

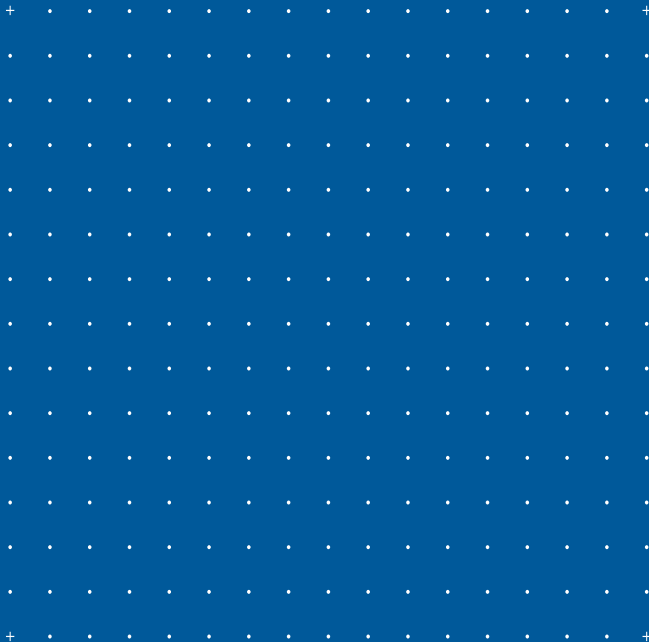
# CRINA<sup>®</sup> Poultry

The essential choice for health and profit

a **DSM** Product



**CRINA<sup>®</sup>**



**DSM Nutritional Products**

*Unlimited.* **DSM**

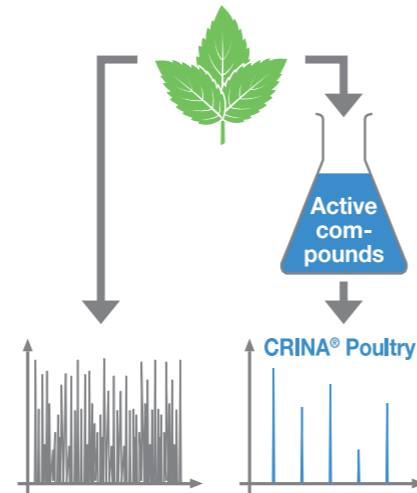
Many plants produce secondary compounds as a defense system against predation, insect attack or bacterial attack. For 5000 years, man has used secondary plant compounds in the form of essential oils as flavors and for antimicrobial properties.

## Designed to perform

Today's trend towards the replacement of in-feed antibiotic growth promoters to improve gut health has driven pioneering research activities at CRINA®.

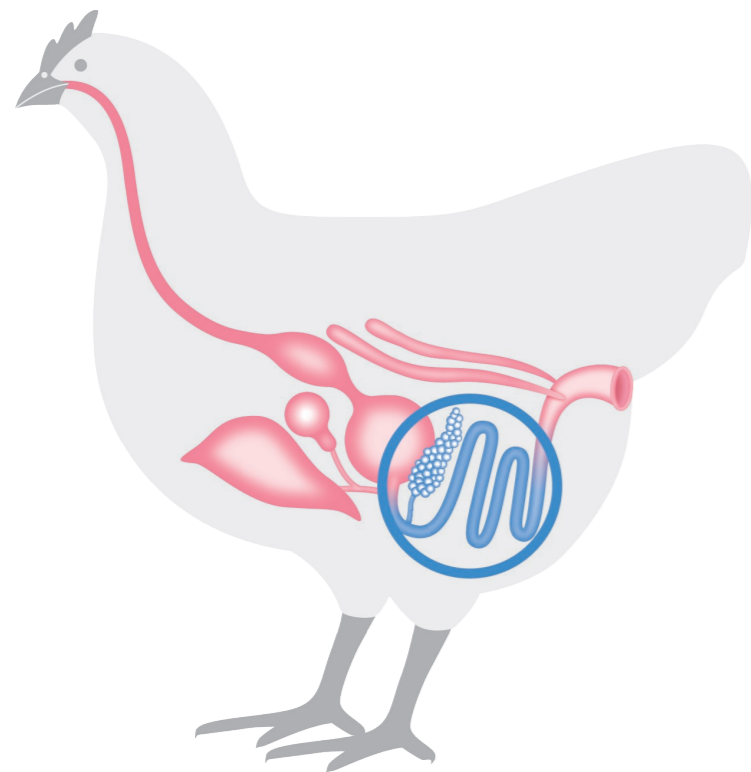
Following extensive research, a range of precisely formulated and consistent blends of essential oil compounds of high purity, marketed under the CRINA® trademark, was developed.

Not only can essential oil compounds function individually, but their effects can be improved through synergistic effects between individual compounds.



## CRINA® Poultry works in different ways

- Positive modulation of gut microbial flora  
 >>> resulting in a reduced risk of enteric disease.
- Stimulation of production of endogenous enzymes  
 >>> feed digestion is enhanced and less substrate is available for gut fermentation.



### Pancreas

Stimulation of the secretion of enzymes (lipases, amylases, trypsin)

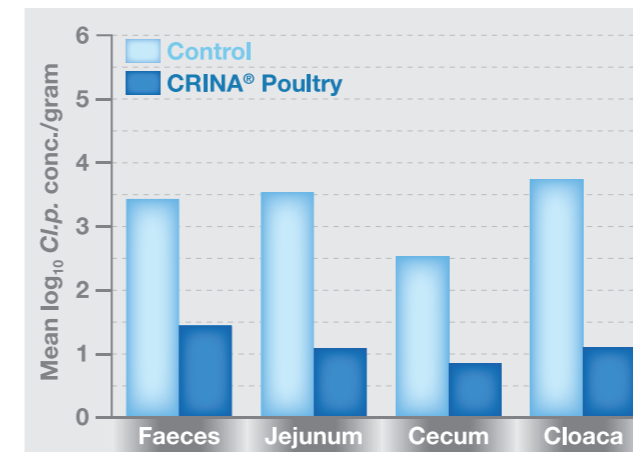
### Small intestine

Stimulation of secretion of digestive enzymes, anti-inflammatory activity, modulation of the gastrointestinal microflora

### Large intestine

Anti-inflammatory activity, modulation of the gastrointestinal microflora

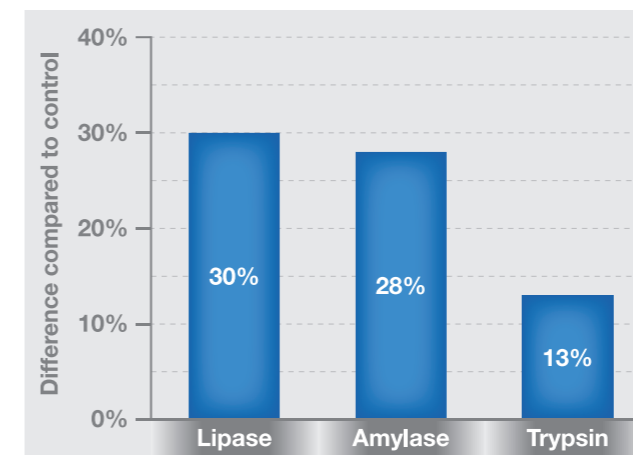
Mitsch et al., (2004)



## Gut health

Research by Mitsch et al. (2004) identified a modulating effect after 14 days on *Clostridium perfringens* when CRINA® Poultry was added to the diet of broiler chickens compared to a control diet.

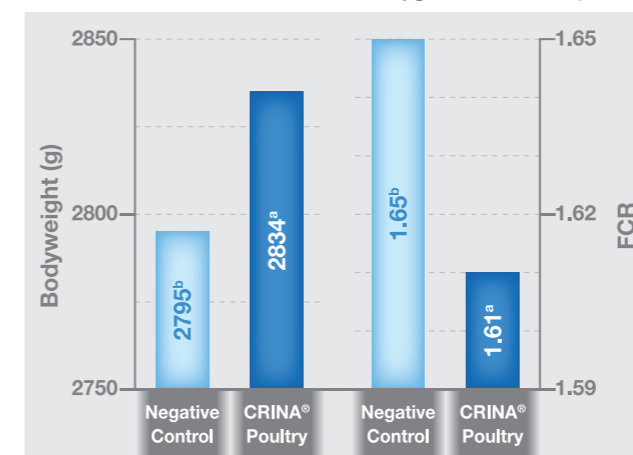
Lee et al., (2003)



## Stimulation of enzyme production

Lee et al. (2003) proved the enhancement of pancreatic enzyme production in broiler chickens at day 21 when CRINA® Poultry was added to the feed in comparison to a control group.

Huyghebaert et al., (2006)



## Performance

Huyghebaert et al. (2006) fed broiler chickens for 42 days a control diet and a diet supplemented with CRINA® Poultry. They observed improvement in live weight gain and feed conversion when CRINA® Poultry was added to the feed.

## Economics – Improved Profit Margin

Promising results from a series of published research and commercial studies have shown that feed supplementation with CRINA® Poultry improves live weight gain and feed conversion. This gives a very interesting return on investment of 1:5.

## Recommendations

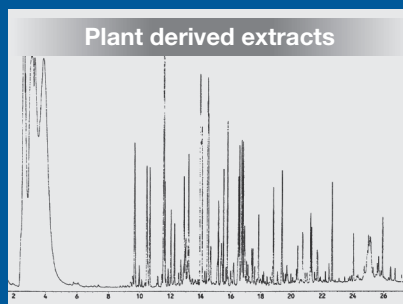
	Starter	Grower to slaughter
Broilers	100 - 150 mg/kg	50 - 100 mg/kg
Turkeys	100 - 150 mg/kg	50 - 100 mg/kg
Layers	50 - 100 mg/kg	

Supplementation levels should be adapted according to local conditions.

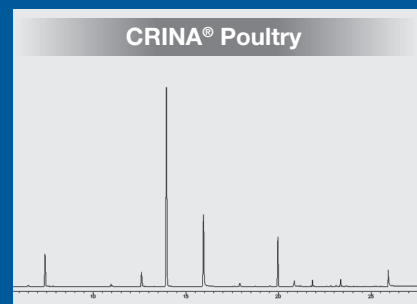
**CRINA® Poultry:** all active ingredients appear on the European community register of feed additives.

## DSM Quality you can trust

As market leader, DSM Nutritional Products constantly strives to maintain and advance its own high quality standards. The aim is not only to be the benchmark for the industry but also to give our customers the peace of mind that only comes with a superior quality supply.



Plant derived extracts can show high variation in composition. In addition seasonal variations can have a significant effect on purity.



With CRINA® Poultry we select the most promising compounds of high purity and combine them in a unique blend – adapted to animal needs.

**CRINA® Poultry** is part of the Eubiotic product portfolio of DSM Nutritional Products.

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