

CinnaGar™ – Essential For Rumen Fermentation

The unique microbial ecosystem of the rumen allows cattle, sheep, and goats to utilize feed materials that have no value to other animals. However, this comes at a cost with the production of waste products such as methane and ammonia. Reducing the production of these waste products is a unique way to improve rumen efficiency. Recent studies have identified plant extracts that have this ability. The two most potent, derived from garlic and cinnamon, are the ingredients of **CINNAGAR**. A novel encapsulation technology allows us to deliver these ingredients into the rumen to improve the performance of ruminant livestock.

Plant Extracts

Plant extracts are natural volatile compounds obtained from plant products. They are either extracted by steam water distillation or by enzymatic activity followed by steam water distillation. Plant extracts contain active components that give the oils their properties. Currently, about 2,600 molecules have been identified in plant extracts, and some of these have been shown to favorably influence rumen fermentation. Plant extracts from garlic and cinnamon are of particular interest.

Benefits Of Garlic

In laboratory studies, garlic has been shown to inhibit the production of methane, saving energy that the cow can utilize for milk production and simultaneously limiting the emission of an important greenhouse gas. Lower methane production leads to an increase in the proportion of propionate in the mix of volatile fatty acids (VFA) produced by the rumen (Table 1). This is favorable to both milk yield and milk protein synthesis.

Table 1. Effects Of Garlic Oil On The Molar Proportion Of Acetate, Propionate, And Butyrate
(Busquet et al, 2005a) JDS 88; 2508

	Treatments (30 mg/L)	
	Control	Garlic
Total VFA, mM	123.1	124.9
Acetate, mol/100 mol	65.3 ^a	62.9 ^b
Propionate, mol/100 mol	17.3 ^a	18.3 ^b
Butyrate, mol/100 mol	13.1 ^a	14.3 ^b
^{a,b} means within a row with a different superscript differ (P < 0.05)		

Table 2. Effect Of Cinnamon On Protein Degradation
(Busquet et al 2005b) JDF 89:761

	Treatments (31.2 mg/L)	
	Control	Cinnamon
Ammonia N, mg/100 ml	21.5	18.5
Crude protein degradation, %	49.6	54.5
EMPS	27.6	30.6
EMPS = Efficiency of microbial protein synthesis (g/kg true organic matter digestibility)		

Benefits Of Cinnamon

Cinnamon slows down the breakdown of peptides and amino acids through its interaction with certain bacterial species. This results in an increased availability of peptides and amino acids, which stimulate the growth of many important rumen bacteria. The production of ammonia, a waste product and pollutant, is reduced. The net result is an increase in the synthesis of microbial protein (Table 2) and a reduction in the concentration of urea nitrogen in blood and milk.

Encapsulation – Protected Plant Extracts

The use of plant extracts in ruminants is very difficult due to the environment of the rumen, which can consume all plant extracts within minutes after feeding. Therefore, Vigortone now offers CINNAGAR: the active ingredients of garlic and cinnamon encapsulated by a patent-pending technique. The encapsulation ensures a slow release of CINNAGAR in the rumen to maximize its effect on the microbial flora. The encapsulation also protects the product against the evaporation of the volatile protected plant extracts during feed manufacture, storage, and use.

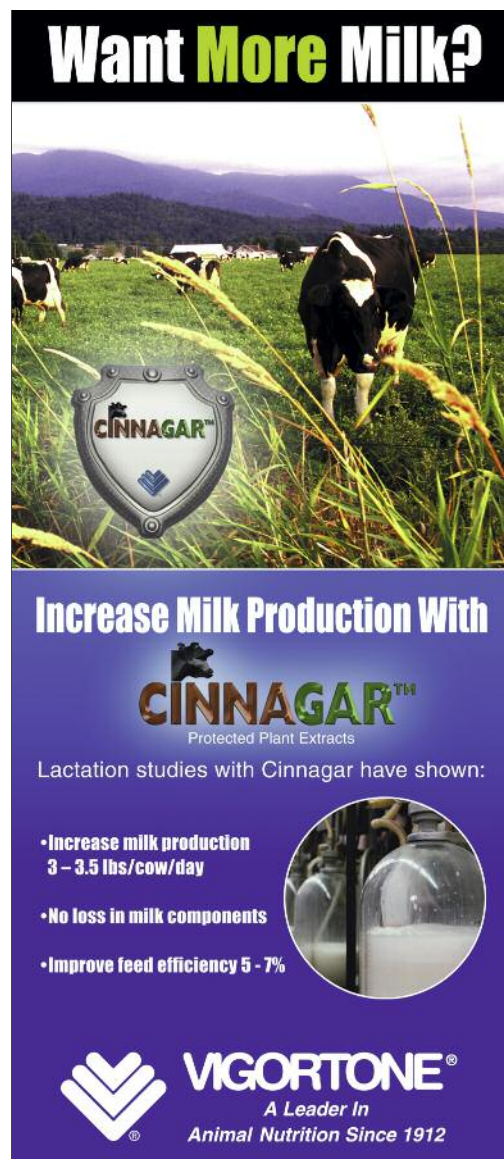
CINNAGAR In Practice

Vigortone field trials in three herds and 346 cows from Minnesota, Pennsylvania, and Wisconsin showed:

- 3.5 lb more milk
- Milk components unchanged
- Feed efficiency improved 5-7%

Studies in Italy and Switzerland showed:

- 2 lb and 3.9 lb milk increase



Want More Milk?

Increase Milk Production With

CINNAGAR™
Protected Plant Extracts

Lactation studies with CinnaGar have shown:

- Increase milk production 3 – 3.5 lbs/cow/day
- No loss in milk components
- Improve feed efficiency 5 - 7%

VIGORTONE®
A Leader In
Animal Nutrition Since 1912

CinnaGar™
(Protected Plant Extracts)