POULTRY

FOCUS ON RESEARCH

FEEDING ORIGINAL XPC™ TO BROILERS DURING A NECROTIC ENTERITIS CHALLENGE: IMPROVED PERFORMANCE AND REDUCED INTESTINAL LESIONS

Researchers[1] challenged broilers with coccidia and *Clostridia* to induce necrotic enteritis (NE) lesions and found that feeding Original XPC resulted in lower intestinal lesions and better performance. Feeding a combination of Original XPC and antibiotics further improved performance or reduced lesion scores.

RESEARCH SUMMARY

- 448 Day-old male Cobb broilers raised in battery brooders.
- 7 Treatments (Table 1); 8 replicate pens of 8 chicks each.
- Body weight gain and feed consumption measured from 14-21d and 0-21d.

TABLE 1: TREATMENT DESIGN

Treatment	Treatment Code	Coccidia Challenge 14d	*Clostridia* Challenge 19, 20, 21d	Necropsy & Lesion Scored 21d	NE Mortality Monitored 19-28d
Negative Control (NC)	NC	Yes	No	Yes	Yes
Positive Control (PC)	PC	Yes	Yes	Yes	Yes
PC + XPC	XPC	Yes	Yes	Yes	Yes
PC + Virginiamycin (VIR)	VIR	Yes	Yes	Yes	Yes
PC + XPC & VIR	XPC+VIR	Yes	Yes	Yes	Yes
PC + BMD	BMD	Yes	Yes	Yes	Yes
PC + XPC & BMD	XPC+BMD	Yes	Yes	Yes	Yes

- Feed additives were fed from 1-28d, at the following inclusion rates:
  - Original XPC: 2.5 lb/ton
  - Virginiamycin (VIR): 20 g/ton
  - Bacitracin methylene disalicylate (BMD): 50 g/ton
- All birds were orally gavaged with 5,000 oocytes of *Eimeria maxima* inoculum on 14d.
- Challenged groups were orally gavaged with $1x10^8$ *Clostridium perfringens* (CP) on 19, 20, and 21d.
- On 21d, six hours after final CP dose, three birds per replicate pen were euthanized and intestinal lesions scored.
- Mortalities through 28d were necropsied and NE lesions were recorded.

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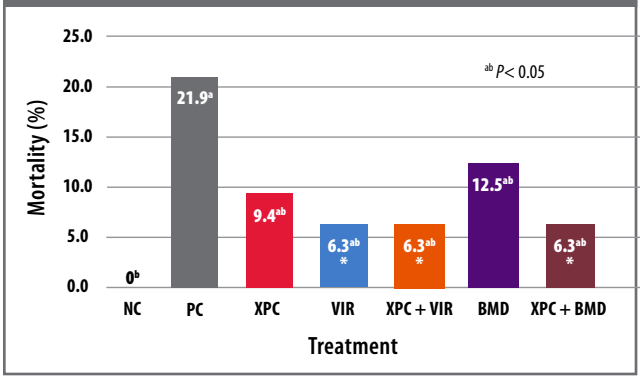
RESULTS

- The experimental model resulted in a high NE challenge. The positive control (PC) group had significantly higher mortality (Figure 1), lesion scores (Figure 2), feed conversion (FCR; Table 2), and reduced body weight gain (BWG; Table 2) compared to the negative control group (NC; $P < 0.05$).
- The virginiamycin treatment and the two XPC combination treatments had reduced mortality ($P = 0.054$) compared to PC.
- Necrotic enteritis intestinal lesions were significantly reduced ($P < 0.05$) when XPC was fed, while BMD and both XPC combination treatments had lesion scores similar ($P > 0.05$) to the NC group.
- During the challenge, feeding XPC significantly improved ($P < 0.05$) BWG and FCR, with a further improvement in FCR observed when XPC is combined with virginiamycin or BMD.
- All treated groups significantly improved ($P < 0.05$) overall 0-21d FCR compared to PC, with XPC+VIR not different ($P > 0.05$) than NC.

FIGURE 1: Necrotic enteritis mortality



* $P = 0.054$ vs. PC

FIGURE 2: Necrotic enteritis lesion scores

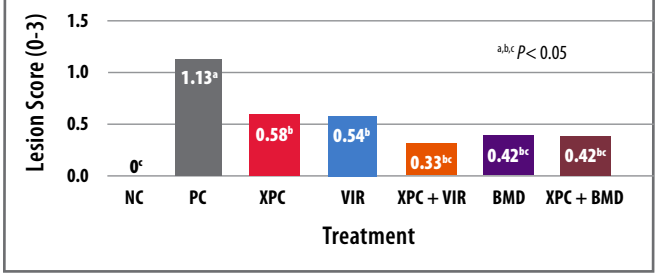


TABLE 2: Animal Performance

Treatment	Challenge Period; 14-21d		Overall; 0-21d	
	Body Weight Gain (g)	Feed Conversion	Body Weight Gain (g)	Feed Conversion
NC	222^{a}	1.65^{e}	462	1.70^{c}
PC	144^{c}	3.02^{a}	417	2.10^{a}
XPC	188^{b}	2.43^{b}	455	1.91^{b}
VIR	195^{b}	2.16^{cd}	464	1.85^{b}
XPC+VIR	201^{ab}	1.98^{d}	452	1.80^{bc}
BMD	186^{b}	2.28^{bc}	454	1.87^{b}
XPC+BMD	188^{b}	2.15^{cd}	439	1.87^{b}
P value	$P < 0.0001$	$P < 0.0001$	$P = 0.08$	$P < 0.001$

$^{a\text{-}e}$ Values, within a column, with different superscript are statistically different.

CONCLUSIONS

- Feeding Original XPC significantly reduced necrotic enteritis lesions and improved performance during the *Clostridium* challenge.
- Combining Original XPC with virginiamycin or BMD resulted in further protection against the negative performance effects caused by a *Clostridium* challenge.

[1] Broomhead, J., D. McIntyre, G. F. Mathis, and B. Lumpkins. 2014. Effects of feeding Original XPC™ and bacitracin or virginiamycin to broilers during a necrotic enteritis challenge. Poultry Sci. 93(E-Suppl. 1): 227-228.

If you would like more information on this study, please contact your local Diamond V representative.

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