CRINA® Poultry Plus

Ensuring a good gut feeling



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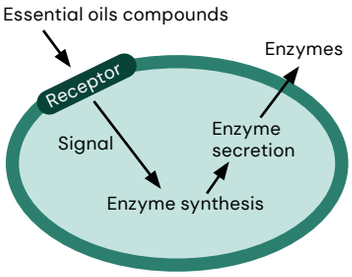
Introduction

Age old problem – innovative new solution

At last, an answer to the question 'How do I get broilers to grow quicker and use feed better?'
Feed is around 70% of total production costs so broilers that convert feed into meat efficiently are more profitable. Achieving the best returns is about more than cutting feed costs. It is about reducing feed costs per kilo of liveweight produced by using feed better.
Modern breeds are selected for rapid growth and high meat yield. Realizing the bird's full potential requires management of gut health.
Disorders or diseases that affect the gut directly or indirectly have an effect on health, feed utilization and profit. These problems can be reduced if the microflora in the gut can be controlled to ensure the right numbers of the appropriate bacteria in the correct part of the intestine.
By maximizing feed digestibility in the small intestine and reducing the levels of potentially pathogenic bacteria in the large intestine it is possible to increase feed utilization and bird performance. It can also improve uniformity, which is a big benefit to broiler producers and processors.
CRINA® Poultry Plus is an eubiotic solution to gut health challenges and the demand for maximum feed efficiency in broilers.

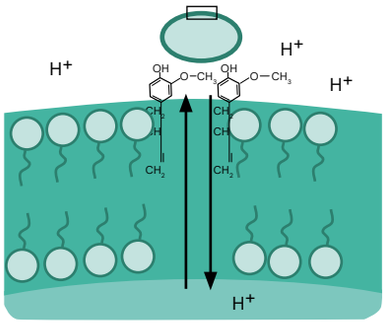


Mode of action



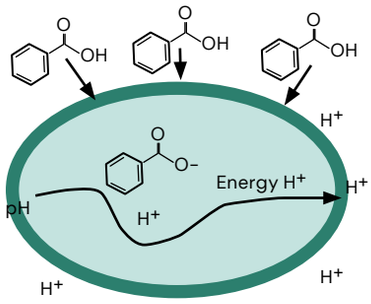
CRINA® Poultry Plus has a unique multistage mode of action within the digestive system of chickens.

Essential oil compounds stimulate increased secretion of key digestive enzymes including lipase, amylase and trypsin.



Essential oil compounds can influence bacterial cell wall permeability.

Other essential oils attack the cell walls of specific classes of bacteria, making the cell wall more permeable so making it easier for protons to enter the cell.



Influence of organic acid on bacterial cells.

Benzoic acid enters the bacteria cell and reduces intracellular pH. This disrupts cellular functions and depletes energy reserves as the cell tries to re-establish homeostasis.

Cost effectiveness in broilers

These trials showed a very high level of performance. Even in these conditions, CRINA® Poultry Plus delivered very consistent improvements leading to an average return on investment of 4:1.

Trial	Weight (g) Control	Weight (g) CRINA® Poultry Plus	FCR Control	FCR CRINA® Poultry Plus	ROI
Netherlands	2681	2706 + 0.9%	1.76	1.73 -1.7%	3.4 : 1
Belgium	2818	2868 +1.8%	1.62	1.60 -1.2%	4.5 : 1
USA	2671	2694 + 0.9%	1.71	1.68 -1.5%	3.1 : 1

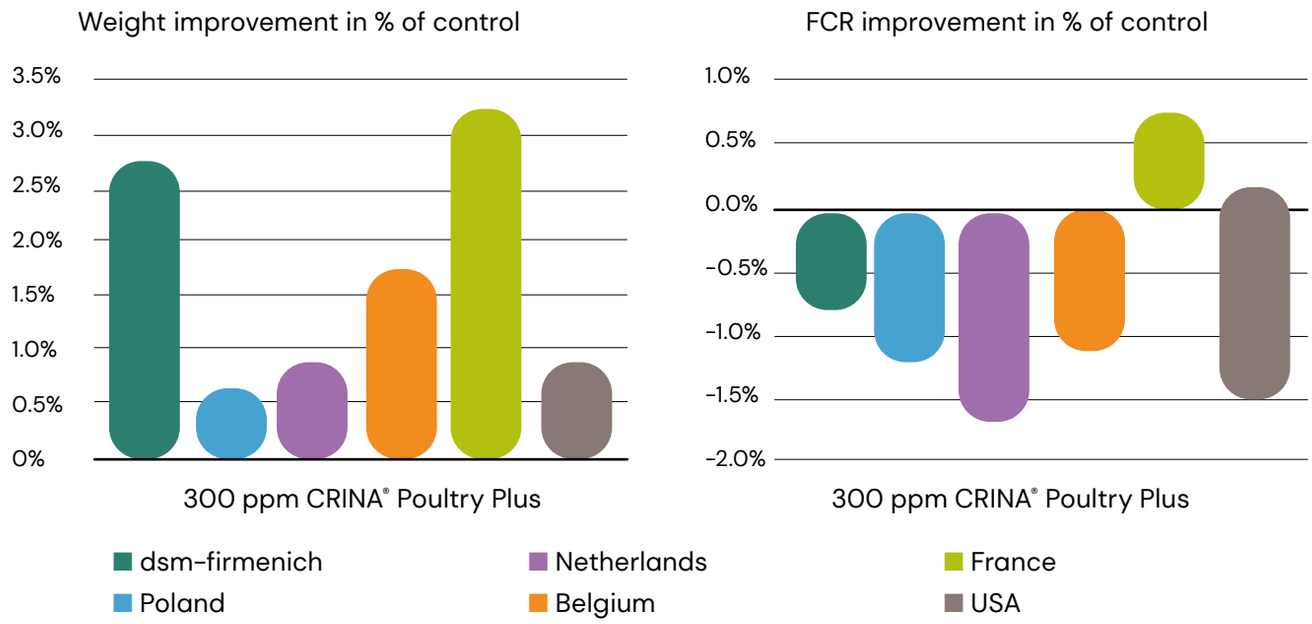
This summary of 10 customer field trials, confirms the effectiveness of CRINA® Poultry Plus, with profitability consistently improved by €35 per 1000 broilers.

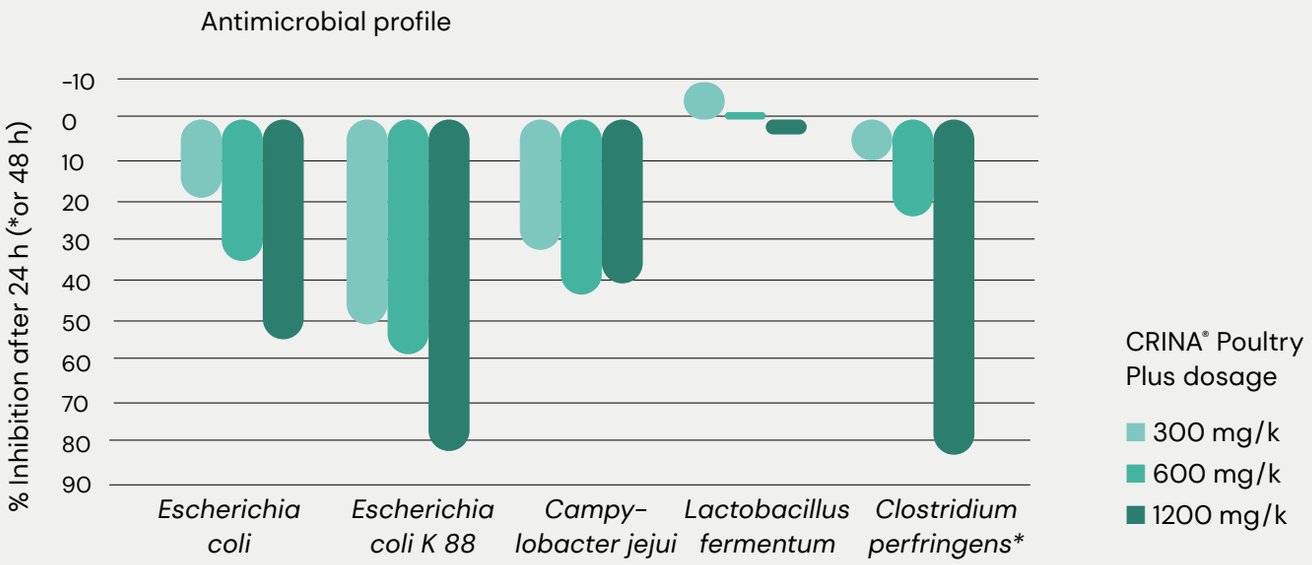
Average results	Weight (g) Control	Weight (g) CRINA® Poultry Plus	FCR Control	FCR CRINA® Poultry Plus	Mortality CRINA® Poultry Plus	ROI
at 39 days	2352	2392 + 1.8%	1.70	1.66 -2.4%	-0.6%	5.3 : 1

CRINA® Poultry Plus – benefits

Results from extensive floor pen broiler trials in several countries demonstrate that CRINA® Poultry Plus:

- Increases daily weight gain
- Improves feed conversion ratio
- Boosts profitability
- Produces an average payback of 4:1 in optimum management conditions.





CRINA® Poultry Plus reduces the populations of potentially pathogenic bacteria such as *E.coli, Campylobacter, Cl. perfringens* but does not affect the beneficial *Lactobacilli*.

What is CRINA® Poultry Plus?

CRINA® Poultry Plus is a real breakthrough in poultry gut health management.

- CRINA® Poultry Plus is a unique combination of two long-established and proven products
- CRINA® Poultry Plus is a unique and innovative formulation of benzoic acid (the most effective organic acid) combined with a blend of essential oil compounds including thymol, eugenol and piperine
- Benzoic acid improves the conditions in the gut and is particularly inhibitory against Gram negative bacteria, including *E. coli, Salmonella* and *Campylobacter*. It helps ensure excellent preservation of food and feed, being particularly effective against yeasts
- Thymol and eugenol interact with bacterial cell membranes, making the membranes more permeable. This makes it easier for benzoic acid to enter and accumulate in the bacterial cell, leading to disrupted cell functions and cell death. This reduces the levels of pathogenic bacteria and improves digestive efficiency
- Piperine improves the levels of digestive enzymes including amylase which is involved in the digestion of starches and lipase which is responsible for the breakdown of fats. More enzymes equal better digestion
- *In vitro* trials show that the unique blend of essential oil compounds in CRINA® Poultry Plus inhibits potentially detrimental (harmful) bacteria, both Gram positive, particularly *Clostridium perfringes*, but also Gram negative such as *E.coli*
- Reducing the levels of pathogenic bacteria lowers the incidence of digestive disease and disorders in a flock
- *In vivo* trials show that CRINA® Poultry Plus improves the gut microflora, increasing feed efficiency and growth rates.

Feeding guide

CRINA® Poultry Plus recommended feeding rates

Recommended dosage

In broiler feeds	Recommended dosage mg/kg
Starter	300
Grower	300
Finisher	300

In layer and breeder feed	Recommended dosage mg/kg
Pullet stage	150 – 300
Laying stage	150 – 300

Stability

- CRINA® Poultry Plus is a free-flowing light brown powder containing a minimum 90% extractable, with around 10% essential oil compounds and minimum 80% benzoic acid.
- CRINA® Poultry Plus is stable during premixing and standard broiler feed processing.
- All compounds are listed on the Register of Feed Additives (Reg 1831/2003) of the European Union and in the USA.

Crina Poultry Plus is registered for broilers for fattening and reared for laying at 300 g/ton in EU markets.

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