

BOOSTING THE DEFENCE SYSTEM

3 ways in which FRA® C12 supports broilers' natural immunity

FRA® C12 not only possesses antipathogenic properties but is also boosting broilers' natural defence system. As a first line of defence, FRA® C12 supports a well-balanced gut microbiome, which benefits immunity. Secondly, it reduces the inflammatory response, preventing birds to overreact on when small challenges occurs and saving energy for growth. Thirdly, FRA® C12 stimulates the immune response of broilers after vaccination against infectious bronchitis.

As antibiotic resistance has become an issue of global interest, many countries already have restricted both the therapeutic and non-therapeutic use of antibiotics. Without the use of antibiotic growth promoters (AGPs) nutritionists and poultry farmers face the big challenge of maintaining the health status and genetic growth potential of their production animals. Most suppliers have focused on the antibacterial effect of newly developed additives. However, FRA®melco goes beyond this with a specific glyceride product named FRA® C12.

The main component of FRA® C12 is alpha-monolaurin. This molecule is the result of the esterification of lauric acid (a medium chain fatty acid of 12 C-atoms) to the first position of a glycerol molecule. Its specific molecular structure allows alpha-monolaurin to exert strong antipathogen effects, by disturbing cell metabolism and the attack of bacterial membranes, but also of fat-enveloped viruses. This results in considerable damage to a vast range of pathogens. Moreover, research has revealed three important immune supporting properties of alpha-monolaurin.

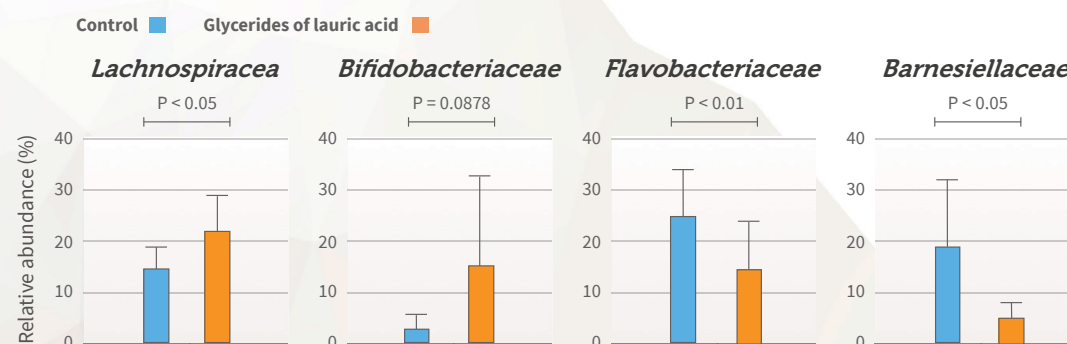
1 A HEALTHY GUT AS FIRST LINE OF DEFENCE

Broilers' natural defence system already starts in the gastrointestinal tract which not only functions as a site for digestion and absorption of nutrients. The interactions between natural gut microbiota and the immune system in the gut (i.e. GALT; gut-associated lymphoid tissue) are considered to be the basic mechanism of broilers against invading pathogens. Pathogenic bacteria and viruses are bound, inhibited, or killed. In addition, the role of GALT is to manage a potent adaptive immune response.

Glycerides of lauric acid have a positive effect on microbiota composition as becomes clear from both literature and practice, see also Figure 1. They have an inhibiting effect on pathogenic bacteria such as *E. coli*, *Salmonella* and *Clostridium*, whereas it stimulates the colonization of beneficial bacterial like *Lactobacillus* and *Bifidobacterium*.

Figure 1.

Glycerides of lauric acid have a positive effect on microbiota composition of broilers by improving the ratio between beneficial bacteria (*Lachnospiraceae* and *Bifidobacteriaceae*) and pathogenic bacteria (*Flavobacteriaceae* and *Barnesiellaceae*) (Adapted from Liu et al., 2020).



2 REDUCTION OF THE INFLAMMATORY RESPONSE

Stress, either caused by the environment, diet changes or infections, can lead to local intestinal inflammation. These inflammations cause a cascade of events which are energy consuming. Especially when an overreaction on small challenges occur, macrophages produce too much nitric oxide, which disturbs the balance between good and bad bacteria in the gut and results in decreased bacterial diversity. The increased number of pathogenic strains in turn induce more inflammation resulting again in more macrophage activity. Now the vicious circle is complete. Above that, the immune system activates specific immune cells (T-cells) which start to produce more pro-inflammatory cytokines that stimulate inflammation.

FRA® C12 can stop this vicious cycle by suppressing the inflammatory response and avoiding the overreaction. An *in vitro* trial confirmed that alpha-monolaurin reduced the production of nitric oxide compared to oxytetracycline (Figure 2). Furthermore, FRA® C12 seems to suppress T-cell activation and control the production of pro-inflammatory cytokines. The vicious cycle is broken: less overreactions occur, resulting in a healthier gut and saving energy for growth.

3 BOOST VACCINATION STRATEGY

According to a new study published in Journal of Applied Poultry Research, FRA® C12 Dry stimulates the immune response of broilers after vaccination against infectious bronchitis, one of the most important diseases in the poultry industry today. Significantly higher amounts of antibodies were found in birds receiving FRA® C12 Dry compared to the vaccinated control birds, see Figure 3. Together with the observation that more birds were able to establish faster clearance of vaccine-derived IBV, this may suggest that alpha-monolaurin strengthens the immune response. The authors point out that further research is needed to determine whether a higher number of antibodies found in the animals receiving alpha-monolaurin also results in better protection against future infections.

IN CONCLUSION

FRA® C12 is gaining popularity in broiler farming. This is mainly due to its unique molecular structure, allowing it to have strong antipathogenic effects in the entire gastrointestinal tract. FRA® C12 has a positive effect on the broilers' defence system, as shown by the increase in IB-antibody titer values, on the other hand, FRA® C12 can temper the inflammatory response, thereby saving energy for growth.

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Immune response ↑ Microbiota composition ↑ Inflammatory response ↓

Nitric oxide production induced by LPS-challenge

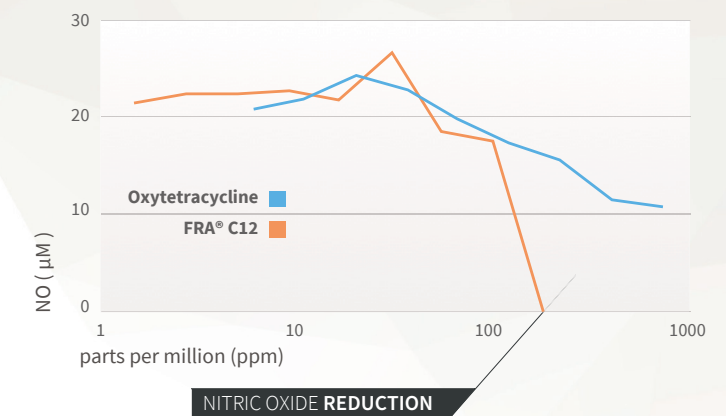


Figure 2.

FRA® C12 reduces the nitrogen oxide production by lipopolysaccharide-challenged macrophage-like cells, compared to the control (oxytetracycline), indicating an anti-inflammatory effect (FRA®melco, 2018).

Infectious Bronchitis

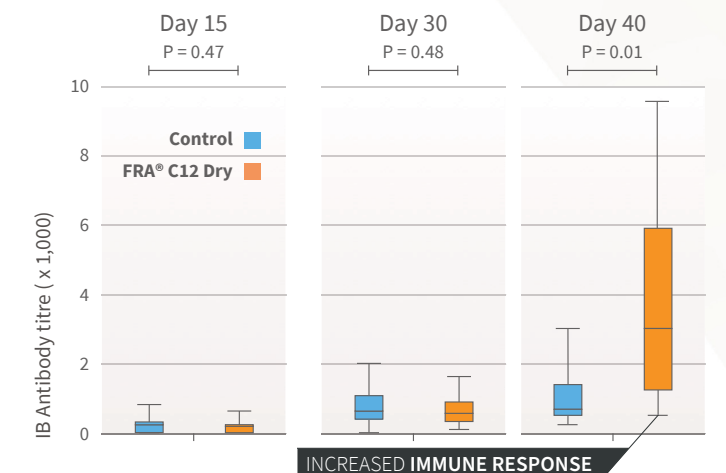


Figure 3.

FRA® C12 Dry improves the immune response in infectious bronchitis vaccinated broilers (FRA®melco, 2021).

