ProPhorce™ AC 299

Elegantly Balanced Performance

Perstorp

The power of balance

Perstorp recognises that it is more important than ever to manage your dietary electrolyte balance – without compromising animal performance and feed efficiency. That is why we developed ProPhorce™ AC 299.

ProPhorce™ AC 299 is a highly available sodium source, as well as being a non-corrosive, dry acidifier. It is an economically efficient solution that replaces two products at once. It contains both sodium and formate that have a number of unique properties, as they:

- Manage the electrolyte balance in a cost-effective way. Optimizing dEB has proven to enhance live weight gain
- Enhance the conversion of pepsinogen into pepsin, a major enzyme involved in protein digestion.
- Reduce the emptying rate of the stomach, resulting in an improved nutrient digestibility.
- Control the enterobacterial load

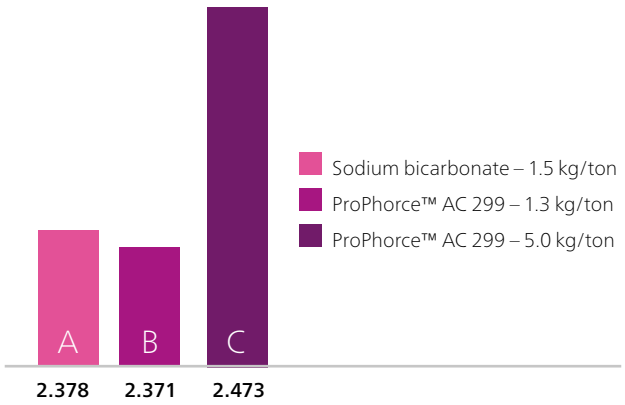

Figure 1. Broiler live weights at day 35 with differing sodium sources and levels. Treatments A and B are iso-sodium with dEB of 190 mEq. Treatment C with dEB of 240 mEq has significantly ($p<0.01$) improved weight gain. Feed conversion ratios were similar between groups. (ADAS, 2016)

The importance of dEB

Many researchers have shown that in monogastric animals the optimum dEB level is between 220 and 250 mEq in the diets. This level improves animal performance as measured by weight gain, feed consumption and feed conversion ratio (FCR). (Borges et al., 2003, Nobakht et al., 2006, 2007)

Proven efficiency

ProPhorce™ AC 299 is as effective as sodium bicarbonate as a sodium source when dosed at iso-sodium levels. At higher levels ProPhorce™ AC 299 can improve performance even further.

Performance opportunity

Ensuring that the dEB of the diet is 240 mEq secures greater daily gain opportunity.

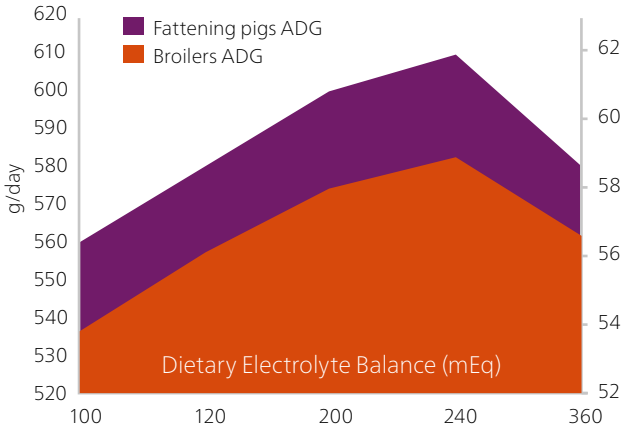

Figure 2. Optimum average daily gain performance is achieved at a dEB of 240 mEq for both broilers and fattening pigs.(Adapted from: Borges et al 2003, Inra Prod. Anim., 2009, 22 (2), 117-130)

Performance

Optimizing performance

ProPhorce™ AC 299 is an ideal sodium source

Nutritionists usually optimize dEB through the addition of sodium bicarbonate. However, basic chemistry shows that adding sodium bicarbonate to an acidic solution will increase the pH and release CO2 and water. This has a number of nutritional implications. Firstly, any increase in gastric pH negatively affects the enzyme pepsin, that requires a low gastric pH to work optimally. Secondly, any commercial acidifiers added to the diet can be effectively neutralised by sodium bicarbonate by up to 30%. So while sodium bicarbonate provides sodium, this is either at the cost of added acidifiers, digestive performance or both.

ProPhorce™ AC 299 is a source of sodium that is as effective as sodium bicarbonate as shown in figure 1. Importantly it also consists of formate, which in the presence of excess protons will be converted into formic acid effectively increasing total acid content (figure 3).

Additionally formic acid and its salts have a bacteriostatic effect on pathogenic bacteria (such as Salmonella and E. coli) in the feed. As such, the passage of harmful bacteria into the small intestine is reduced. This effect along with improved feed nutrient absorption leads to an improved gut health and less chance of pathogenic bacterial growth.

When balancing dEB, the choice of sodium source may affect other performance enhancers as well as total feed cost. While sodium bicarbonate has the potential to increase gastric pH and neutralize a substantial part of any added feed acidifier, ProPhorce™ AC 299 maintains gastric pH and further potentiates the acidifier effect.

Optimizing acidification

Using ProPhorce™ AC 299 improves overall pH and total available acids in feed.

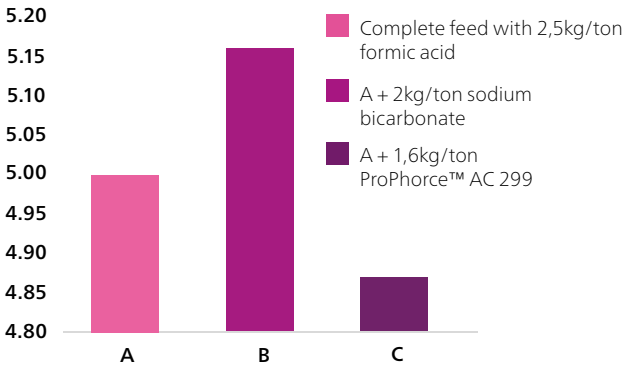

Figure 3. Addition of ProPhorce™ AC 299 reduces pH levels in a complete feed containing formic or lactic acid when compared to addition of sodium bicarbonate at iso-sodium levels. At the physiologically relevant pH 5 it increases formic acid levels in particular, however total acid availibility is increased when compared to control (see also figure 4).

Best practice

Make the most of your feed acidifier and minimize your feed costs by carefully choosing your sodium source. See the effects of two commonly used sodium sources in the figure below.

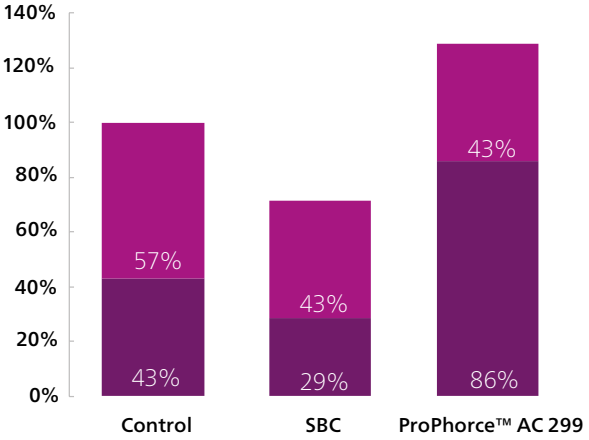

Figure 4. Percentage index of acids remaining in a 20% feed in water blend measured by gas chromotography containing either:

Control – formic/lactic acid blend at 5 kg/ton of feed
SBC – Control with sodium bicarbonate at 2 kg/ton of feed
ProPhorce™ AC 299 – Control with ProPhorce™ AC 299 at 2 kg/ ton of feed

How to calculate dEB

The dietary electrolyte balance (dEB) is the balance between Na+, K+ and Cl- in feed and is calculated as follows:

dEB (mEq) = Na/0,023 + K/0,039 – Cl/0,035 where Na, K and Cl is in g/kg Dry Matter

Contrary to popular belief salt changes dEB very little, here's why:

1 kg NaCl= 390/0,023 + K/0,039 - 606/0,035 = 0,36 mEq

Compared to ProPhorce™ AC 299:

1 kg ProPhorce™ AC 299 = 340/0,023 + K/0,039 - Cl/0,035 = 14,78 mEq

One molecule can change everything

Perstorp believes in improving everyday life – making it safer, more convenient, more fun and more environmentally sound for millions of people all over the world. As a trusted world industrial leader, our innovations provide essential properties for products used every day at home and work. You'll find us everywhere from your car and mobile phone to towering wind turbines and the local dairy farm. Simply put, we work to make good products even better.

Perstorp's focused innovation builds on more than 135 years of experience, representing a complete chain of solutions in organic chemistry, process technology and application development. Manufacturing is based in Asia, Europe and North America, with sales and support in all major markets. The Perstorp Group is controlled by funds managed and advised by the European private equity company PAI partners.

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