

FERMENTEN[®]

Rumen Fermentation Enhancer



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Research Summary

*Turning feed into additional profits
by enhancing rumen performance.*



ARM & HAMMER[®] Animal Nutrition Group
Innovative. Proven. Trusted.[™]

FERMENTEN® Rumen Fermentation Enhancer gets heifers off to a great start and lactating cows to a profitable finish. By providing amino acids, peptides and non-protein nitrogen, FERMENTEN® promotes increased microbial protein production.

FERMENTEN® Rumen Fermentation Enhancer:

- Promotes optimal rumen function
- Improves microbial bacterial growth
- Increases microbial protein output

Bottom line, FERMENTEN® leads to improved profitability for you.

New Research Announced.

Past research with FERMENTEN® showed improved rumen microbial protein production and increased rumen efficiency. However, the amount of readily fermentable carbohydrates in the diet contributed to the level of success when feeding FERMENTEN®. Our challenge was to:

- Determine how much microbial protein production had increased.
- Quantify the improvement in rumen efficiency.
- Identify a formula for calculating an ROI for feeding FERMENTEN® in lactating dairy cows.

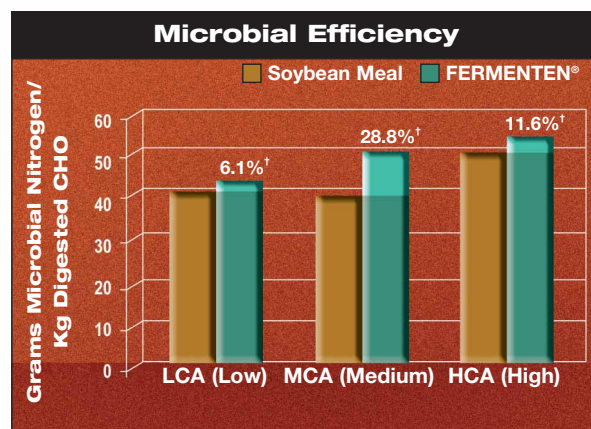
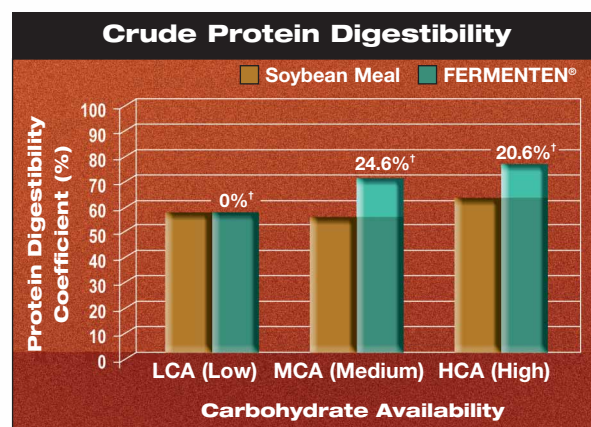
This research report summarizes the findings under both controlled laboratory settings and on-farm trials.

Using a laboratory study conducted at West Virginia University, we compared FERMENTEN® and soybean meal (SBM) at three different levels of rumen-available carbohydrates by substituting steam-flaked corn (SFC) for ground dry corn (GDC). Each ration contained the same level of non-fermentable carbohydrates and protein, but by adding steam-flaked corn to the ration, we could control the level of fermentable, or readily available, carbohydrates.

Diets were formulated using CPM Dairy and based on early lactation cows producing 100 lbs./day of milk at 3.7 percent fat and 2.95 percent protein. The following table represents ration formulations.

	Ground Dry Corn (%)	Steam-flaked Corn (%)
LCA Low Carbohydrate Availability	100	0
MCA Medium Carbohydrate Availability	80	20
HCA High Carbohydrate Availability	60	40

Results.



† Indicates % increase of FERMENTEN® over SBM.

- The addition of steam-flaked corn to a ration rapidly increased the level of available fermentable carbohydrates, enhancing the microbial output in the FERMENTEN® rations.
- More significantly, FERMENTEN® diets showed an increased rate and amount of crude protein digestion over diets containing only SBM.
- When FERMENTEN® was substituted for part of the SBM along with SFC, microbial protein production increased 20 percent.

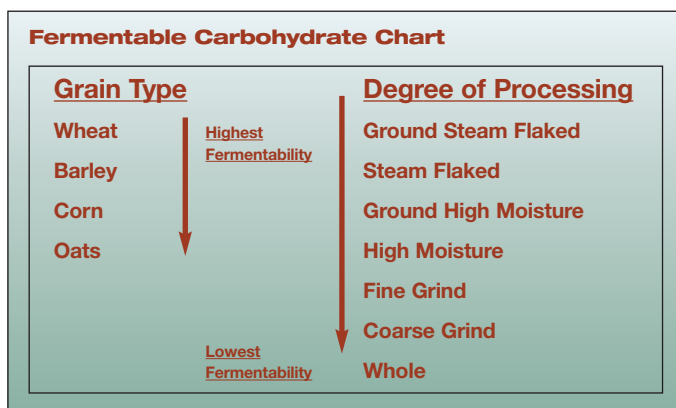


- Protein produced by rumen microbes has an optimal amino acid profile, which meets requirements for growth and milk production.
- More microbial protein production leads to improved feed efficiency, enhanced milk production and better milk components.

Fermentable Carbohydrate Availability.

The West Virginia University trial compared FERMENTEN® with soybean meal at varying levels of fermentable carbohydrates. However, steam-flaked corn is only one of several feed ingredients that supply readily available carbohydrates.

Relative carbohydrate fermentability is based on the combination of both the grain type and degree of processing.



Rumen microbes need energy from carbohydrates to grow efficiently. As more fermentable carbohydrates are added to the ration, available energy increases. This chart indicates a variety of carbohydrate sources and their relative fermentability. Ground steam-flaked wheat has the highest relative fermentability, which is higher than fine ground wheat and even whole wheat.

Seeing Results on the Farm.

Although research conducted under a controlled environment provides valuable information on rumen performance, producers often like to see results from more practical situations. So we tested FERMENTEN® under the most challenging nutritional conditions. FERMENTEN® was substituted for soybean meal on three dairies from across the country. These studies were formulated as a direct substitution—no other changes were made to the diets.

The first trial was conducted on more than 1,400 cows on a Southeastern dairy. The fermentable carbohydrates in the ration were similar to the medium carbohydrate availability (80 percent GDC, 20 percent SFC) used in the university study and FERMENTEN® was substituted for SBM at a rate of 1.6-2 lbs./cow/day. In the first 60 days, this producer saw significant increases in milk production:

- More than seven pounds of milk in first-calf heifers
- More than nine pounds in lactating cows

The second trial substituted FERMENTEN® at 1.5 lbs./cow/day. During this trial on a Western dairy operation, lactating cows increased milk production by more than six pounds per day over the trial period. The total carbohydrates in this ration were lower than in the first trial, and as a result, there were not enough carbohydrates available in the ration to generate the same milk response. The levels of metabolizable protein and energy also may have limited the milk response.

The third herd had ongoing challenges with rumen acidosis. However, we still saw an improvement in milk production with the direct substitution of FERMENTEN® for soybean meal—more than three pounds in first-lactation heifers and more than two pounds in lactating cows. By providing the right nutrients, FERMENTEN® helped improve the overall rumen environment for increased productivity.

FERMENTEN® Improves Milk Production, Increases Profit

	Trial #1	Trial #2	Trial #3
Milk/c/d			
Heifers	7.8		3.8
Cows	9.8	6.5	2.1
Revenue (\$)*	67,427 (90d)	1,303/d	2,745 (90d)

Even under varying conditions, FERMENTEN® generated an increase in milk production. In the first trial, we saw a significant increase in milk response and cows were fed a well-balanced ration. However, even under stressful nutritional conditions, trials two and three demonstrated 6.5- and 2.1-lb. increases in milk production, respectively.

The Bottom Line.

Return on investment is calculated by dividing income by the cost. The chart below indicates the return on investment for each trial. For example, in the first trial the producer calculated \$2.67 profit for every \$1.00 invested.

Return on Investment			
	Trial #1	Trial #2	Trial #3
Revenue (\$)*	67,427 (90d)	1,303/d	2,745 (90d)
Cost**	25,216	601	2,815
Return on Investment	\$2.67	\$2.20	\$0.96

* Milk price = \$0.10/lb.

** Assumes \$0.10/lb. for FERMENTEN® substitution, 1 lb. extra DMI needed to produce 3 lbs. more milk. One extra pound of DMI calculated at \$0.07.

The third trial showed a positive milk response. Other nutritional, environmental and management practices held the ROI to break-even.

FERMENTEN® and Improved Profitability.

In both university and field research trials, FERMENTEN® showed a positive correlation to rumen microbial output, especially when the fermentable carbohydrate fraction of the diet was highly

fermentable. The largest economic benefits can be seen when FERMENTEN® is used for its amino acid contribution, substituting for more expensive bypass protein sources in the ration.

- University trials showed a 20 percent increase in microbial protein production when FERMENTEN® was substituted for soybean meal in rations where the carbohydrate fraction of the diet was highly fermentable.
- In on-farm trials, cows fed FERMENTEN® increased their milk production by up to 10 lbs. of milk.
- When FERMENTEN® is used in rations as an amino acid supplement, return on investment can be as high as \$10 for every \$1 invested***

Since the FERMENTEN® response is highly dependent on rumen function and efficiency, careful attention should be paid to a herd's rumen buffer program. Although FERMENTEN® is not a quick fix for nutritional problems, when fed at the recommended levels, FERMENTEN® will help optimize rumen function and improve feed efficiency for increased milk production and milk protein.

Every dairy operation will vary in response when using FERMENTEN®. Enhanced microbial production may contribute to muscular and skeletal growth, milk production and milk protein. It may not be nutritionally possible to receive full responses in all categories.

Ask for it by name.



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*** As calculated by CPM Dairy. Recalculation based on relative cost of replacing bypass protein with FERMENTEN for amino acid supplementation.