AnimaXx Premium

The real solution is always close to nature

RumenProtect

Highly efficient rumen buffer

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Natural-based calcified kelp powder

- **Strong buffer capacity**
- **Long-lasting buffering effect**
- **Low dosage required**

Content

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The natural buffer for ruminants

RumenProtect is a calcified seaweed powder that is fed as a slow release buffer to ruminants including dairy cows, beef cattle, calves, sheep and lambs. The unique physical structure of **RumenProtect** product has a large surface area.

RumenProtect is most active at rumen pH. With correct feed intake, it effectively prevents acidosis and improves digestion, which leads to improved feed conversion rate and production. This buffering effect is beneficial not only for the rumen, but also for maintaining the pH of the blood.

RumenProtect is an excellent organic source of calcium, magnesium and the necessary «essential trace elements» elements, as well as many other bioavailable trace elements. The minerals in **RumenProtect** result in a healthy rumen microflora and animals are more resistant to disease.

An excellent source of trace elements

RumenProtect is an excellent organic source of calcium, magnesium and many other bioavailable trace elements as well as essential trace elements.

To prevent acidosis

RumenProtect effectively prevents acidosis. Better digestion and feed utilization improves the health of the animals and increases their milk production.

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General benefits of RumenProtect

A RumenProtect "NATURALLY BETTER"

- 34% CALCIUM
- 2.4% MAGNESIUM
- 0.5% SODIUM
- 100% OF MARINE ORIGIN
- UNIQUE POROUS STRUCTURE
- OTHER ORGANIC MACRO MINERALS

The animal

- OPTIMUM INTESTINAL BUFFERING
- LONG EFFECT
- LOW INCLUSION RATE
- TASTY
- SAFE

Health

- PREVENTS ACIDOSIS
- SUPPORTS WELFARE
- STRENGTHENS THE IMMUNE SYSTEM
- INCREASE RESISTANCE AGAINST DISEASE
- PROVIDES ESSENTIAL TRACE ELEMENTS

Farmer manager

- IMPROVES PROFITS
- STRESS REDUCES

Calcium, magnesium and trace elements from 100% natural sources

Natural origin

Lithothamnium calcareum is a calcareous algae that is completely protected from all kinds of pollution. It grows in clean and not very deep waters (10-22 meters below sea level) with the support of photosynthesis, without strong currents. This algae can crystallize the minerals found in seawater, mainly calcium, but also significant amounts of magnesium, sulfur and many trace elements. Impregnation of its walls with calcium and other minerals results in a hard coral-like physical structure.

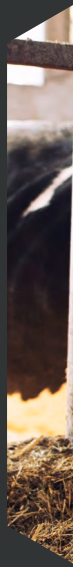
Macro minerals

Calcium and magnesium are two essential minerals for dairy cows. The lack of these minerals causes diseases. Calcium deficiency in young animals results in growth retardation and bone development abnormalities. The presence of highly available organic calcium and magnesium in RumenProtect helps to replace minerals lost during milk production, thereby avoiding a decrease in profitability. Magnesium and calcium in RumenProtect also provide excellent protection against grass tetany.

Trace elements

In addition to macrominerals, RumenProtect contains more than 30 organic trace elements. These trace elements are essential for proper digestion, metabolism and assimilation of feed.

The “essential trace elements” in RumenProtect help to strengthen the immune system and, as a result, enable better resistance to infections and viruses.



Guaranteed content:

Lithothamnium calcareum fossilized seaweed powder in fully carbonated form:

- 34% Calcium Ca (80% Calcium Carbonate)
- 2.4% Magnesium Mg (6% Magnesium Carbonate)
- 0.5% Sodium
- 0.04% Forsfor

And many trace elements are found in the product in ppm concentrations.

Properties:

Powder form, easy handling — Tasty — 100% natural — Non-hygroscopic (does not swell in steam, does not absorb water).

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Directions for use:

It should be mixed in ruminant feed at 0.5-2%, or 50-120 grams/animal/day to the existing feed dose.

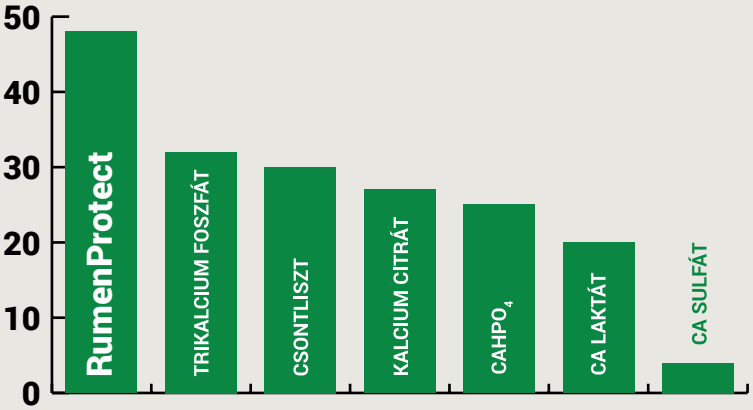
Macro minerals

RumenProtect's unique porous, honeycomb-like structure is quite different from inorganic calcium carbonate, which has a compact crystal structure. The specific surface area of **RumenProtect** is approximately 5.5 times greater than conventional calcium carbonates. This results in better absorption than conventional minerals, thus benefiting the animal to a greater extent.

High specific surface area, solubility and buffer capacity

Lithothamnium RumenProtect under the microscope

The surface area of 1gr RumenProtect > 8 m^2



Natural composition

Thanks to the natural composition (calcium, magnesium, trace elements, etc...) and the microporous structure, **RumenProtect** is able to neutralize the acids from the digestive system.

This results in a more sustainable, stable rumen pH. Here we are talking about a strong buffering capacity, with which an extremely effective preventive method of combating acidosis can be achieved.

Healthy rumen

Effect of acidosis in the rumen

To prevent acidosis

A rumen pH between 6.0 and 6.8 favors the growth of fiber-digesting bacteria, while a pH between 5.5 and 6.0 supports the growth of starch-digesting bacteria.

Thus, the high-producing cow must maintain a pH close to 6.0 for optimal growth of both bacterial populations, resulting in a favorable VFA composition and amount (volatile fatty acids).

The long-term effect of acidosis (formation of VFA in a greater than optimal amount and with a different composition) results in the reduction and possible destruction of the rumen papillae. This is an insidious process that reduces a cow's peak capacity, is costly and destroys productive cows that are valuable to the farmer. The use of RumenProtect at the recommended dose prevents this process.

Buffer capacity: RumenProtect is more effective than $NaHCO_3$

In vivo tests: comparison of RumenProtect and sodium bicarbonate (NaHCO3).

The buffering capacity of **RumenProtect** in lactating cows, its effect on rumen metabolic parameters with sodium bicarbonate was determined and compared in a 2006 experiment in a laboratory specialized in ruminant feeding.

Measurements

- Rumen pH (continuous measurement over 2 days)
- Rumen VFA (volatile fatty acids)
- Ruminal ammonia nitrogen
- Daily milk production and milk composition

Method

We investigated the effect of RumenProtect on the rumen pH of dairy cattle. In the experiment, exclusively Holstein cows were used. The cows were examined in a Latin square arrangement over three periods. The basic diet was specially designed by feeding with a high level of concentrate to test the effect of RumenProtect on buffer capacity. Some of the results of these tests are presented in the following tables.

Treatment 1: basal diet + 0.6% RumenProtect

Treatment 2: basal diet + 0.6% $NaHCO_3$ (Sodium bicarbonate)

The total experimental period was 63 days out of three 21-day periods. Each 21-day period consisted of a 14-day adjustment period and a 7-day data collection period.

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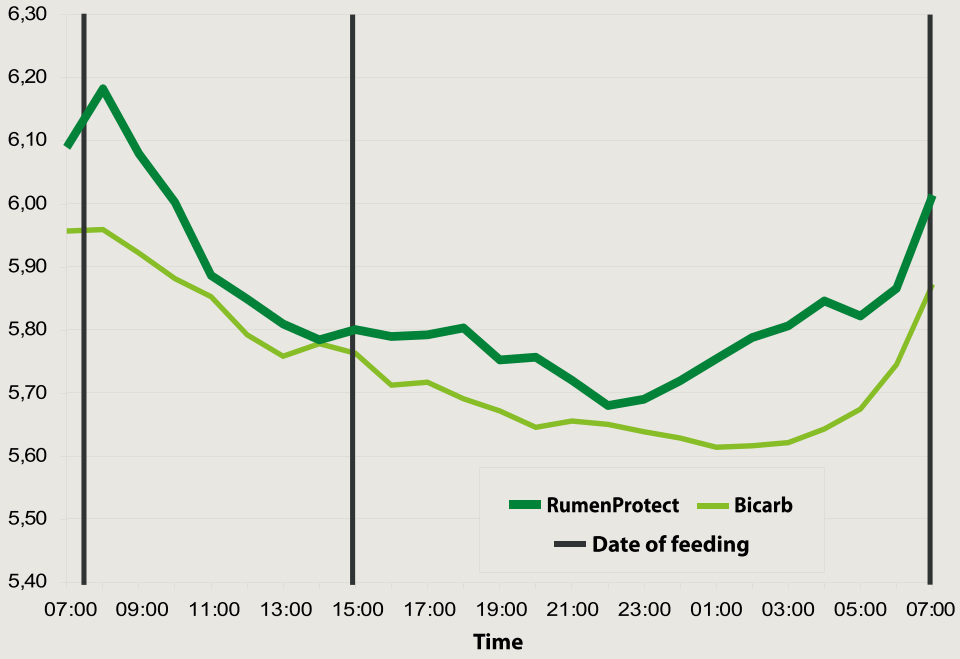
Effect of RumenProtect on rumen pH of dairy cattle



	RumenProtect	Na Bicarb
pH max	6.18	5.98
pH min	5.65	5.59
pH average	5.84	5.74
Hours< 5.7	2.70	12.0

As shown in the figure, the pH curve of the RumenProtect treatment ran above the bicarbonate curve throughout. Rumen pH in the early morning hours was much higher with **RumenProtect** feeding than with bicarbonate.

The pH remained below 5.7 much longer with Bicarb feeding than with **RumenProtect** feeding. This suggests that **RumenProtect** supports pH restoration more effectively than Na-bicarbonate.

The effect of RumenProtect on the production of volatile fatty acids, lactic acid and ammonia in the rumen

	RumenProtect	Na Bicarb
Acetic acid (mM/L)	**64.1**	67.3
Propionic acid (mM/L)	**22.3**	21.8
Butyric acid (mM/L)	**12.5**	12.7
Total VFA (mM/L)	**100.1**	105.4
Acetic acid (% in total)	**64,0**	63.8
Lactic acid (mM/L)	**1.89**	2.34
Rumen NH 3 (mM/L)	**17.7**	17.8

Perfect values

The values are at an acceptable level when the acetic acid is more than 60% of the molar fatty acid concentration.

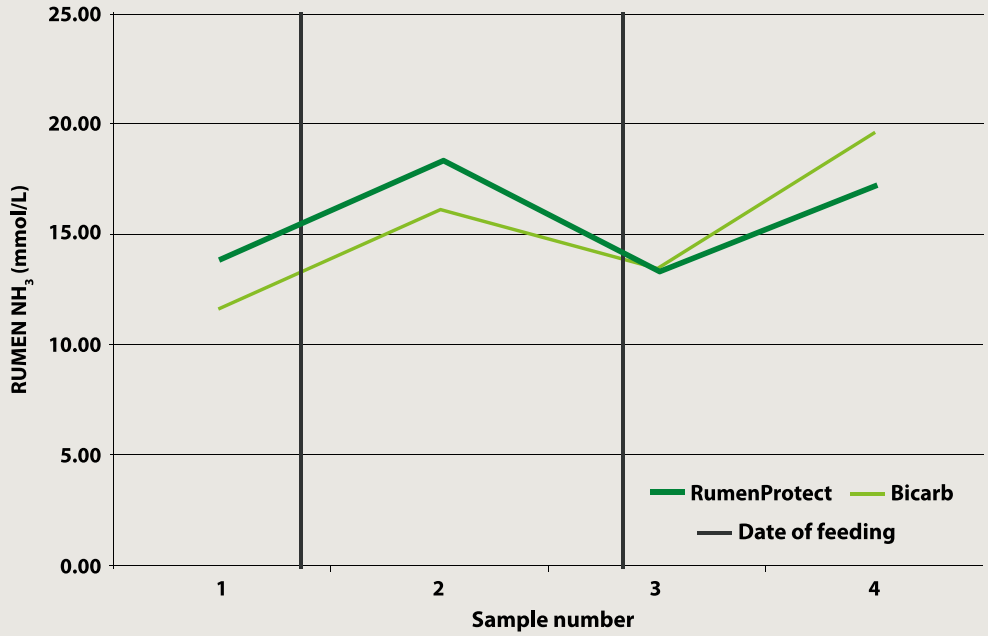
Total VFA values were at an acceptable level.

The effect of RumenProtect on the production of volatile fatty acids, lactic acid and ammonia in the rumen

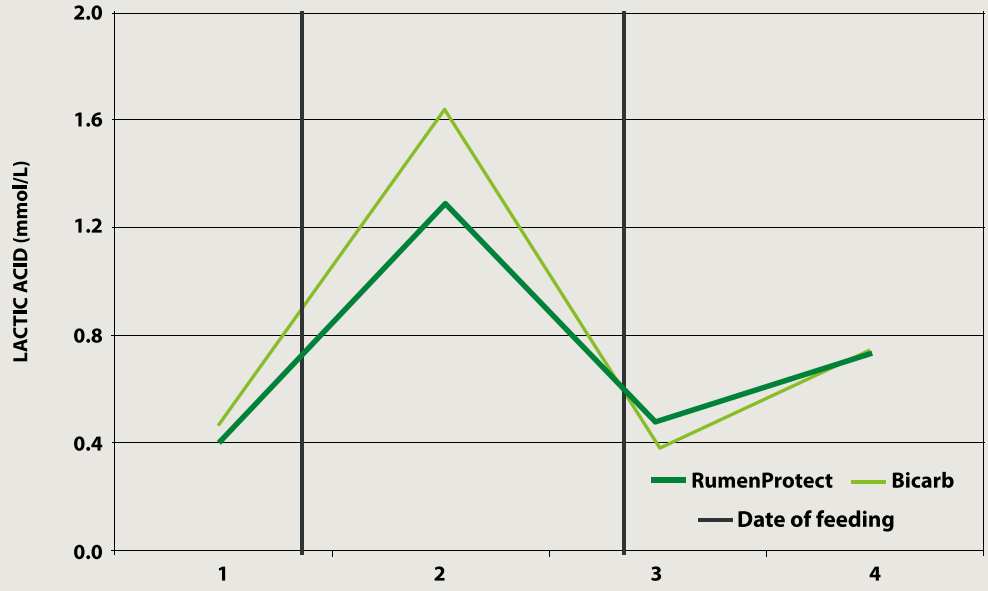
As shown in the figures on the right, the buffer capacity of the **RumenProtect** diet was sufficient to prevent lactic acid accumulation. Pre- and post-feeding values are at acceptable levels and support the growth of fibre-degrading bacteria.

These results show that **RumenProtect** supported the production of the optimum amount of NH_3 required for the growth of rumen fermenting bacteria.

Effect on rumen NH_3 concentration (mmol/liter)

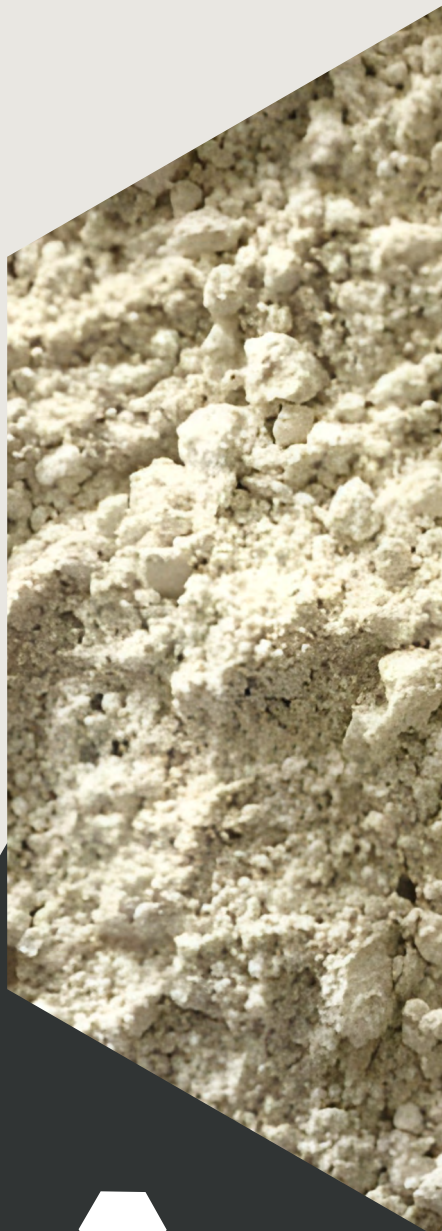


Effect on rumen LACTIC ACID concentration (mmol/liter)



The effect of RumenProtect on milk production and milk composition

	RumenProtect	Na Bicarb
Milk production (kg/day)	**33.2**[a]	25.2[b]
Milk fat (%)	**3.51**	3.37
Milk fat (kg/day)	**1.17**[a]	0.85[b]
Milk protein (%)	**3.06**	2.86
Milk protein (kg/day)	**1.02**[a]	0.72[b]
Lactose (%)	**4.87**	4.87
Lactose (kg/day)	**1.62**[a]	1.23[b]
Total d.m. (%)	**12.2**[a]	11.8[ab]
Total d.m. (kg/day)	**4.05**[a]	2.98[b]
Dry matter not fat (%)	**8.68**[a]	8.45[ab]
Dry matter not fat (kg/day)	**2.88**[a]	2.13[b]
Daily dm. intake (kg)	**23.8**	23.6



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Comparison

Milk fat, milk protein and lactose content (kg/day) were higher when **RumenProtect** was used than when $NaHCO_3$ was used as buffer. Total dry matter % and dry matter-non-fat % were higher when **RumenProtect** was used. Due to the significant effect of the treatment on milk yield, both the total d.m. and the d.m. - non-fat yield (kg/day) was higher in the **RumenProtect** treatment than in the $NaHCO_3$ treatment.

Increased milk production

It can be seen that when **RumenProtect** was added to the feed, milk production increased significantly compared to when $NaHCO_3$ was used as a buffer. The statistically different milk production indicators show that **RumenProtect** is a very good buffer and that using TMR without a buffer means milk loss. The observed differences in rumen pH do not fully explain the differences in milk production response.

It is assumed that the positive milk production results cannot be explained by **RumenProtect's** buffering capacity and effect on fatty acids alone. R**umenProtect** may have other effects on the rumen that have not yet been explored.

Conclusion

RRumenProtect is a highly effective buffer: mixed into concentrated feeds, it prevents subclinical acidosis and supports maximum milk production.

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