Probiotic *Bacillus licheniformis* to mitigate clinical necrotic enteritis

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The problem

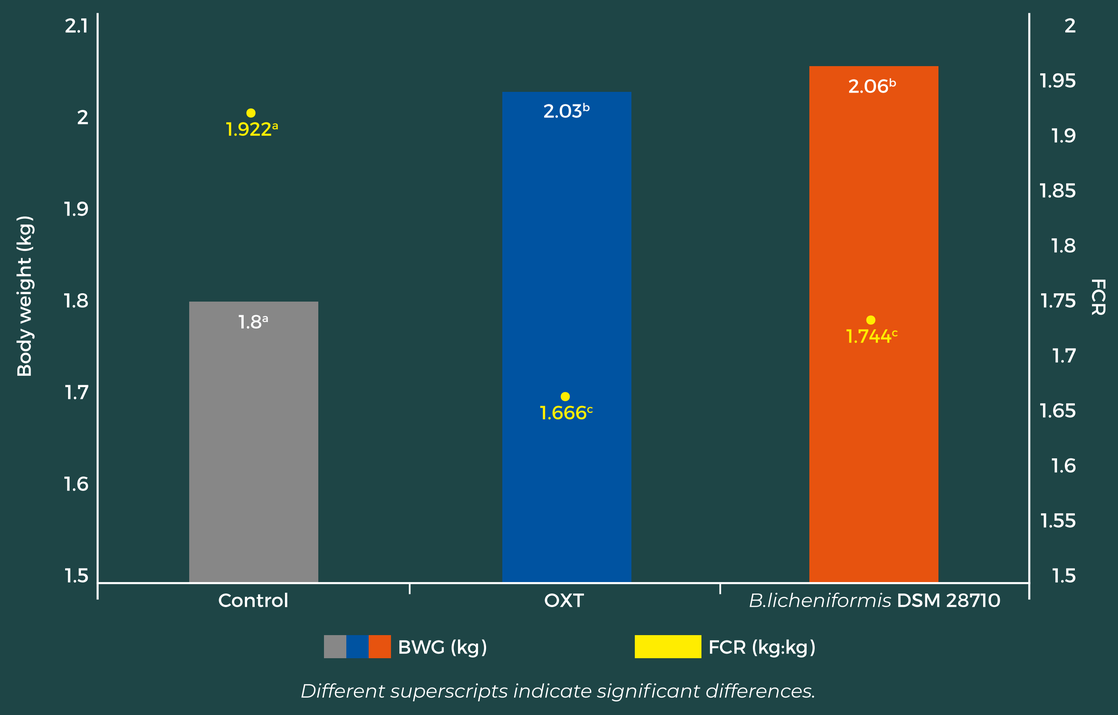
Gastro-intestinal diseases in broilers can lead to poor welfare, reduced profitability and major losses on farm. To help manage these, multiple feed additives have been developed. Probiotics and necrotic enteritis (NE) is a good example, with probiotic strains such as *Bacillus licheniformis* aimed at mitigating the opportunistic pathogen *Clostridium perfringens* as the causative agent in the onset and development of NE. To evaluate the above for a commercially available *B. licheniformis*, B-Act® was put to the test. The probiotic product is based on a single strain of *B. licheniformis* DSM 28710, already known to support technical performance in poultry.

How we researched the problem

A 42-day induced NE trial was conducted in broilers, with both health and production performance parameters recorded. All animals received the same amount of *C. perfringens* on day 19, 20 and 21 (1 ml/bird, 1.0 x 10^{8-9} CFU *C. perfringens*/ml). The used *C. perfringens* strain was known to have caused NE in a commercial operation. Three treatment groups were evaluated: a negative control (basal diet), a probiotic group (1.6x10^{12} CFU *B. licheniformis* DSM 28710/tonne of feed, start until finish) and an antibiotic group. Animals in this latter group were treated with oxytetracycline hydrochloride (OXT) according to label recommendations, for three consecutive days after the NE challenge.

Results

Even under the induced NE challenge, weight gains of the probiotic and OXT groups were similar to each other and significantly higher compared to the control at the end of the study (2.06 and 2.03 kg vs. 1.8 kg respectively; P<0.05; Figure 1). Weight gain of the probiotic group was already significantly higher compared to the control on day 21 (P<0.05), indicating a potential benefit of the probiotic even before clinical establishment of NE. Feed conversion ratio (FCR) values followed a similar pattern, with a significantly lower overall FCR for the probiotic and OXT groups compared to the control (1.744 and 1.666 vs. 1.922 respectively, d0-42; P<0.05; Figure 1). From a health perspective, NE lesion scores and NE mortality were both significantly improved in the probiotic and OXT groups compared to the control (0.18 and 0.08 vs. 0.68 respectively; 2.5 and 0.6% vs. 7.8% respectively; P<0.05; Figure 2 and 3).



Different superscripts indicate significant differences.

Figure 1. Technical performance for the three treatment groups from day 0 to 42

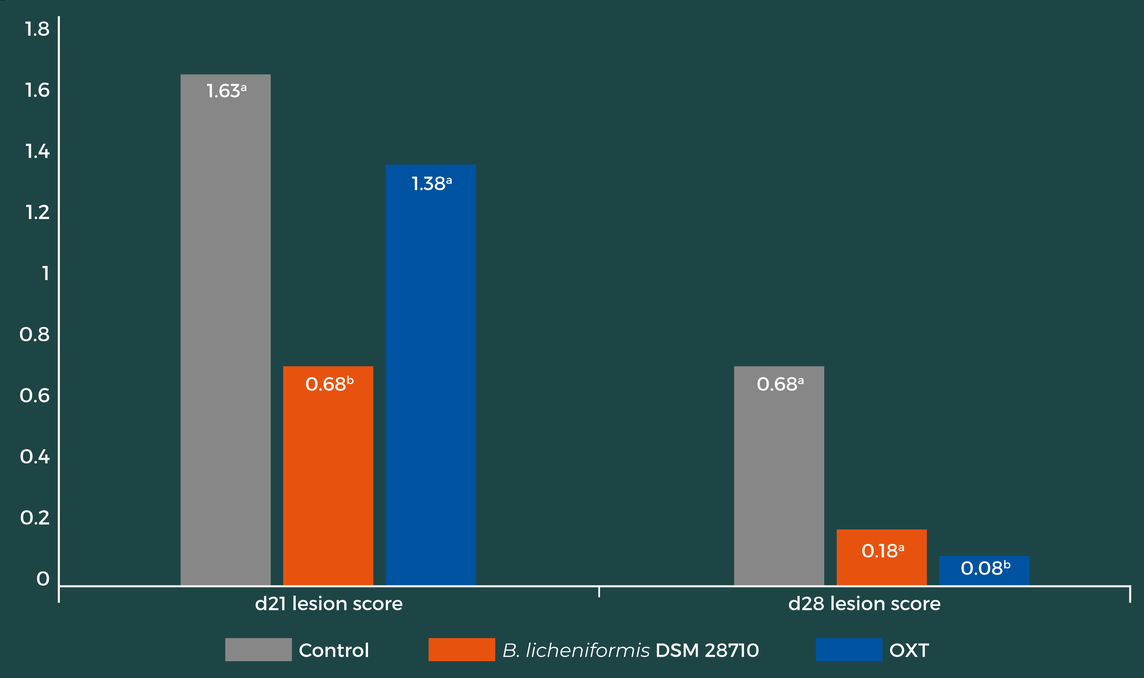


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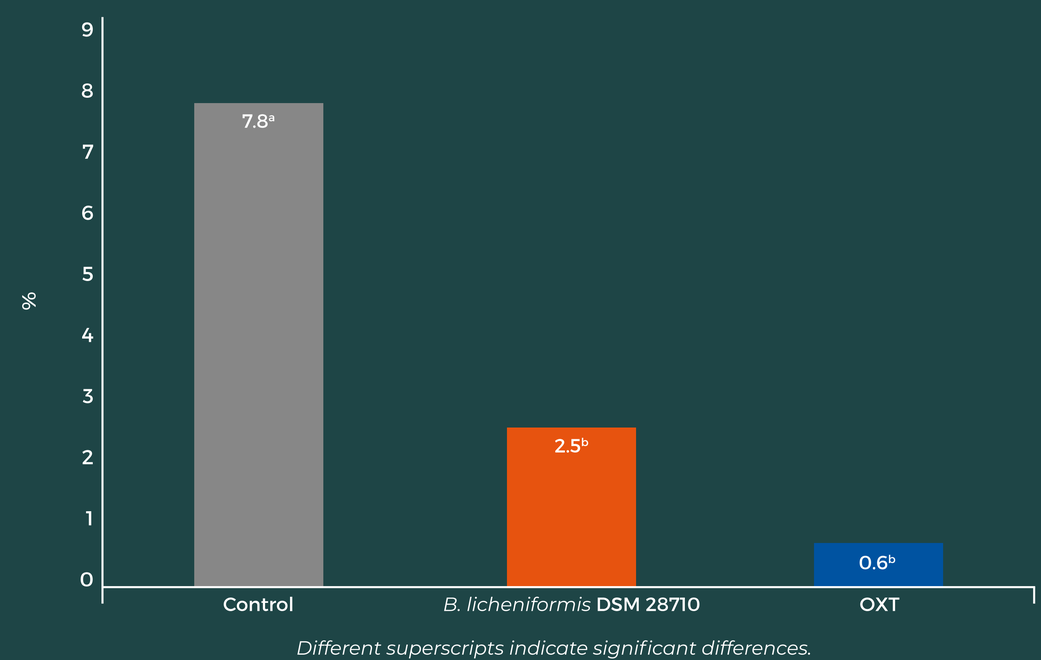
Figure 2. NE related lesion scores for the three treatment groups at day 21 and day 28



Different superscripts indicate significant differences.

Figure 3. NE related mortality for the three treatment groups over the course of the trial

Conclusions

This trial demonstrates that feeding probiotic *B. licheniformis* DSM 28710 significantly improved health and growth performance parameters of broilers under a NE challenge. The results achieved with prophylactically administered *B. licheniformis* DSM 28710 were comparable to those realised with the therapeutic antibiotic treatment. Continuous administration of the probiotic thus has the potential to be a useful and practical tool to mitigate NE in commercial broilers, even more so as benefits were already recorded before the NE challenge took hold properly.