



salkil

combination of acids on a unique carrier control enteropathogens
in feed **and throughout** the digestive tract

promotes intestinal health... 'naturally'

kiotechagil

Performance in **aquaculture&agriculture**



salkil

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 poultry species from colonisation by enteropathogens, whether from sources using feed as a vector, or non-feed origins.

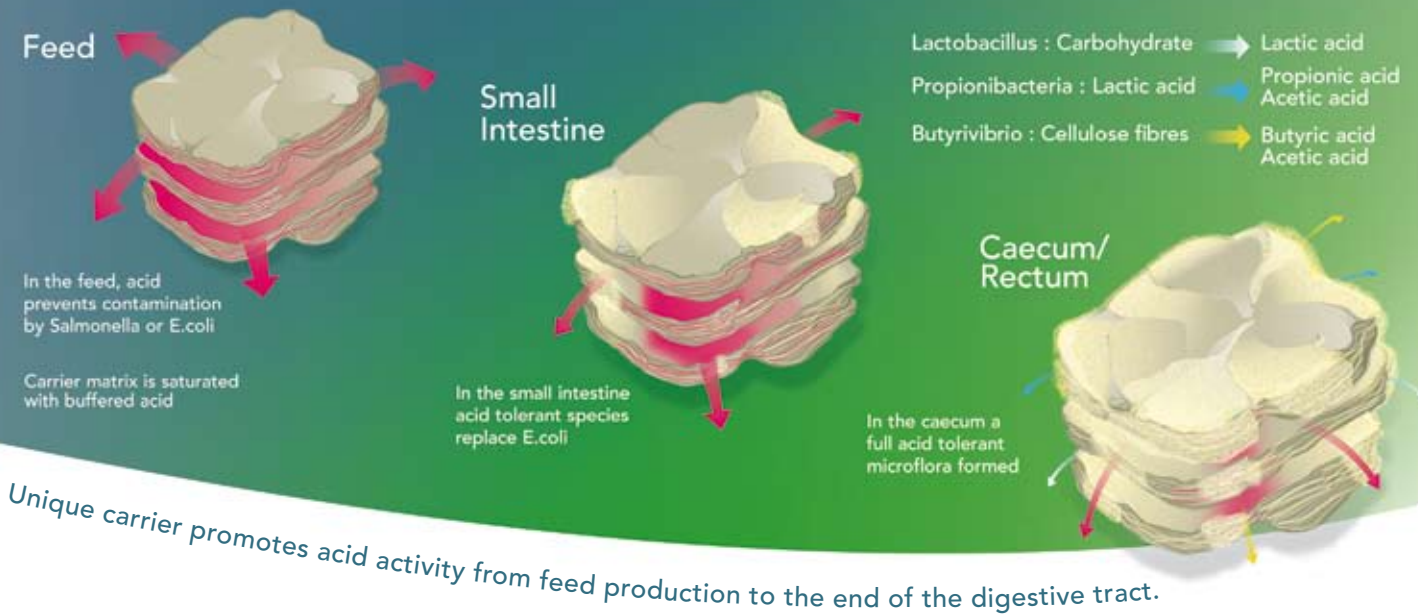
This carrier matrix has four vital functions:

- **The high surface area enables** formic acid in its vapour stage 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 acid tolerant bacteria such as Lactobacillus, Propionibacteria 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 and salmonella and maintaining a healthy gut microflora. This helps to improve feed conversion, reduce disease and mortality.

mode of action

Salkil'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 pH balance.

All acids are subject to natural buffering from feed ingredients such as calcium. In the upper intestinal tract they are absorbed, excreted or used as intermediates of energy metabolism and utilised as nutrients with little acid action beyond the proventriculus as a result of natural neutralisation at the duodenum.



The special carrier used by Salkil protects the acids from this metabolism process, releasing them slowly as the carrier particles pass along the intestinal tract. These create a localised environment of lower pH which supports the colonisation of the carrier particles by acid tolerant bacteria, particularly the lactobacillus species. These utilise the carbohydrate sources from the feed and ferment them to lactic acid.

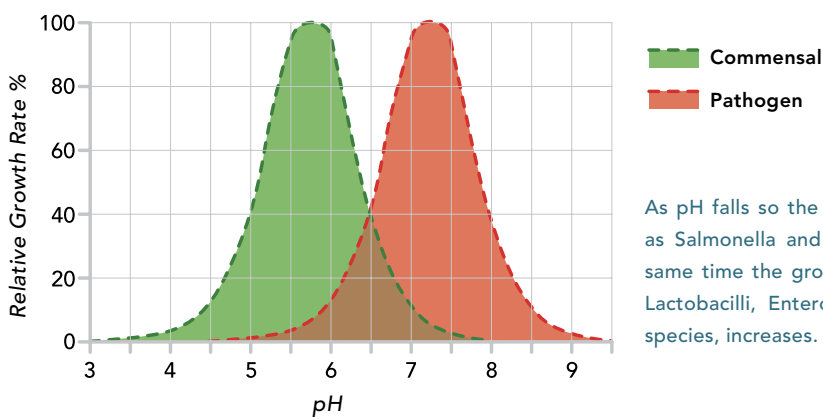
Lactic acid maintains the intestinal pH at a lower level, slowing the growth rate of the potential pathogens and making their colonisation much more difficult.



Colonisation by lactic acid bacteria on the Salkil 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.

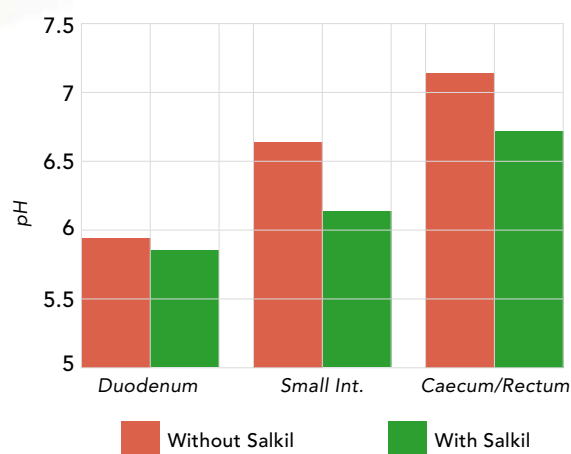


As pH falls so the growth rate of potential pathogens such as Salmonella and some E. coli serotypes reduces. At the same time the growth rate of acid tolerant species such as Lactobacilli, Enterococci, Propionibacteria and Butyrivibrio species, increases.

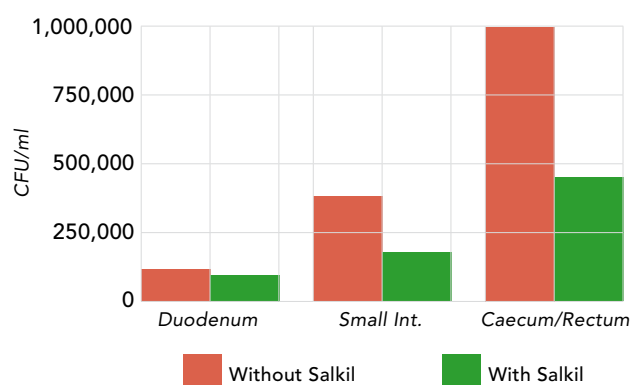


Salkil's ability to promote acid production in the intestinal tract is demonstrated by the difference in pH, compared to a control group at the small intestine and caecum level in vivo with broilers at 35 days. Lowering the pH has a direct impact on the microbial population present by reducing fast growing 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 birds.



Salkil lowers pH in the Intestine

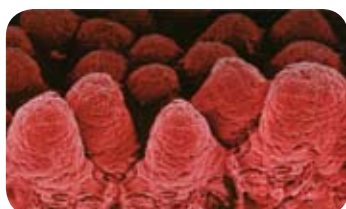


Bacterial numbers decrease with lowered pH levels

productivity



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.

Performance benefits are achieved when intestinal pH is reduced. High E. coli numbers in the gut reduce the length of villi that line the small intestine. This dysbacteriosis can reduce nutritional absorption and lead to diarrhoea and wet litter.

Acidification of the intestinal tract with continuous use of Salkil reduces the coliform numbers, allowing the villi to develop to their full length, resulting in improved FCR and a more healthy gut microflora capable of extracting nutrients more effectively.

The use of Salkil in breeders will limit enteropathogen numbers in faeces and reduce contamination of hatching eggs.

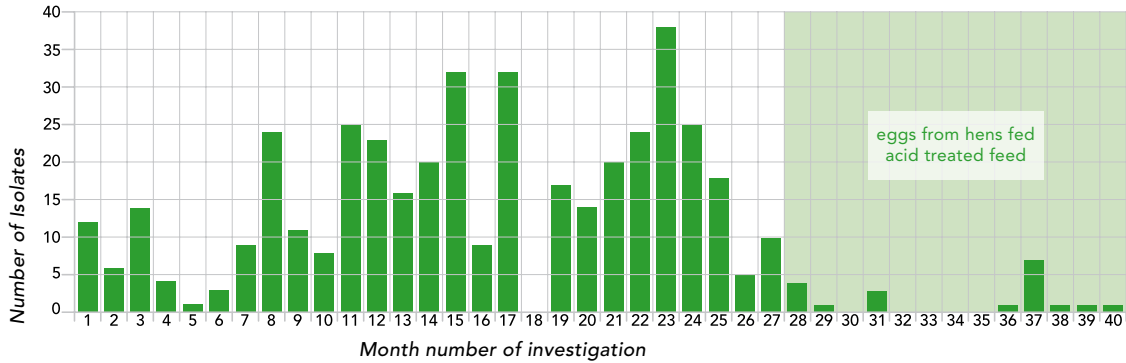
An additional benefit from acidification of the intestinal tract with Salkil is to improve calcium availability from around 47% to 55%. This can improve egg shell quality simply by better utilisation of the same calcium sources.



trial experience

1 Breeders

Treating the feed at month 28 reduced salmonella isolations from hatchery waste and as a result there were virtually no new incidences of salmonella. This is in marked contrast to the history of infection before acidification.



2 Layers - Commercial Layers

	Control	Salkil
Number of birds	800,000	800,000
Feed consumption	2,500 t/month	2,400 t/month
Salmonella positive	5.0%	<0.01%
Egg Weight	58g	63g
Shell Quality		Improved
Laying percentage		Improved

Reduced E.coli and salmonella resulted in improved albumen weight in eggs. Because the egg weight was above the normal for this farm the quantity of Salkil treated feed was reduced by 100 tonnes/month to return egg weight to the original requirement.

3 Broilers - Commercial Broiler – UK (1998)

The trial was carried out to assess the cost-effectiveness of using Salkil in controlling enteropathogens such as salmonella, E. coli and Campylobacter. Salkil at 4kg/t was used in the starter ration and 2kg/t in grower/finisher rations. Cloacal and litter swabs were taken at 28 days.

	Farm 1		Farm 2		Farm 3	
No. of Birds	25,000		11,500		110,000	
Cloacal swabs (day 28)	-ve		-ve		-ve 12 houses	
Litter swabs (day 28)	-ve		-ve		-ve 10 houses +ve 2 houses (S.ohio)	
	previous 3 months	Salkil	previous 3 months	Salkil	previous 3 months	Salkil
Age (days)	41.2	40.7	40.3	39.6	40.4	41.1
Mortality (%)	7.80	5.78	6.15	4.14	8.65	3.03
Ave Weight (kg)	1.71	1.91	1.96	1.99	1.95	2.22
FCR	2.02	1.92	1.93	1.88	1.88	1.88
EEC*	190	230	236	256	205	279

*European Efficiency Factor

4 Feedmill

Salkil Activity against Salmonella in Feed

Salmonella organism	Feed Type	Survival % @4 kg/t	
		After 24 hours	After 48 hours
mbandaka	Breeder meal	2.4	1.6
enteritidis	Breeder meal	4.0	2.7
enteritidis	Meat & bone	5.5	3.8
Campylobacter jejuni	Breeder meal	4.2	NT
Salmonella spp	Layer meal (natural infection)	0.7	0

NT = Not tested

Used at the correct rate Salkil will kill 95% of organism in feed within 24 hours and up to 98% within 48 hours.

packaging and storage

Salkil is packed in 25 kg pre-printed sacks.

Salkil is a granular formulation which can be introduced in feed without premixing or expensive equipment.

Salkil is non-corrosive to milling equipment and safe to handle.

The inclusion level in feed is 2kg/t – 4kg/t depending on the challenge risk.

In raw materials the rate may be safely increased to 8 kg/t.



For further information

kiotechagil

Performance in aquaculture & agriculture

Kiotechagil
Hercules 2, Calleva Park
Reading
Berkshire RG7 8DN

Tel: +44 (0) 11 89 813333
Fax: +44 (0) 11 89 810909
E-mail: info@agil.com
www.agil.com

Distributor:

