

Decreasing feed microbial loads improves broiler health and development

Recent research shows that decreased microbial loads in broiler breeder feed are associated with lower eggshell contamination, decreased hen mortality and improved chick quality.

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Additionally, work underway examining the impact of clean feed on broilers facing Necrotic enteritis (NE) challenge suggests that providing sanitised feed during critical developmental windows could improve overall gut health, better-enabling broilers to cope with the disease.

Feed is a very efficient pathogen delivery mechanism to the developing poultry gut. Unfortunately, feed is also associated with high microbial loads.

Heightened microbial loads in feed are linked to increased pathogen prevalence.

Analysis of more than 8,000 globally obtained feed and feed ingredient samples within the Anitox Global Feed Database shows that microbial profiles vary amongst feed types and ingredients, but indicates that animal by-products, vegetable proteins and cereal grains can all be contaminated by pathogenic micro-organisms (Table 1). Furthermore, an

extensive examination of microbial loads in corn samples reveals that the fungal and bacterial populations within the microbial load vary based on the overall contamination level (Table 2).

Early introduction and colonisation of pathogenic micro-organisms in the avian gastrointestinal tract leads to a microbiome imbalance.

Pathogen colonisation prevents the establishment of healthy microflora, which, in turn, can negatively affect intestinal integrity.



Research on microbial loads

A recently published study, Avila et al. 2023, was done in collaboration with the Poultry Science department at the University of Georgia under the direction of Dr Jeanna Wilson to specifically examined the impact of decreasing feed microbial loads on broiler breeder performance and the quality of their progeny. In this study, broiler breeder hens were fed either a control diet or a diet treated with a feed sanitiser from weeks 25

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Table 1. Anitox feed ingredient survey.

Ingredient	Percent contaminated (%)		
	Enterobacteriaceae	Staphylococcus	Streptococcus
Sorghum	77	79	88
Soybean meal	69	88	84
Corn	73	76	68
Wheat	100	100	100
Cottonseed	100	0	0
Palm kernel	11	44	100
Meat meal	57	92	85
Poultry meal	64	41	59
Feather meal	62	92	85
Fish meal	43	88	65

Table 2. Microbial loads observed in corn samples (Richardson et al., 2000).

Level of contamination (CFU/g)	Microbial contaminant in corn (% samples contaminated)		
	Mould	Bacteria	Enterobacteriaceae
<30	1.1	0.0	27.1
30-100	3.2	5.1	11.9
100-1,000	25.5	20.3	18.6
1,000-10,000	36.2	33.9	23.7
10,000-100,000	19.2	16.9	15.3
100,000-1,000,000	10.6	16.9	3.4
>1,000,000	4.25	6.8	0.0

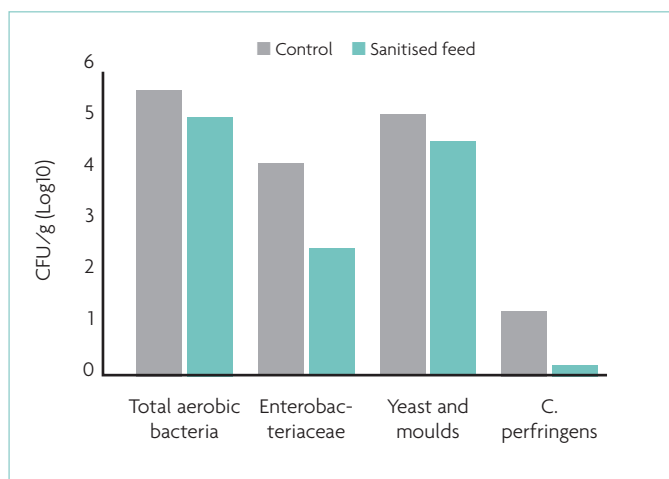


Fig. 1. Microbial load of control vs. sanitised feed (Avila et al 2023).

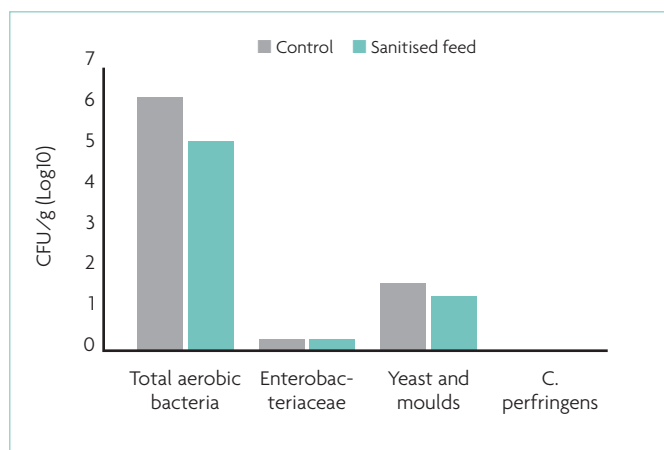


Fig. 2. Microbial load of eggshell surfaces for hens consuming control vs. sanitised diets (Avila et al 2023).

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to 60 of the broiler breeder's life. While this study demonstrated that decreasing feed microbial loads improved hen mortality, investigators also observed positive impacts on the offspring of hens fed a sanitised diet.

Reductions of the microbial load on the eggshell surface were also observed from hens consuming the sanitised diet as compared to the untreated control (Figs. 1 and 2).

In addition, hens fed sanitised feed produced a significantly higher percentage of 'Grade A' chicks (Fig. 3).

Reduced microbial loads on the eggshell surfaces are thought to positively impact offspring post-hatch. A concept further supported by the fact that offspring resulting from hens fed sanitised feed exhibited lower 7-day mortality, especially during late lay, where chick mortality was reduced by 3%.

Ultimately these results conclude that hens consuming feed with lower microbial loads can produce cleaner eggs, increasing chick quality.

Furthermore, lowering the incoming feed microbial load presumably reduces the

microbial challenge to the gut, limiting dysbiosis and decreasing hen mortality in broiler breeders.

Additional research, in collaboration with Colorado Quality Research, yields preliminary results suggesting that by reducing feed microbial loads with a feed sanitiser during the first two weeks of life, broilers were better prepared to handle a Necrotic enteritis (NE) experimental challenge.

Improved performance parameters

Broilers consuming sanitised feed show significantly lower NE-specific lesion scoring, reduced oocyst shedding and improved performance parameters compared to birds fed the untreated control diet.

Additionally, broilers consuming sanitised feed demonstrated lower NE-related mortality and reduced mortality from day 7 to day 35 (Fig. 4).

Further research is required to understand the mode of action and confirm the impacts

of feed sanitisation on the microbiome and intestinal health.

However, findings evidence that decreasing feed microbial loads and reducing inbound pathogen prevalence, especially within the first two weeks and during ration changes, supports broiler health and performance.

Controlling microbial loads and reducing pathogen introduction and colonisation during early broiler life stages can protect lifetime health, growth and performance.

Feed sanitisers are applied to feed at low inclusion rates, effectively reduce feed microbial loads and provide long-term protection against feed recontamination.

True feed sanitisers enable producers to achieve a high level of control over feed-source pathogens and variable feed microbial loads, reducing the risk of pathogen colonisation and dysbiosis in broilers.

Decreasing microbial loads in feed supports broiler health and performance. To learn more about how feed sanitisation protects and promotes commercial poultry performance and productivity, contact your Clean Feed Expert today at www.anitox.com ■

Fig. 3. Chicks from hens fed sanitised feed were more likely to receive 'Grade A' ratings (Avila et al 2023).

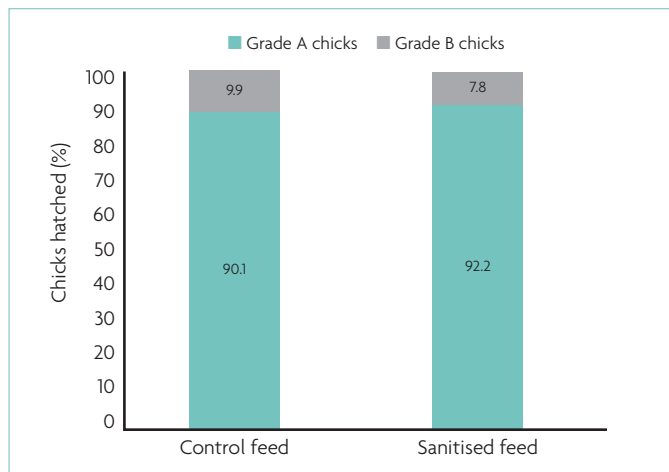


Fig. 4. Birds fed sanitised feed demonstrated lower NE-related mortality and mortality and removal (M&R) in a NE challenge model compared to birds fed a control diet.

