were placed in four different houses (20,000 in each), and received one of the two following treatments: 40,000 broilers (20,000 in each of the two control houses) were fed the standard control diet used by the company, supplemented with 3,000 IU of vitamin D₃; the other two groups of 20,000 broilers were fed the same basal level of vitamin D₃ but were supplemented with 300g/t of Hy-D[®] premix (supplying 1,500 IU vitamin D₃/kg). Production parameters (body weight, feed intake, feed conversion and mortality) were monitored from 1 to 46 days of age, and slaughterhouse parameters (European carcass and breast meat drip losses on storage, and bone breaking strength) were measured at the end of the trial.

Results and Discussion

Table 1 contains the summary of the results obtained with Ross and Cobb broilers. Average body weight of the broilers fed either a control diet, or a diet that had been supplemented on top with 300 g/T of Hy-D[®] premix (supplying an additional 1,500 IU/kg of vitamin D₃) was measured at 46 days of age.

Table 1. Selected performance and slaughterhouse parameters of Ross and Cobb broilers fed a control diet, or a diet supplemented on top with 300 g/T Hy-D[®] premix between 1 and 46 days of age

Parameter	CONTROL	HY-D-300	DIFFERENCE, %
Body weight (g), 46 days	2510	2553	+ 1,7
Feed conversion, g/g	1,994	1,943	+ 2,6
Carcass drip losses (%), 24h	1,00	0,60	- 20
Carcass drip losses (%), 48h	1,00	0,80	- 40
Breast meat drip losses (g), 3h	0,44	0,33	- 27
Breast meat drip losses (g), 24h	1,00	0,56	- 55
Tibia breaking strength, kg	20,89	22,86	- 9,3

Body weight of control birds was 2,510 g at this time, whereas that of Hy-D[®]-supplemented broilers was 1.7% higher (2,553 at the same age). This increase, concomitant to a decrease in feed intake observed with the use of 300g/T of Hy-D[®] (data not shown), resulted in an improved feed conversion (Table 1) of around 2.6%: 1.994 for the control treatment, 1.943 for the Hy-D[®]

treatment. Similar improvements in body weight and feed conversion have been reported by Parkinson and Cransberg (2004).

Slaughterhouse parameters were also improved with Hy-D[®] addition; carcass drip losses were measured after 24 and 48 h of storage at 4°C. Using Hy-D[®] in the diet decreased drip losses by 40 and 20%, at 24 and 48 h, respectively. Carcass drip losses decreased from 1 to 0,6% at 24 h, and from 1 to 0,8% after 48 h of storage. The same parameter was measured in breast meat at 3 and 24 h of storage. Again, the use of Hy-D[®] decreased drip losses by 27 and 55%, respectively. Breast meat drip losses averaged 0.45% for the control and 0.33% for the Hy-D[®] treatment at 3h, and 1 for the control and 0.56% for the treated birds at 24h. To the authors' knowledge, no information exists in the literature regarding the decrease in drip losses with Hy-D[®] addition. Whether the effect observed is directly related to the influence of Hy-D[®] on meat quality, or an indirect effect due to the better quality of the bones of broilers fed Hy-D[®], we can only hypothesize. However, these results seem to be confirmed by the bone breaking strength results. Tibia breaking strength was measured at 46 days of age in 60 birds per treatment using a texture analyzer. Hy-D[®] bones were 9.3% stronger than their control counterparts (20,892 g for the control, 22,862g for the treated birds).

An economical calculation, done for 10,000,000 broilers, and taking into account the improvement obtained in production parameters (body weight, feed conversion), yielded a final benefit of more than 600,000 euros when using Hy-D[®] in broiler diets.

References

- Parkinson, G.B., and P.H. Cransberg, 2004. Effect of casein phosphopeptide and 25-hydroxycholecalciferol on tibial dyschondroplasia in growing broiler chickens. *British Poultry Science* 45: 802-806.
- Rennie, J.S., and C.C. Whitehead, 1996. Effectiveness of dietary 25- and 1-25-hydroxycholecalciferol in combating tibial dyschondroplasia in broiler chickens. *British Poultry Science* 37: 413-421.