

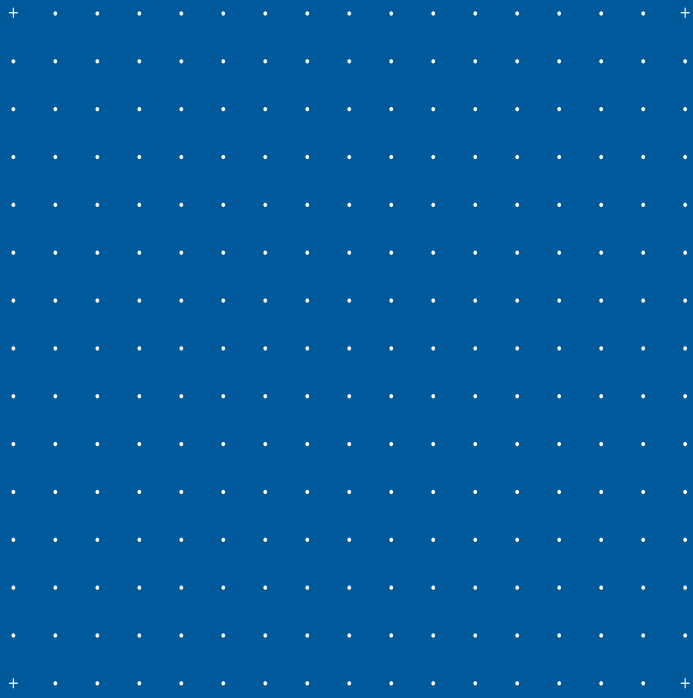
# CRINA<sup>®</sup> Ruminants

Essential oil compounds for ruminants

a **DSM** Product



**CRINA<sup>®</sup>**



# What is CRINA<sup>®</sup> Ruminants?

CRINA<sup>®</sup> Ruminants is a unique blend of natural and nature identical essential oil compounds. These are specially formulated into a dry powder which can be added to concentrates, mineral feeds or speciality products.

Essential oils have been used by man for centuries as fragrances, flavours and for their antimicrobial properties. More recently, it has been discovered that specific compounds have a valuable role in supporting the health and performance of livestock species.

CRINA<sup>®</sup> Ruminants modulates rumen fermentation, and trials show that it can increase milk production in dairy cows and liveweight gain in beef cattle.



**Reduces  
rate of protein  
degradation**

**Reduces  
rate of starch  
degradation**



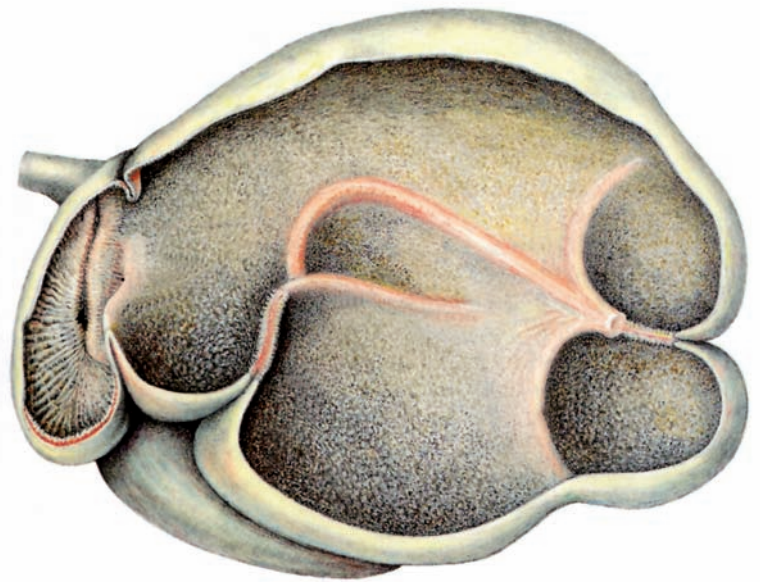
**IMPROVED  
RUMEN STABILITY  
AND FUNCTION**

# Rumen fine tuning for increased profitability

High yielding dairy cows and intensive beef cattle struggle to maintain an optimal rumen environment. Rumen acidosis is a frequent problem due to high starch diets. On pasture based systems, large intakes of soluble protein cause high rumen ammonia concentration. CRINA® Ruminants helps to fine tune rumen function by improving the efficiency of nitrogen and carbohydrate utilisation and feed conversion.

## Mode of action

- Selective effect on microbial attachment and colonisation of feed materials in the rumen
- Inhibition of Hyper Ammonia Producing (HAP) bacteria



## Rumen Fine Tuning

- Reduces the rate of protein and starch degradation
- Better synchrony between energy and protein degradation
- Modulates rumen environment:
  - > stabilises rumen pH
  - > reduces rumen ammonia concentration

## Increased profitability

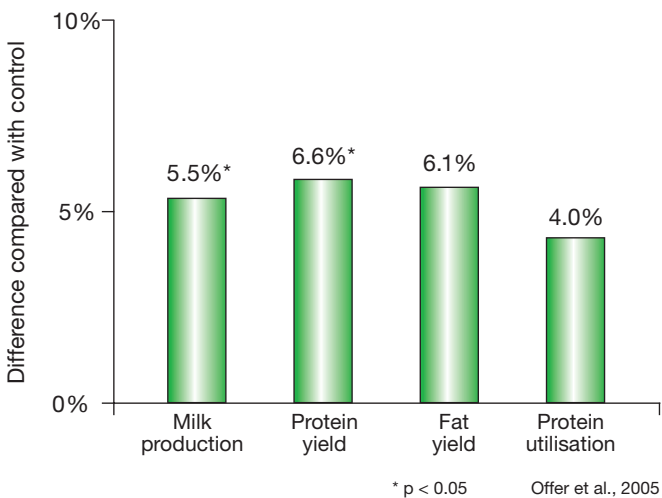
- Increased milk production and milk protein yield
- Increased liveweight gain
- Improved feed conversion
- More stable rumen conditions help contribute to cow health and longevity



# Trial results

## Dairy cows

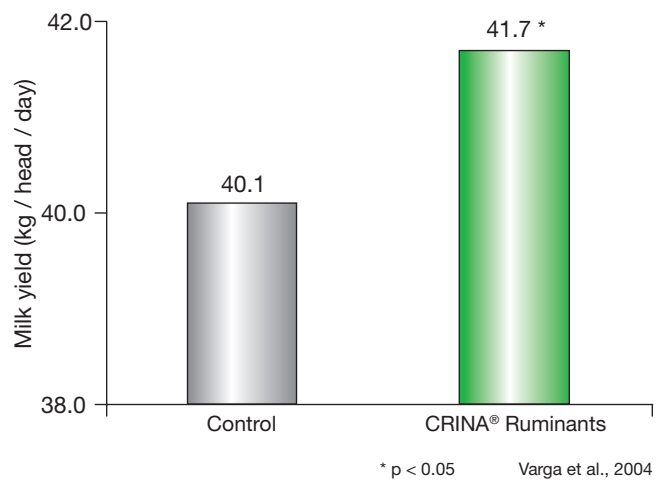
**CRINA® Ruminants significantly increases milk production and milk protein yield**



In a UK Study at the Scottish Agricultural College, cows fed a grass silage based diet were supplemented with 0 or 1 g/hd/g CRINA® Ruminants.

- CRINA® Ruminants significantly increased milk production by 1.7 kg
- Milk protein yield was significantly higher in the treatment group
- Feed intake was not significantly different between groups.
- The estimated improvement in conversion of feed to fat corrected milk was about 5%

**Increased lactation performance in dairy cows due to CRINA® Ruminants supplementation**

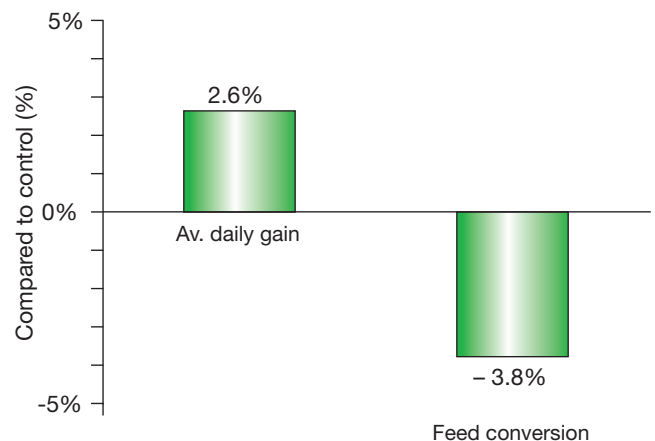


A Penn State University study on a 1200 cow commercial unit reported the following responses to 1.2 g/hd/d CRINA® Ruminants during the first 120 days of lactation:

- Milk production increased by 1.6 kg/hd/d
- No change in milk component concentration
- Increased protein and fat yield

## Beef cattle

**Increased liveweight gain and improved feed conversion efficiency in beef cattle due to CRINA® Ruminants AF\* supplementation**



A beef feedlot study by the University of Nebraska found that beef cattle supplemented with 1.0 g/hd CRINA® Ruminants AF\* for 115 days had:

- 2.6% greater daily liveweight gain compared with unsupplemented controls
- 3.8% improvement in feed conversion

(\* available in the US only)

# Economics

## Dairy Cows

Results from a series of research and commercial studies in Europe and the US show that CRINA® Ruminants supplementation increases milk production by about 1.5 kg per cow per day. This gives a return on investment of 9:1.

## Beef cattle

Feedlot studies with CRINA® Ruminants show that liveweight gain increases by about 3% and feed conversion efficiency improves by 4%, giving a return on investment of 2:1.

## Supplementation guidelines for CRINA® Ruminants

	g/head/day
Dairy Cow	1.0

	mg/100kg liveweight/day	Liveweight kg	mg/head/day
Beef Cattle	150 – 200	200	300 – 400
		400	600 – 800
		600	900 – 1200

	mg/head/day
Sheep and Goats	100

## Why DSM Nutritional Products?

DSM Nutritional Products is the world's leading supplier of vitamins, carotenoids, enzymes and eubiotics for the Animal Nutrition & Health (ANH) Industry, with a comprehensive range of value-added, branded product forms enabling efficient feed and food production. It has a unique and extensive network of dedicated premixture facilities world-wide. DSM Nutritional Products has its headquarters in Switzerland. DSM Nutritional Products adds value to the food chain through the provision of innovative solutions based on safety, traceability and quality, benefiting our customers, the consumer, the environment and animal welfare.



## Why CRINA®?

In 1980, CRINA®, then a private research centre for animal nutrition, recognised the significant role that essential oils could play as digestive stimulants in livestock production. Following extensive research, a range of precisely formulated and consistent blends of essential oil compounds, marketed under the CRINA® trademark, was developed. CRINA® Poultry, CRINA® Piglets, CRINA® Finishing Pigs and Sows stimulate superior feed digestibility and regulate gut microflora. CRINA® Ruminants reduces the rate of protein and starch breakdown in the rumen, as well as ruminal deamination and therefore increases rumen by-pass. All compounds used in CRINA® products are approved for feed and food and appear on the FEMA (Flavour and Extracts Manufacturers Association) and/or GRAS (Generally Recognised as Safe) listings.



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