



bact-a-cid

Combination of acids on a unique mixed carrier to control enteropathogens both in feed and throughout the intestinal tract

promotes intestinal health... 'naturally'

kiotechagil

Performance in aquaculture&agriculture

bact-a-cid

is a combination of buffered formic and propionic acids in liquid form blended onto a unique carrier system to give a dry granular appearance.

The unique carrier enables the product to have two effects:

- **Reduces contamination** and prevents recontamination of feed by pathogens.
- **Protects the digestive tract** of all pigs from colonisation by enteropathogens, whether from sources using feed as a vector, or non-feed origins including water, vermin or horizontal transmission.

This carrier matrix has four vital functions:

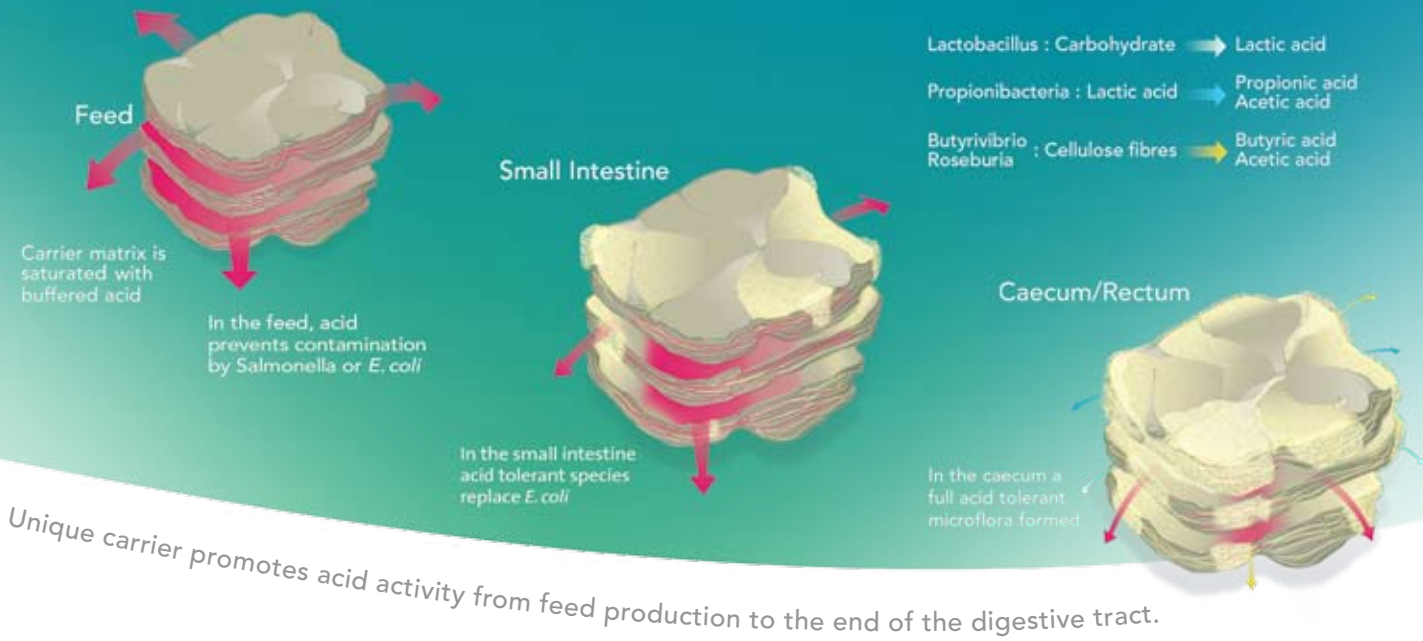
- **The high surface area enables** formic and propionic acids in their vapour form to diffuse through feed more easily enabling better contact with pathogenic bacteria.
- **Protects the acids from dispersing** into the gut lumen where they would otherwise be metabolised.
- **Enables the slow release of acid** along the intestinal tract.
- **Provides an inert substrate** for the colonisation by acidophilic bacteria such as Lactobacillus, Propionibacteria, Roseburia and Butyrivibrio. These bacteria produce lactic acid and other secondary metabolites to maintain a lower pH of the intestinal tract, reducing the risk of colonisation by *E. coli*, salmonella and campylobacter and maintaining a healthy gut microflora. This helps to improve feed conversion, reduce disease and mortality.

mode of action

bact-a-cid's acid blend affects pH and has a direct anti-bacterial activity, particularly against Gram negative bacteria. This activity in feed is due to penetration of the bacterial cell wall by formic acid in its free undissociated form, assisted by the lipophilic propionic acid disrupting the Gram negative cell structure. This action impairs the DNA synthesis and causes a loss of energy as the bacterial cell tries to maintain the intracellular pH balance.

All acids are subject to natural buffering from feed ingredients such as calcium. In the upper intestinal tract they are absorbed through the gut epithelium from which they are either excreted or used as an energy source by the animal. There is little acid action beyond the jejunum as a result of natural neutralisation at the duodenum.





The special carrier used by **bact-a-cid** is a combination of two components, one of which releases acid rapidly for availability in feed and the stomach to support the potential shortage of natural stomach acid in the young animal. The main carrier not only releases free acid into the feed but also protects the acids from the metabolisation process, releasing them slowly as the carrier particles pass along the intestinal tract. These create a localised environment of lower pH within the carrier particles which supports the colonisation of these particles by acid tolerant bacteria, particularly the lactobacillaceae family. These utilise the carbohydrate sources from the feed and ferment them to lactic acid producing far larger quantities than could be economically added as a feed additive.

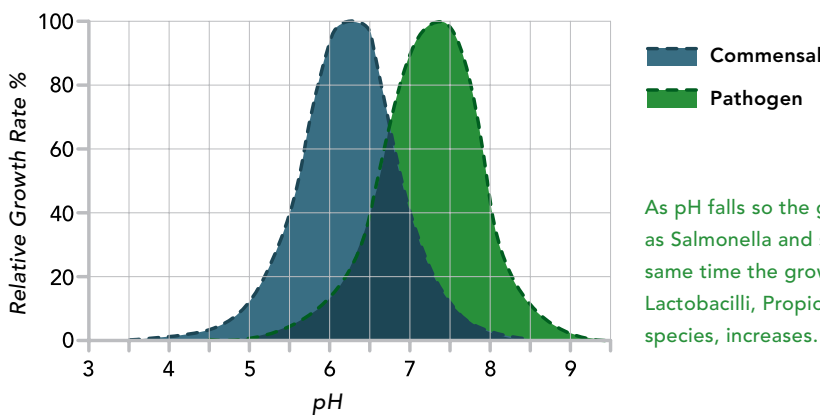
Lactic acid maintains the intestinal pH at a lower level, slowing the growth rate of the potential pathogens and making their colonisation much more difficult.



Colonisation by lactic acid bacteria on the **bact-a-cid** carrier surface creates conditions of lower pH throughout the intestinal tract.

Optimum rates of growth under differing pH conditions:

- a. favourable bacteria are generally acid tolerant.
- b. potential pathogens prefer higher pH environments and have slow growth rates under acid conditions.



As pH falls so the growth rate of potential pathogens such as Salmonella and some *E. coli* serotypes reduces. At the same time the growth rate of acid tolerant species such as Lactobacilli, Propionibacteria, Butyrivibrio and Roseburia species, increases.



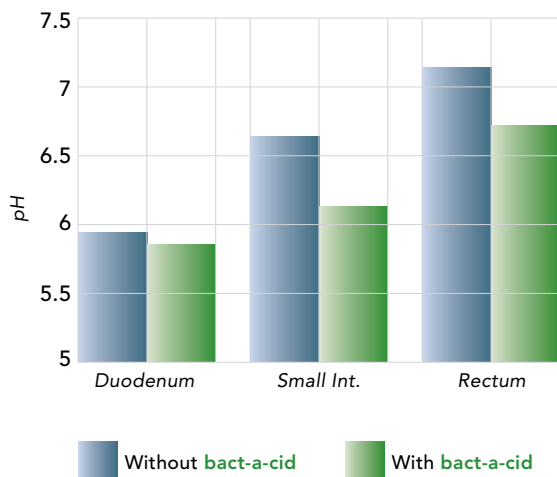


mode of action - continued

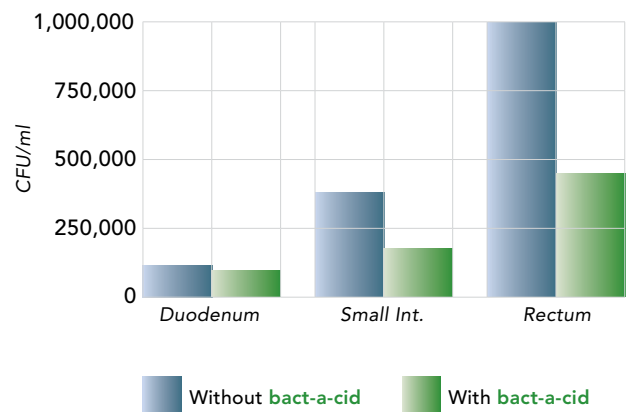
bact-a-cid's ability to promote acid production in the intestinal tract is demonstrated by the difference in pH, compared to a control group at the small intestine and rectum level in vivo after 35 days. Lowering the pH has a direct impact on the microbial population present by reducing fast growing enteropathogens and replacing them with slower growing acidophilic species.

Total bacterial numbers are lower but the resulting microflora is much more favourable to the health of the pigs.

bact-a-cid lowers pH in the Intestine



Bacterial numbers (especially non-acidophilic pathogens) decrease with lowered pH levels



activity areas

In Feed: Reduces the risk of infectious scours from contaminated raw materials or finished feed.

Stomach: Helps to acidify the stomach to improve gastric secretion and promote better protein utilisation and increased digestive activity giving optimum nutrient retention.

In pre-weaner pigs diet changes from milk to vegetable protein which can buffer the acid secretion from the immature stomach while environmental changes increase the microbial challenge from housing and the environment.

Intestine: the microbial optimisation of the gut

- Reduces *E. coli*, salmonella and campylobacter colonisation.
- Maintains villi length to maximise absorption.
- Reduces nutrient passage to the hind gut.
- Provides acidified platforms for acid producing lactobacilli.

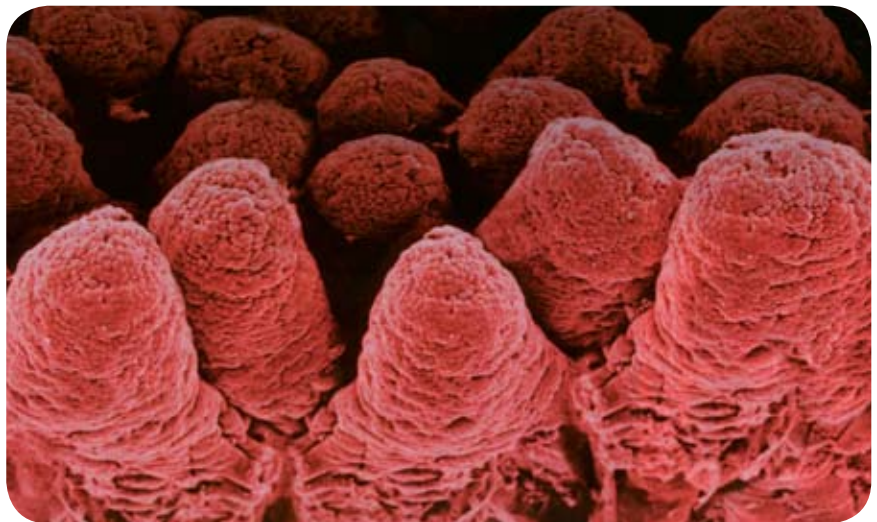
Breeding Sows: Reduces the bacterial load of the sow's dung which can otherwise contaminate the farrowing pen and infect suckling piglets.

Benefits:

- Lowers disease risk
- Improves growth rates and FCR
- Improves feed intake/palatability
- Reduces intestinal disorders from coliform and other enteropathogenic bacteria
- Stimulates digestive enzymes and bile production
- Ensures more uniform pigs
- Improves dung quality
- Increases calcium availability, especially in lactation rations with high calcium content, due to the lower intestinal pH



Effect of low bacterial numbers. The gut is able to absorb nutrients.



Effect of high bacterial numbers, especially E. coli. Absorption of nutrients severely impaired.



trial experience

1 Nursery Pigs

Weaning to 15kg over 32 days.

	bact-a-cid @2kg/t	Control	Difference
Average weight gain (kg)	7.72	6.82	
Feed intake/pig/day (kg)	0.39	0.37	
Average daily gain (kg)	0.25	0.22	+ 13.6%
Feed conversion efficiency	1.58	1.66	+ 4.8%

- Significant improvement in piglet performance from the **bact-a-cid** group

2 Growers in 2 periods

1st Period: up to 40 days / Final Period: up to +/-103 days.

	bact-a-cid @2kg/t	Control	Difference
1st Period:			
ADG (g/day)	0.561	0.524	+ 7.1%
FCE (energy/kglw)	2.69	3.02	- 10.9%
Final Period:			
Days	99	103	
Slaughter weight (kg)	98.3	93.3	+ 5.4%
ADG (kg/day)	0.706	0.645	+ 9.5%
FCE	2.79	2.95	- 5.4%

- **bact-a-cid** group slaughtered 4 days earlier.
- Treated group achieved 5kg heavier slaughter weight – a 5.4% improvement.
- Performance achieved without antibiotic growth promoters.

3 Grower/Finisher 25 to 110kg

	bact-a-cid @2kg/t	Control	Difference
Number of pigs at start	712	699	
ADG (kg)	0.780	0.757	+ 2.9%
FCE (MJ/kg growth)	34.26	36.75	- 6.8%
Mortality (%)	2.11	2.15	

- **bact-a-cid** group improved feed efficiency by 6.8% and moderately improved ADG by 2.9%.
- **bact-a-cid** pigs grew more uniformly; 82.9% delivered to slaughter in 4 groups compared to 73.7% of controls in the same period.
- 76 control pigs required extra time to finish compared to only 7 fed **bact-a-cid** resulting in less feeding days to achieve slaughter weight.
- **bact-a-cid** group gave an overall 13.9% improvement in profitability.



4 Finisher Pigs 30kg to slaughter

comparing **bact-a-cid** with Salocin (salinomycin) used as a growth promoter (positive control).

	bact-a-cid @2kg/t	Salocin	Difference
Pigs in/out	297/293	304/297	
Mortality (%)	1.35	2.3	- 42%
Average dead weight (kg)	65.98	65.36	+ 1%
Days to finish	68.4	72.2	- 3.7 days
Growth rate (g/day)	630	610	+ 20 g/day
Average feed intake (kg/day)	2.14	2.03	+ 11 g/day
Average P2 backfat (mm)	11.5	12.3	- 0.8 mm
Lean meat (%)	57.0	55.8	+ 2.1%

The **bact-a-cid** group showed:

- Significantly reduced mortality.
- Increased growth rate and lower number of days to achieve slaughter weight.
- Better quality carcass.

5 Sow Trial

	bact-a-cid @2kg/t	Control	Difference
Number of sows	600	500	
Litters per sow/year	2.53	2.35	+ 7.6%
Piglets per sow/year	24.05	19.00	+ 26.6%
Fertility by AI (%)	91.70	87.00	- 5.4%
Pre-weaning mortality (%)	5	12	- 58%
Weaning age in days	19-20	19-20	-
Progeny: Days to slaughter	150	170	20 days
DLWG (g)	830	720	+ 15.3%

The **bact-a-cid** group showed:

- Reduced coliform bacterial build up at a time when sows generally have slow colon emptying.
- Reduced risk of sow self contamination and less MMA.
- Excretion of formic acid in the urine can contribute to lower risk of Agalactia.
- Lower Gram –ve environmental challenge to young piglets resulting in better piglet survival and growth.



dosage recommendations

Weaners/Growers < 35kg	3kg/t
Growers/Finishers > 35kg	2kg/t
Gilts and Sows	2-3kg/t*

*Ideally **bact-a-cid** should be fed to sows throughout the breeding cycle.

Where this not possible 3kg/t should be fed from day 100 of gestation and throughout lactation.

packaging and storage

bact-a-cid is packed in 25 kg bags.

bact-a-cid is a granular formulation which can be introduced in feed without pre-mixing or expensive equipment.

bact-a-cid is non corrosive to milling equipment and safe to handle.



For further information

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Performance in **aquaculture & agriculture**

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