

Smart combination of algae-clay technologies to improve performance

Gut health and feed efficiency are key for productivity and both are challenged in broiler farming because of the risk of mycotoxins, raw material variability, and environmental conditions.

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Mycotoxins have a big impact on gut health and are a global problem as they are widely present, with corn being the most contaminated raw material. Fusarium toxins pose the most risk to corn grain.

The Olmix MycoScreen Overview shows that over the past six years deoxynivalenol (DON) was found in 84% of the tested corn grain samples, fumonisins (FUM) in 89% of the tested samples, and zearalenone (ZEA) in 66% of the tested samples (Fig. 1).

If DON and FUM show the highest risk for poultry (high occurrence combined with a significant median value), what makes them a real threat to broiler performance is their co-occurrence, since they act synergistically at the gut level and impair nutrient uptake, gut barrier integrity, and immune functions.

Several studies highlight the individual and synergistic impact of DON and fumonisins on the intestinal health of poultry, but

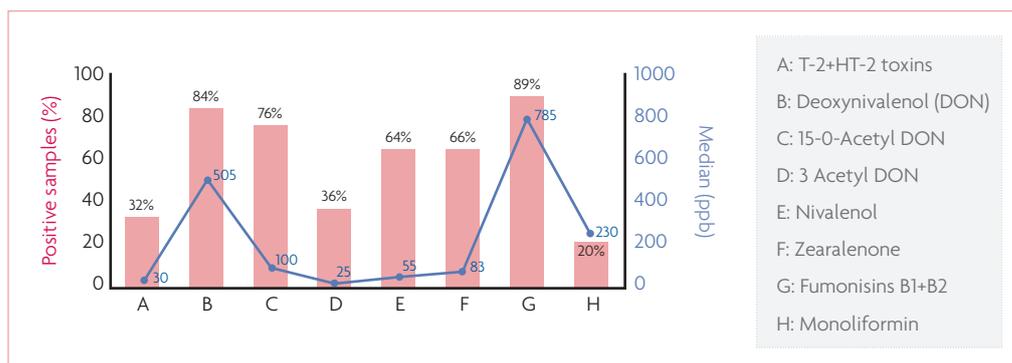


Fig. 1. Fusarium mycotoxin occurrence in 1,157 corn grain samples collected worldwide from 2013 to 2019 and analysed by chromatography (Labocea, France).

also their role in disease outbreaks and performance degradation, without acute symptoms of mycotoxicosis.

In fact, DON and FUM increase the risk of bacterial or viral outbreaks by favouring the intestinal colonisation, increasing the intestinal translocation of pathogens and affecting the immune system leading to higher sensitivity to infections.

This has a huge impact on performance and profitability at the farm level as it decreases the level and quality of production, hence increasing the cost of production.

Young broilers are the most sensitive to mycotoxins, since their intestine and immune system are not fully mature.

A proper gut health condition is

also fundamental for proper nutrient digestion and absorption which deeply impacts performance.

When aiming at optimum performance, one also wants to optimise feed efficiency, to reach maximum growth in a minimum time and with minimum feed.

The first challenge falls to nutritionists and formulators, who need to accurately know the animals' requirements on one hand, and the ingredients' characteristics on the other, to make them match with performance expectations in a cost-effective manner.

Precision nutrition

Tremendous advances have been made in the past years in the field of 'precision nutrition'.

Research allows us to know our animals' requirements better and better, and technological improvements also allow us to have a more accurate evaluation of feed characteristics (for example NIR analysis of materials reaching the plant, tailor-made feeding tables, etc).

Feed efficiency can be further boosted by the use of digestibility enhancers, which help to make the most of the feed.

Numerous in-feed solutions are available on the market to promote gut health and support performance, and it is not easy for producers to find their way in this jungle. What to use? How to prioritise?

Brazilian case study

The present case study comes from a large integrator located in Ceara province (North East of Brazil), facing gut health problems possibly related to mycotoxin contamination.

Mycotoxin analyses of corn from north east of Brazil (76 samples) show a high risk for fumonisins, with 99% of positive samples (>LOQ) and a median contamination of 1,042 ppb. At the same time, this producer was willing to boost feed efficiency of the broilers.

Olmix recommended a dual strategy, in dedicated stages: secure the mycotoxin risk to young broilers, to ensure good development of the digestive and immune systems; and support feed efficiency of older broilers, when they eat the most with the highest feed conversion ratio.

Olmix is specialised in algae and clay-based technologies. The unique association of seaweed extracts and montmorillonite clay gave rise to several patented technologies addressing animal nutrition challenges. In this context, two technologies were used.

The mycotoxin risk was managed by using an algae interspaced clay, which increases interlayer space and provides a greater surface of adsorption for mycotoxins, as well as diversified adsorption sites for multiple mycotoxin binding.

The efficacy of this technology was proven in several scientific

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Table 1. Efficacy of Olmix algae-clay based technologies on broiler performance.

Parameters	Control	Test	Difference
Initial number of birds	68,860	68,864	+4
Age at slaughter (days)	44.7	44.0	-0.7
Average final weight (kg)	2.867	2.839	-0.028
Average daily gain (g/d)	64.1	64.5	+0.4/+1%
Av. total feed intake (kg/bird)	5.188	4.881	-0.307/-6%
Feed conversion ratio (44 days)	1.761	1.679	-0.082/-5%
Mortality (%)	9.4	6.5	-2.9/-31%
Production Efficiency Factor ¹	321	351	+30/+9%

¹PEF = ADG (g) * [% Livability]/(FCR*10)

Continued from page 11 studies. Its efficacy against fumonisin was particularly demonstrated by the Samitec Institute, in Brazil, which concluded that based on the evaluated parameters (following Samitec standard protocol for fumonisin testing on broilers), the use of Olmix interspaced clay product (2.5 or 5kg/T) strongly mitigated the effects caused by a very high fumonisin contamination in the feed (100ppm) during the experimental period of 21 days.

In the current programme, this technology was supplemented to the broiler prestarter and starter feeds (0-21 days), at the rate of 0.5kg/T according to the evaluated mycotoxin risk.

On the other hand, the need for feed efficiency in the later stages was addressed by using an exfoliated algo clay developed by Olmix in which all the clay layers are separated from one another.

This exfoliated algo clay maximises digestive enzyme activity by increasing the natural capacity of clays to stabilise and activate enzymes in the intestine, as well as to increase their interactions with the nutrients.

Recent research conducted at the University of Viçosa (Brazil) showed that this exfoliated clay technology increases the nitrogen-corrected



AME of corn-soybean based diets by 56kcal/kg, as well as increases the nitrogen retention by 6%.

This solution was supplemented to the grower and finisher phases (21-44 days) at the rate of 1kg/T of feed.

The programme was implemented in three houses (test group), and performance was compared to three identical houses (control group), all located on the same site, raised at the same time and following the same feeding programme (only differing by the use of the algae-clay based technologies). A total of 135,000 broilers was involved in the study.

Birds from the test group showed a higher growth rate than the control birds (+1%), allowing for an earlier slaughter (-0.7 days) at a similar weight. They also showed a better feed efficiency, with eight points

gained on FCR (-5%) compared to the control group.

Necropsies were conducted by a veterinarian at 21 days (end of the starter phase), on six birds per group following the standard farm protocol. Results showed a better integrity of the liver and the GIT in the test group compared to the control group, reflecting a better protection against mycotoxins. The better organ integrity is in line with the observed reduction in mortality: -31% in the test group compared to the control group.

The economic performance of the algae-clay technologies programme was evaluated. Thanks to selling a higher number of chickens, at a lower feed cost, the net benefit was greatly increased in the test group compared to the control group: +4%, equivalent to \$0.09/chicken. The

combined use of the algae-clay based technologies was thus very profitable, with a net return on investment (ROI) of 6 to 1.

All in all, this large-scale trial demonstrated the effectiveness of a combined use of two algae-clay based technologies on specific stages of broilers fed a corn-soy based diet, in a region with a high fumonisin risk.

Young birds were efficiently protected from mycotoxins, showing better intestinal integrity and lower mortality than the control group; while feed efficiency was maximised in the later stages, resulting in 3% more birds sold, using 1.5% less feed, thus providing a 4% higher net benefit to the integrator.

Conclusion

The modern poultry industry has reached incredibly high performance rates, but often animals face gut health problems that can impair their immune system and their feed efficiency and compromise profitability.

Innovative technologies with complex clays and algae provide natural solutions to counteract these threats, helping the animals to cope and reach their expected high production levels. ■