Producing quality poultry with antibiotic-free programs

The withdrawal of antibiotics as performance enhancers and the rational use of the therapeutic form in animal production is a pressing issue all over the world, not only for consumers but also for the scientific community and international regulatory bodies.

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In January 2017 the United States banned the use of any antimicrobial substance of importance in human medicine and large companies in the fast food market adhered to antibiotic-free production, where antibiotics are no longer used even in the therapeutic form.

According to the WHO (2015), about 600 million, or nearly 1 in 10 people worldwide, become ill after consuming contaminated food. Of these, 420,000 people die, including 125,000 children under the age of five. Bacteria cause most cases of foodborne illnesses, and the most frequent serotypes are Salmonella spp, Escherichia coli and Staphylococcus aureus.

The impact of antibiotics on the gut microbiota has been more recently investigated and researchers have shown that, in addition to altering the composition of the microbiota, antibiotics can also affect the gene expression, protein activity and the overall metabolism of the intestinal microbiota.

Microbial changes caused by antibiotics increase the immediate risk of infection and can also affect basic immunological homeostasis in the long-term.

With this new reality, it is imperative that the production chain adapts and applies a strict plan of management, health, and nutrition, since the transmission could be by the ration, environment or even vertical (from the breeder to the chicken/laying hen), so a proper management plan is essential in this control.

Alternative methods of control

There are several alternatives on the market to control pathogenic bacteria, such as live attenuated vaccines (which act on Salmonella gallinarum, Salmonella typhimurium, and Salmonella enteritidis); products that act on the feed as bactericidal antimicrobials, or products that act on the animal organism, such as probiotics, organic acids, plant extracts, prebiotics, etc.

Each product has a different mode of action, directly or indirectly modulating the microbiota and the response of the immune system.

The yeast cell wall from Saccharomyces cerevisiae is one of the solutions that can help with a pathogen control program since it is a natural solution that helps to reduce the contamination and prevent the problem. Based on this concept, ImmunoWall stands out from other products because it is composed of a dense yeast cell wall of Saccharomyces cerevisiae with high concentrations of β-glucans and mannan oligosaccharides (MOS), resulting in a feed additive with proven results and great cost/benefits.

MOS is known for its capacity to agglutinate pathogens. It will prevent pathogen colonisation in the gut as it offers a binding site to harmful bacteria that possess type 1 fimbriae present in the intestinal tract.

Because the β-glucans are indigestible, the 'trapped' bacteria will be excreted together with the faecal material.

It is important to highlight that to reach its full functionality, the yeast cell walls must have a low digestibility in the intestine.

β-glucans are the indigestible portion of the yeast cell wall, thus, the higher the β-glucan concentration, the lower the digestibility of a yeast cell wall. The β-glucans present will also modulate the immune response of the animals as they are natural stimulants of the innate immune system. When phagocytic cells are in contact with β-glucans, these cells are stimulated, and cytokines are produced.

The production of cytokines will trigger a 'chain reaction', inducing a higher immune status in animals, making them able to resist opportunistic infections better.

Thus, supplementation with ImmunoWall ensures that birds maintain the balance of the intestinal microbiota and improve their immune system responses, resulting in decreased contamination and transmission of pathogenic bacteria to other organs of the body.

Study of performance

A study (unpublished data) was conducted with the aim of understanding the performance responses of the animals supplemented with different levels of ImmunoWall compared to an antimicrobial growth promoter (AGP).

No statistical difference was found between the studied doses of the yeast cell wall and the positive control (AGP) related to body weight gain. The feed conversion was similar to AGP when the level of 0.5kg/MT was supplemented (see Table 1).

The results showed that the substitution of AGP with a natural product does not impact on animal performance since the expected benefits on intestinal health also reflect zootechnical indexes.

Security begins on the farm

A link between quality, nutritional value, and food safety is a task that has required a lot of research by the industries to ensure public health.

While intensive poultry production is a challenging environment, food security begins on the farm, where it is possible to control pathogens without the use of antibiotics as growth promoters.

However, it is of the utmost importance that producers, who are the first link in the chain of production, commit themselves fully. This is because it is proven that the reduction of pathogens in the field contributes significantly to reducing the risk of foodborne diseases due to bacterial contamination. ■

References are available from the author on request

Table 1. Performance of broilers at 42 days of age supplemented with AGP or different levels of ImmunoWall (Dr Michael D. Simms, Virginia Diversified Research Corp., Harrisonburg, USA, 2012. Unpublished data).

Treatments	FI (kg)	BWG (kg)[2]	FC (kg/kg)[3]	Mortality (%)	PF[4]
Negative control	4.320	2.242[b]	1.927[c]	1.7	267
AGP (BMD)[1]	4.273	2.395[a]	1.784[a]	2.3	307
IMW 0.25kg/MT	4.437	2.360[ab]	1.880[c]	0.0	294
IMW 0.50kg/MT	4.256	2.359[ab]	1.804[ab]	1.0	303
IMW 1.00kg/MT	4.347	2.399[a]	1.812[b]	1.0	307

[1]AGP - Bacitracin Methylene Disalicylate. [2,3]Means followed by different letters in the same column, differ by Tukey test at 5% significance.
[4]PF: production factor = [(BWG (kg) x viability (%)) / (FC x age)] x 100.