



ProPhorce™ BD

Making a difference in
combatting pathogens

Feed additives that give key benefits

- ➔ Strong action against harmful bacteria
- ➔ Improves effectiveness of anti-salmonella programs
- ➔ Cost-efficient dosage rates
- ➔ Synergistic combination ensures enhanced antibacterial effect
- ➔ Effective at high and low pH levels

Highly effective antibacterial

Hygiene and biosecurity measures are the most important measures to prevent pathogenic bacteria such as *Salmonella* and *Campylobacter* on pig and poultry farms. The risk of introducing *Salmonella* on a farm via the feed is relatively low. To exclude any risk acidification is a good measure to prevent contamination of the feed. Another important effect of acidification is that the bacterial infections in the gastro-intestinal tract of the animals are reduced (Creus et al., 2007). To minimize the risk of horizontal transmission (i.e. via faeces) acidification of the drinking water is necessary.

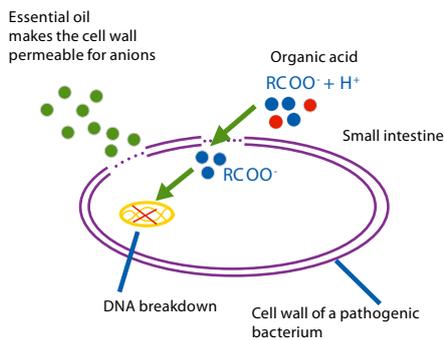
When farms have acute problems with pathogens, a powerful product is required to improve the situation. *Salmonella* can not only cause disease in animals but more importantly in humans. Many countries want to eradicate *Salmonella* in farm animals, enforced by financial punishment of slaughterhouses and farmers.

ProPhorce™ BD is mainly used to combat problems with pathogenic bacteria found along the feed chain, particularly on farms. Pathogenic bacteria can cause severe illness and even death in both human hosts and farm animals at great economic loss. Organic acids and essential oils form an important weapon in the arsenal directed at raising standards of hygiene and animal performance.

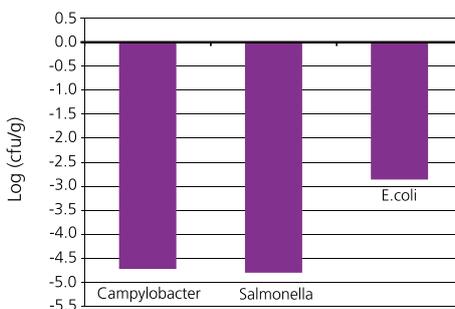
ProPhorce™ BD is the result of many years of research into the antibacterial effect of the combination of organic acids and essential oils. The antibacterial qualities of specific plant extracts are being utilized. These plant extracts protect plants against attacks from their natural enemies.

Mode of action

The inhibiting effect of ProPhorce™ BD lies for a great part in the synergy of organic acids and specifically selected essential oils. At a higher pH the essential oils enable the anions of organic acids to penetrate the bacterial cell wall and disturb the metabolic processes in the bacterial cell. Specific essential oils have shown to have an antibacterial effect against pathogenic bacteria.



At higher pH levels an organic acid will dissociate ($RCOO^-$ and H^+) and normally these ions will not be able to penetrate a bacterial cell. However, specific essential oils make the cell wall permeable to these ions at higher pH levels, enabling organic acids to be more effective in an antibacterial way.



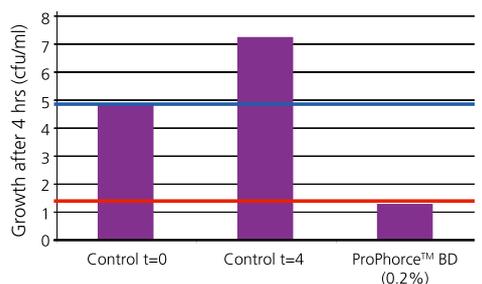
The efficacy of ProPhorce™ BD against several pathogens (results from multiple in vitro trials). These results show that the product is very active against *Salmonella*, *Campylobacter* and *E.coli*.

Inhibiting bacterial growth

Some *Staphylococcus aureus* are resistant to the antibiotic methicilline and to most other antibiotics as well. Research has shown that the much lower level of antibiotic usage on organic farms is likely to minimize the chances of MRSA emerging on these farms (Harper et al., 2009).

Combining the above the conclusion is evident; antibiotic use has to decrease and when MRSA is present it has to be eradicated. Because *Staphylococcus* is also present in the gastro-intestinal tract, a solution can be to provide a product via the feed or drinking water in order to minimize the spread via the faeces.

ProPhorce™ BD has been tested in vitro against MRSA. The MRSA isolates used in the in vitro test are three isolates related to pigs.



■ *Staphylococcus aureus* (MRSA), 3 pig related isolates
 — Control T=0 (4.89 cfu/ml)
 — Detection limit (1.3 cfu/ml)

This graph shows the results (cfu/ml) of the control at the beginning of the trial (T=0) and after 4 hours (T=4). The bars of the treatments represent the results after 4 hours. The blue line represents the baseline (control T=0) and the bars above this line indicate ongoing growth of the MRSA. The red line represents the detection limit of cfu. ProPhorce™ BD was below the detection limit (Source: CCL, 2010, Ref: PRPW-0708).



ProPhorce™ BD user guide

Besides acidifying animal feed and drinking water, there are more ways to minimize health risks for animals as well as humans. Farm management is the key factor when it concerns purchase of new animals, feed and labour to influence animal health and productivity. Nevertheless it is still possible to unwittingly introduce new pathogens.

ProPhorce™ BD can be used either as a feed or drinking water preservative. Preservation of feed or drinking water can prevent contamination with harmful bacteria, improve effectiveness of anti-salmonella programs. The synergistic combination of organic acids and essential oils enforce the antibacterial effect. Economic benefit of ProPhorce™ BD is the cost-efficient dosage rate.

Dosage advice in compound feed

Species	Dosage in kg per ton
Swine	2-3*
Poultry	2-3*

* Depending on the severity of the problems.

Dosage advice in drinking water

Species	Schedule	Dosage in kg per 1000 liter	Optimum pH drinking water
Weaned piglets	Continuously from weaning	1.0-2.0	3.5-4.0
Lactating sows	Lactation period: continuously	1.0-2.0	3.5-4.0
Grower/finisher swine	Depending on severity: 3 days/week or continuously	1.0-2.0	3.5-4.0
Broilers	Week 1: Continuously During 7 days before sampling During 5 days before slaughter	1.0-1.5	3.7-4.0
Layers/breeders	Depending on severity: 3 days/week or continuously (2-3 weeks)	1.0-1.5	3.7-4.0





Your Winning Formula

The Perstorp Group is the world leader in several sectors of the specialty chemicals market. Few chemical companies in the world can rival its 130 years of success. Today we have a rich performance culture distilled from our long history and extensive knowledge in the chemical industry. That culture and knowledge base enables us to produce Winning Formulas for a wide variety of industries and applications.

Our products are used in the aerospace, marine, coatings, chemicals, plastics, engineering and construction industries. They can also be found in automotive, agricultural feed, food, packaging, textile, paper and electronics applications.

Our production plants are strategically located in Europe, North America and Asia and are supplemented by sales offices in all major markets. We can offer you speedy regional support and a flexible attitude to suit your business needs.

If you want a partner for feed additives who can offer you focused innovation to enhance your product or application, which is delivered reliably and responsibly, look no further. We have a winning formula waiting for you.