

Research Notes

Arm & Hammer Animal and Food Production



Research reveals nutrient sparing effects of CERTILLUS Perform Poultry Energy supplementation in broilers.

STUDY OVERVIEW

A study¹ was conducted to determine the effect of feeding CERTILLUS™ Perform Poultry Energy on multiple performance metrics when fed to male Vencobb 430Y broiler chickens. 154-day-old chicks were assigned to one of four treatment groups with 11 birds/pen and 14 pens/treatment.

- The study was designed as a 2 x 2 factorial with two levels of energy and two levels of CERTILLUS:
 - The positive control (PC) diet was formulated with normal apparent metabolizable energy (AME), and supplemented with two levels of test product (CERTILLUS Perform Poultry Energy, 0 or 500 g/MT).
 - The negative control (NC) diet was formulated with -50 kcal AME, and two levels of test product (CERTILLUS Perform Poultry Energy, 0 or 500 g/MT).
- Data was analyzed in a 2 x 2 factorial design using dietary AME density (standard and $\Delta - 50$ kcal/kg) and the level of test product (0 and 500 mg/kg) and pen as the experimental unit.

RESULTS

Performance

- A decrease in energy by 50 kcal showed a tendency for reduced 42-day body weight (BW) and increase in feed conversion ratio (FCR) of broilers (Table 1).
- Supplementation with CERTILLUS Perform Poultry Energy showed a tendency for increased BW in broilers fed normal energy as well as reduced energy diet, and FCR similar to broilers fed the PC diet (Table 1).

Treatments	42-day BW	Cumulative Feed Intake	FCR
PC	2702.7 ^{ab}	4094.4	1.54 ^a
PC + CERTILLUS Perform Poultry Energy	2740.3 ^b	4128.6	1.532 ^a
NC (-50 kcal AME)	2632.9 ^a	4070.3	1.572 ^b
NC + CERTILLUS Perform Poultry Energy	2689.7 ^{ab}	4073	1.539 ^a

Means with dissimilar superscripts in a column varied significantly ($P < 0.05$).

PHYSIOLOGY

- A decrease in energy by 50 kcal increased levels of acute phase protein Alpha 1 acid glycoprotein (α -1-AGP) (indicates stress) and supplementation of the reduced energy diet (NC) with CERTILLUS Perform Poultry Energy decreased it at d42 (Table 2).
- Broilers fed reduced energy diet (NC) had lower expression of gut barrier protein Zona occludens 1 (ZO1) and supplementation with CERTILLUS Perform Poultry Energy increased its expression (Figure 1).

- Presumably, to compensate for the reduction in energy in the negative control diet, NC fed birds had a tendency to increase expression of sodium glucose cotransporter gene (SGLT-1) and supplementation with CERTILLUS Perform Poultry Energy in the NC diet increased that expression further (Figure 1).
- Significant main effects were noted for serum D-lactate (Table 2).
 - Control-fed (PC) birds had significantly higher levels of D-lactate compared to CERTILLUS™-fed birds.
 - An increase in Serum D-lactate has been associated with dysbacteriosis, poor gut barrier function, malabsorption, and increased hindgut fermentation.

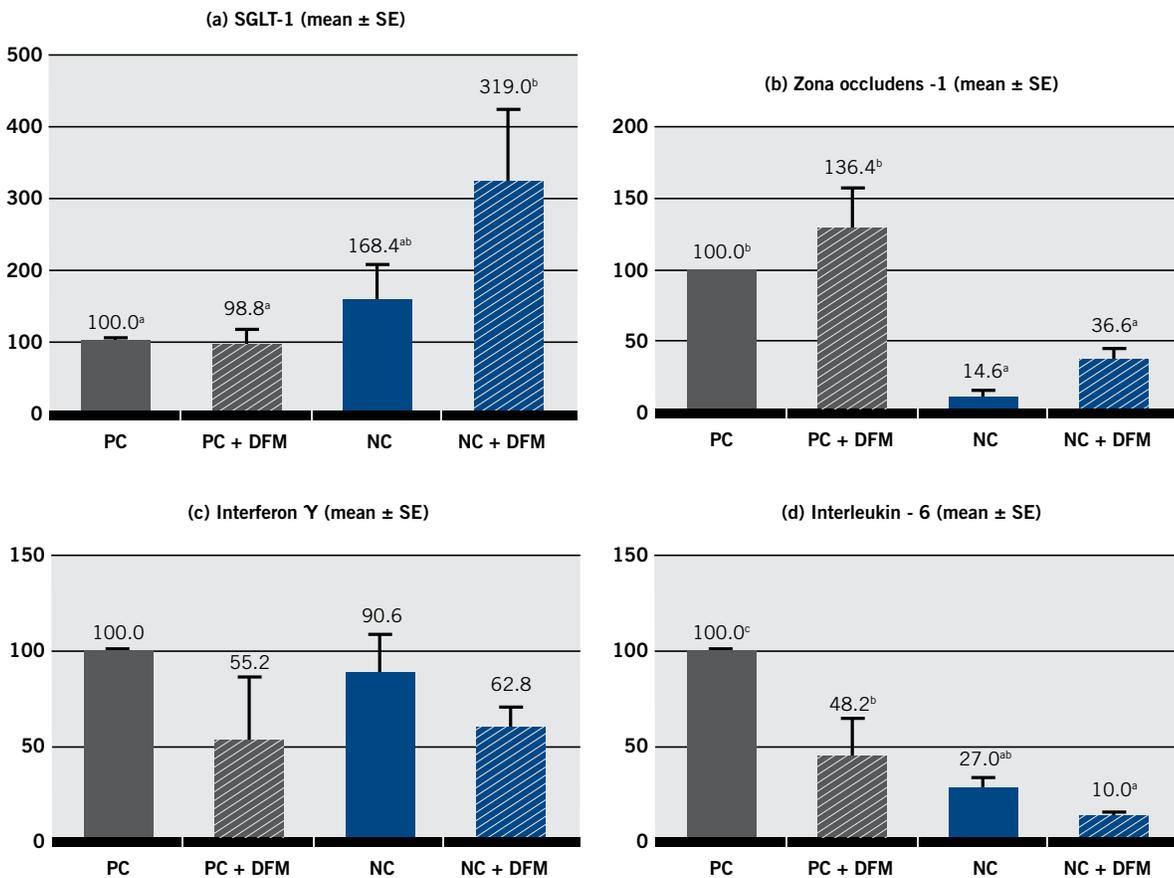
TABLE 2 Effect of treatments on acute phase protein α -1-AGP, gut permeability marker D-lactate and mucosal immune marker SigA.

Treatments	α -1-AGP μ g/mL		D-lactate nmol/ μ L		SigA μ g/mL	
	d21	d42	d21	d42	d21	d42
PC	132.69	216.18 ^a	0.318 ^d	0.34 ^c	3.54 ^a	8.34 ^b
PC + DFM	134.35	223.06 ^a	0.253 ^b	0.319 ^b	5.28 ^c	9.95 ^c
NC	125.51	279.09 ^b	0.28 ^c	0.323 ^b	4.29 ^{ab}	6.73 ^a
NC + DFM	128.29	221.1 ^a	0.232 ^a	0.265 ^a	4.84 ^{bc}	8.2 ^b

Means with dissimilar superscripts in a column varied significantly ($P < 0.05$).

- Significant main effects were noted for mucosal immunity (Table 2 and Figure 1).
 - Broilers fed the reduced energy diet (NC) had decreased mucosal immunity as indicated by level of secretory IgA (sIgA), and lower levels of expression of inflammatory cytokine, interleukin 6 (IL-6), compared to broilers fed PC diet.

FIGURE 1: Effect of treatments on relative fold change in gene expression compared to positive control (100%)



1. Expression of the target genes was determined using β -actin as the house keeping genes.
2. Means with dissimilar superscripts varied significantly ($P < 0.05$).

- Supplementation with CERTILLUS Perform Poultry Energy in broilers fed normal and reduced energy diet had higher sIgA and a tendency for reduced IL-6 compared to control fed broilers.
- No significant treatment effects were noted on expression of Interferon Gamma.

Ileal digestibility

- Broilers fed reduced energy diets were noted to have increased nitrogen digestibility.
- Compared to birds fed normal and reduced energy diet, birds fed diets supplemented with CERTILLUS™ Perform Poultry Energy had increased digestibility of dry matter (DM) and nitrogen (Table 3).

TABLE 3		Effect of treatments on ileal digestibility of nutrient.		
Treatments	DM	Organic matter	Nitrogen	Crude fat
PC	0.704 ^a	0.752 ^a	0.678 ^a	0.787
PC + DFM	0.763 ^b	0.751 ^a	0.711 ^b	0.792
NC	0.705 ^a	0.737 ^{ab}	0.711 ^b	0.777
NC + DFM	0.755 ^b	0.773 ^b	0.741 ^c	0.782

Means with dissimilar superscripts in a column varied significantly ($P < 0.05$).

CONCLUSION

- In this study, CERTILLUS Perform Poultry Energy contributed to significantly improved performance, with the most significant changes being realized when fed a lower energy ration.
- The improved performance seems to be driven by better energy partitioning, making more energy available for growth, despite the lower energy content of the ration. This improved nutrient partitioning appears to be due to a combination of improved digestibility and nutrient absorption and better gut barrier and immunity.



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 To learn more about CERTILLUS Perform Poultry Energy,  
 contact your ARM & HAMMER™ representative.  
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1 Jalukar S, Haldar S, Dey S, Sarkar A, Dhara A. A study on the nutrient sparing effects of a direct fed microbial preparation in male broiler chickens. Agrivet-AH-DFM-Broiler, Agrivet Research & Advisory P Ltd, April 2022.

