



FEEDING ORIGINAL XPC™ TO LAYER PULLETS CHALLENGED WITH *SALMONELLA ENTERITIDIS*: EFFECTS ON CECAL COLONIZATION

University researchers¹ challenged pullets with *Salmonella enteritidis* (SE) and found that feeding Original XPC resulted in fewer birds with positive cecal SE plate counts and less cecal SE.

RESEARCH SUMMARY

- 66 Day-old egg-type Hy-Line W-36 female chicks were utilized in this study.
- Chicks were separated into 3 treatments (22 birds per treatment) and raised on litter until 28d.
- Original XPC was supplemented to diets at 1.5 and 1.0 kg/metric ton for starter and grower diets, respectively.
- Starter (1-21d) and grower (22-32d) diets were supplied by a local egg integrator.

TABLE 1: TREATMENT DESIGN

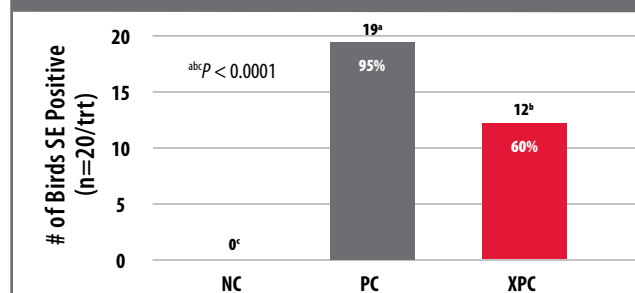
| Treatment | Treatment Code | XPC Fed 1-32 d | 28d SE Challenge | 32d Sampling |
|------------------------|----------------|----------------|------------------|--------------|
| Negative Control | NC | - | - | + |
| Positive Control | PC | - | + | + |
| Positive Control + XPC | XPC | + | + | + |

- At 28d, 20 birds per treatment were moved into raised, group-housed pens.
- 20 birds/treatment were crop gavaged with 1×10^6 colony forming units (CFU) of *Salmonella enteritidis* (SE).
- At 32d, all birds were euthanized and ceca removed.
- Ceca contents were enumerated.
 - Samples were enriched and screened for *Salmonella*.
 - Colony counts were performed on XLT4 agar plates.
 - Samples were analyzed for SE and bifidobacteria using quantitative real time PCR.

RESULTS

- Birds (fecal samples) were confirmed negative for SE prior to the challenge.
- XPC-fed birds had significantly less ($P < 0.0001$; chi squared analysis) positive SE plates (> 0 CFU at 1:1000 dilution of ceca contents; Figure 1)

FIGURE 1: NUMBER OF BIRDS WITH POSITIVE CECAL *SALMONELLA ENTERITIDIS* PLATE COUNT



RESULTS (continued)

- Cecal SE colony counts were significantly less ($P < 0.0001$) in the XPC treatment compared to the positive control (PC) treatment, with almost 1 log CFU/g reduction (Figure 2).
- *Salmonella enteritidis* determination by PCR highly correlated ($R = 0.99$; Figure 3) to CFU/g plate counts (untransformed to \log^{10} units; Figure 4) and moderately correlated to the \log^{10} transformed counts ($R = 0.63$; Figure 2).
- There was a 24% reduction in bifidobacteria in cecal contents from PC birds compared to negative control (NC; Figure 3). No reduction in bifidobacteria was observed in the XPC treatment.

FIGURE 2: SALMONELLA ENTERITIDIS CECAL PLATE COUNTS (LOG¹⁰ CFU/G)

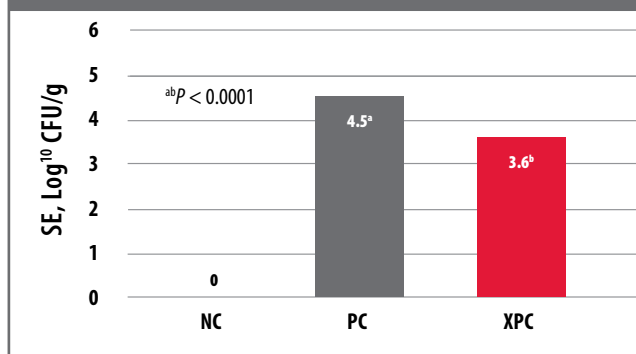
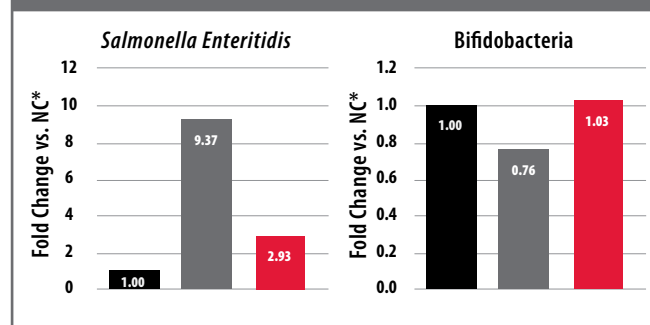
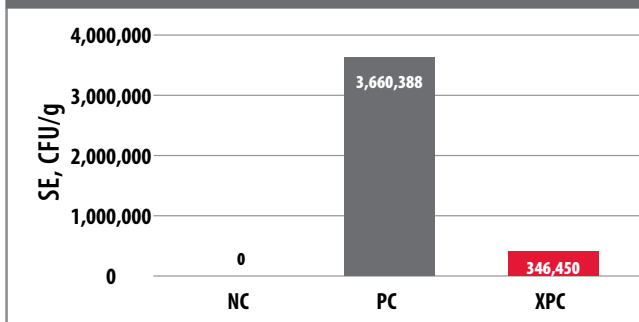


FIGURE 3: SALMONELLA ENTERITIDIS AND BIFIDOBACTERIA PCR ANALYSIS OF ENUMERATED CECAL DILUTIONS



* Results for PC and XPC reported as fold change as compared to NC.

FIGURE 4: SALMONELLA ENTERITIDIS CECAL PLATE COUNTS - CFU/G



CONCLUSIONS

- A 35% reduction in number of birds with a cecal SE positive plate count and a 1-log reduction in cecal SE were observed when Original XPC was fed to layer pullets.
- The lack of bifidobacteria reduction in cecal contents of XPC fed birds when challenged, unlike challenged controls, demonstrates the prebiotic-like effects of XPC and one mechanism of how SE colonization can be reduced.

¹ Ibukic, M., D. Trampel, T. Frana, C. M. Logue, and J. Broomhead. 2012. Evaluation of Diamond V Original XPC for reducing cecal colonization by *Salmonella enteritidis* in layer pullets. In: Proceedings of the 93rd Conference of Research Workers in Animal Diseases. Chicago, IL.

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

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