

The remarkable effects of esters of valeric acid on broiler performance

Short chain fatty acids are very well-known molecules that have been routinely used in animal feed for decades. Each one has unique characteristics making them the reference to tackle an array of challenges to the poultry industry.

by José M. Ros Felip,
Business Development Manager,
Perstorp, Sweden.
www.perstorp.com

Formic acid is the first choice for feed acidification and sanitisation, propionic acid is the most efficient mould-inhibitor, butyric acid is the reference in gut health and digestive integrity. All of them have been thoroughly studied and used intensively except one, valeric acid (C5), the longest of all. That is about to change. It has been decades since a new organic acid for feed was introduced. Now Swedish feed additive producer Perstorp has introduced ProPhorce Valerins (several patents are pending) which are the glycerol esters of valeric acid.

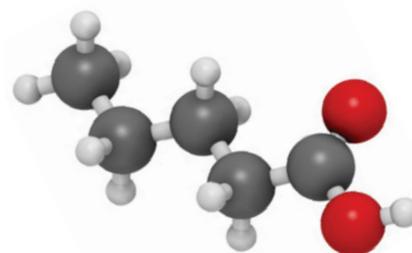
In collaboration with the University of Ghent, Perstorp set out to deepen the understanding of valeric acid, by setting up a four year research project.

As result of this project it was found that valeric acid can play a positive role in the development of the intestinal villi, promote digestive activity and reduce intestinal lesions in challenge models, similar to that

	Starter phase (day 0-14)	Grower phase (day 15-28)	Finisher phase (day 29-42)
T-1	-	-	-
T-2	Butyric acid 500g/t	Butyric acid 500g/t	Butyric acid 250g/t
T-3	Butyric acid 500g/t	Valeric acid 1500g/t	Butyric acid 250g/t

Table 1. Experimental treatments.

of butyric acid. These observations do not come as a surprise to experts, as valeric acid, just like acetic, propionic and butyric acid, occurs naturally in the intestinal lumen by means of fermentation of non-digestible fibres carried out by intestinal microbiota.



Star potential in the grower phase of broiler production

Valeric acid has been shown to support broilers in the grower phase when compared to some other short chain fatty acids. Therefore, more research was done specifically in this area.

Trials conducted in cooperation with Imasde Agroalimentaria SL (Spain) compared flocks with untreated feed to two other feed programs supplemented either with butyric acid glycerol esters only (BA, ProPhorce SR 130) or to a program consisting of BA additions in the starter and finisher phase but valeric acid glycerol ester (VA, ProPhorce Valerins) additions in the grower phase.

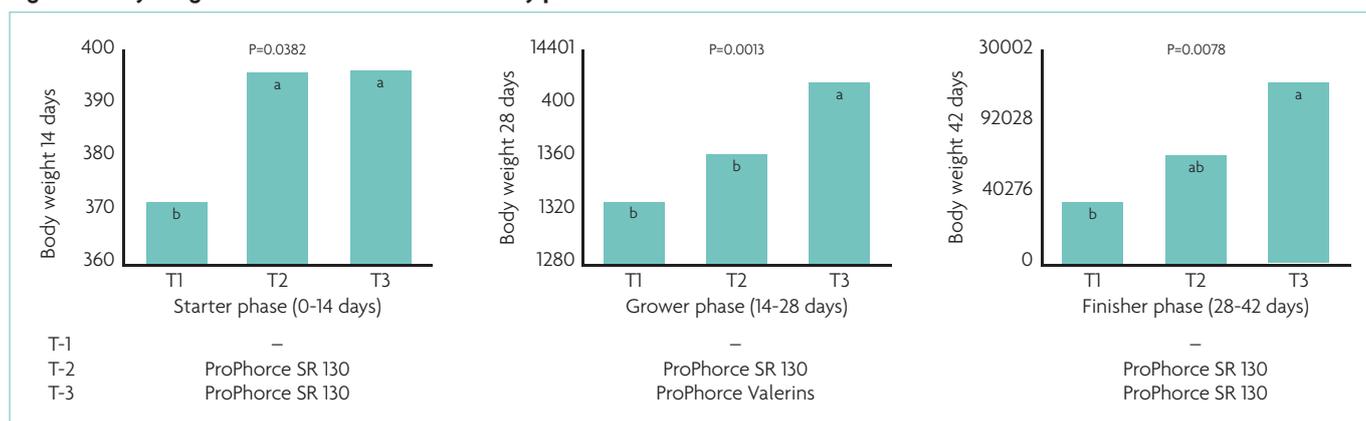
Valeric acid is one of the important organic acids produced by fermentation in the intestinal tract of animals and humans, and is the key component of ProPhorce Valerins, which has been demonstrated to improve animal performance and gut balance.

The trial consisted of 1,056 Ross 308 day old chicks that were allocated to 48 pens, grouped in three treatments (see Table 1); each treatment was replicated 16 times.

All feeds were supplied as mash, free from any antibiotic or antimicrobial compounds, enzymes nor any other gut health or performance enhancers.

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Figs. 1-3. Body weight and feed conversion results by phases.



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The supplementation of broiler diets with glycerol esters of butyric acid only (T-2), improved performance in young broilers by 2.5% as FCR, 1.9% as ADG and 5% as EPEF.

These results are in line with previous trials in experimental conditions. In T-3, addition of Valeric acid boosted performance up to 3.1% as FCR, 4.3% as BW or 10.1% as EPEF at the end of the test. In other words, at day 42, on average ADG of birds on T-3 delivered 2.9g/day more when compared to T-1.

This superior performance could translate to €100,000 extra profit per million birds for an integrator. Benefits of this application strategy are clear over the entire production cycle, but become even more remarkable when focusing on the grower phase only (see Figs. 1-3 on page 21).

Reasons for success in the grower phase

The grower phase is the most sensitive period for broiler birds in terms of gut balance. The majority of gut balance issues recorded in this period may be due to enteric dysbiosis challenges.

Valeric acid has been shown to have similar effects as butyric acid with regard to gut development and helping to optimise a healthy defence system, but the ability to mitigate intestinal damage might be

	Body weight (g)	ADFI (g/day)	FCR	Mortality (%)	EPEF
T-1	2829 ^a	104.4	1.58 ^b	6.0	396 ^b
T-2	2884 ^{ab}	104.2	1.54 ^{ab}	5.7	414 ^b
T-3	2951 ^b	105.5	1.53 ^a	4.0	436 ^a

Table 2. Results as performance for the whole period (day 42).

stronger. In MIC studies, valeric acid also showed superior activity to butyric, propionic and acetic acids.

All these findings are already supported by trials run either in experimental units or in field conditions.

Working with esterified valeric acid

Why work with glycerol esters of valeric acid instead of the pure acid? Many nutritionists have seen the benefits of esterified butyric acid by now and have

Short chain fatty acids and their main uses in agriculture

- C1: Formic acid: Feed preservative
- C2: Acetic acid: Feed and food preservation
- C3: Propionic acid: Mould inhibition
- C4: Butyric acid: Gut health and performance
- C5: Valeric acid: Stay tuned

come to depend on its performance improving effects in their daily work.

Similarly, glycerol esters of valeric acid have the benefit of getting the acid into the intestinal tract intact.

What is next?

Valeric acid is a brand new tool to improve broiler production that has opened up opportunities that need to be explored further. Just a few years ago, results such as the ones from the Imasde trial were hard to imagine. This can only support Perstorp's commitment to unveiling more of the hidden potential for this new molecule in broiler production.

To this end, valeric acid has already demonstrated its worth to be considered for inclusion in feed programs for broilers. ■

References are available from the author on request