

# The special features of alpha-monolaurin to support poultry performance

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In the fight against increasing numbers of antibiotic resistant bacteria many countries have banned the systematic use of antibiotics in feed for production animals. Therefore producers are looking for alternatives. It is known that medium-chain fatty acids (MCFAs) can stimulate animal health and performance. The alpha-monoglycerides of these MCFAs, especially alpha-monolaurin, prove to be even better in managing bacterial and even viral health issues and thus animal health.

The ban on antimicrobial growth enhancers stimulated nutritionists to increasingly include medium-chain fatty acids (MCFAs) in their feed formulations. Due to their molecular size MCFAs can permeate cell membranes without difficulty.

MCFAs are easily digested by putting naturally less strain on digestive systems, which make them a good energy source in animal nutrition. Unlike long chain fatty acids, which have larger molecules, MCFAs do not require special enzymes to utilise them efficiently.

Back in 1972 it was already discovered that monoglycerides of MCFAs are even more active against pathogens than their free fatty acids.

In particular, monolaurin, a monoester formed from lauric acid, was shown to possess strong antibacterial and antiviral properties.

The exact mode of action is quite complicated, but alpha-monolaurin seems to inhibit Gram positive pathogenic bacteria and deactivates fat enveloped viruses by breaking down

their outer cell wall. Another special feature of alpha-monolaurin is that the molecule is not only active in the entire gastrointestinal tract, but also in the bloodstream. Based on all these properties, FRAmelco believes alpha-monolaurin is a useful tool to overcome the negative effects of the ban on systematic use of antibiotics in food producing animals.

An additional and big advantage of alpha-monolaurin compared to antibiotics, is the fact that pathogens do not develop resistance against l-monoglycerides of MCFAs.

## New development

Confronted with the demand for alternative growth enhancers FRAmelco's researchers looked into the properties of MCFAs and, even more, into those of lauric acid and its monoester.

The result of their study was the development of a feed additive which seem to have the potential to inhibit the pathogenic pressure exerted by pathogenic Gram positive bacteria (*Streptococcus* sp.) and fat enveloped viruses (Marek's disease (MD), Newcastle disease (ND), infectious bronchitis (IB) and avian influenza (AI)).

The main ingredient of this additive (FRA C12) is alpha-monolaurin, which is a fat-like, heat stable molecule (up to 160°C) produced by esterification of lauric acid and glycerol. Thanks to the chemical characteristics of alpha-monolaurin, the molecule is pH independent and will not dissociate in the intestinal tract (pH around 6.0-6.5). The product is

non-corrosive and has no negative effect on smell and taste. It is expected that the active ingredients of the additive would partially be transported to the systemic circulation via the intestinal lymphatic transport system.

In this way, alpha-monolaurin is not being transported via the hepatic portal vein to the liver, but enters the bloodstream via the lymphatic system without losing its characteristics. Hence, it is able to do its antibacterial and antiviral job before it is broken down by the liver.

## Managing health

During their life, animals are frequently subject to stress factors resulting from stocking density, climate conditions, type of housing or changes in feed formulation or ingredients. This makes them highly susceptible to (metabolic) disorders and infectious diseases caused by Gram positive pathogenic bacteria and viral infections.

These infections may lead to a decreased reproduction and growth performance, high mortality rates and a lower profitability. In the past, producers tried to prevent these losses by systematic use of antibiotics and implementing vaccination programs. Due to economic and/or practical reasons not all bacteria and viruses could be controlled.

## Livestock trials

FRAmelco believes that feeding poultry an additive containing medium chain l-monoglycerides and carefully selected micro-ingredients can have beneficial effects, may reduce health problems and help to avoid performance drops. Therefore, FRAmelco conducted livestock trials in a number of countries in different parts of the world.

Broiler farms suffering from the runting stunting syndrome showed that supplementation of FRA C12 at a high dose (5kg/ton of feed) during the starter period and 3kg/ton in the grower feed improved final weight and FCR (Table 1).

Feeding FRA C12 to broilers hit by very virulent ND, in Malaysia, resulted in a mortality drop from 10 to 8%. Afterwards these birds looked healthier than before, according to local veterinarians.

Alpha-monolaurin also suppressed clinical signs and mortality caused by MD as well as secondary infections, such as CRD and necrotic enteritis. In addition they discovered that the performance figures went back to normal.

Positive results with alpha-monolaurin (FRA C12) have also been obtained in Taiwan, where many poultry farms suffered from an outbreak of high pathogenic AI.

Waterfowl commonly do not suffer from AI but this time the problems were huge and breeder farms suffered from the devastating disease especially. Since it is not allowed to implement a vaccination program, Taiwanese producers had to go for alternatives. A goose farmer culled his first afflicted flock, but the disease reoccurred, which made him include FRA C12 at a low level (1kg/ton of feed) into the diet.

At the end of the rearing period there was no sign of AI left in the flock. Trials with layers provided a high dose of the additive (3kg/ton of feed) during a short period were less pronounced although a slight reduction of the infection rate was seen.

This led to the assumption among FRAmelco researchers that continuous feeding of the additive would be better than feeding it during a short period at high dose level.

A case study at a broiler breeder farm in Taiwan underlines this. After an outbreak of AI the new flock received 2kg/ton of feed until it reached peak production, at which time the amount of the additive was reduced to 1.0-1.5kg/ton. The result was a peak production of 82%, which was even higher than the peak before the AI outbreak.

These results lead to the conclusion that alpha-monolaurin supports poultry health and performance. It paves the way for its use as a new generation of non-antibiotic health and performance enhancer, but also as a potential antiviral product. ■

**Table 1. Performance of broilers suffering from the runting stunting syndrome fed with FRA C12.**

	Control					
	FRA C12	1	2	3	4	5
<b>Farm A</b>						
Final weight	2.00	1.78	1.92	1.86	—	—
FCR	1.68	1.85	1.86	1.86	—	—
<b>Farm B</b>						
Final weight	2.16	1.75	2.08	1.99	2.00	2.14
FCR	1.74	1.84	1.75	1.91	1.79	1.82