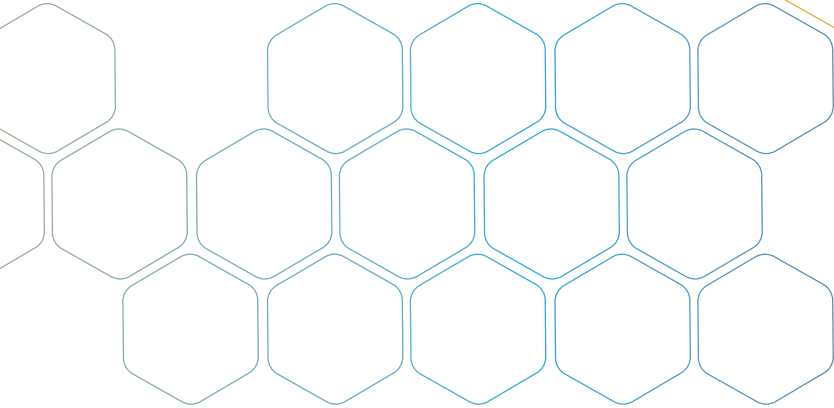
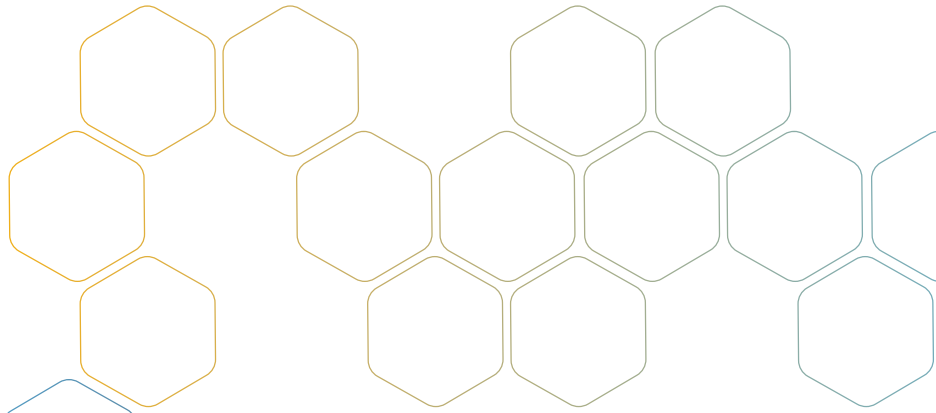




natural  
biologics®  
solutions by nature



# RUMINANT PRODUCT GUIDE

NATURAL SOLUTIONS TO  
BUILD HEALTHIER ANIMALS



## RUMINANT PRODUCTS



## YEAST CELL PROCESSING DIFFERENCES

# WHY AUTOLYSIS MATTERS

AAFCO doesn't distinguish between the different yeast "lysis" processes, but we know that process does make a difference. All Natural Biologics' "hydrolyzed" yeast is produced with a more natural endogenous hydrolysis process known as Autolysis.



PLAY VIDEO

### ► **What makes Autolysis different?**

It starts right from the yeast source. Autolysis requires high-quality live yeast, so our yeast products are produced in an ethanol plant co-located with the yeast autolysis facility. The live yeast are piped directly to the autolysis processing area, reducing any death loss from temperature fluctuations or extended time in transport. The ethanol fermentation process also results in a thicker cell wall, delivering more MOS and beta glucan in the final product.

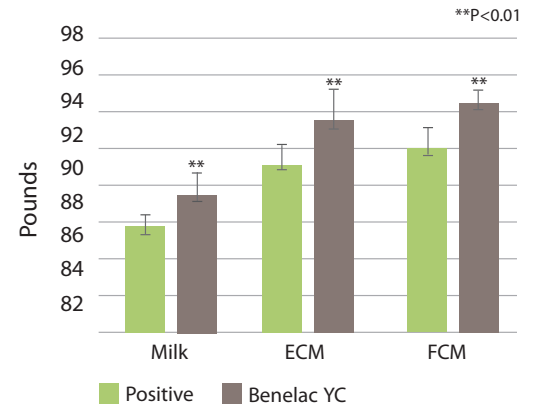
Autolysis uses the yeast cell's own metabolic processes to break the cell wall from the inside using just temperature, pH, and salt. This natural process delivers larger particles of MOS and beta glucan that are more resistant to microbial digestion, enhancing their ability to bind pathogens effectively. Autolyzed yeast also has a more concentrated bioactive content, using less buffering agent. This means better gut health and improved performance for your animals.

**Natural Processes from Natural Biologics**



- ▶ **Formulated without carrier for greater concentration of yeast cells, enzymes, peptides and nucleotides.**
- ▶ **Improves rumen stability and efficiency.**
- ▶ **Highly effective post-biotic factors.**

Figure 1. Milk Production Improvements with **Benelac® YC**



▶ **For Feeding Rates, see page 14.**

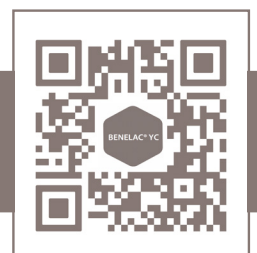
▶ **Product Description:**

Benelac YC is a 100% *Saccharomyces cerevisiae* yeast culture. The yeast cells and media on which the yeast is grown are harvested and dried directly, *without the addition of any carrier*. This means that all of the intrinsic and secreted growth factors, enzymes, peptides, nucleotides and other factors are present at much higher levels than in other yeast cultures.

Research shows that Benelac YC can be an effective feed supplement to aid in improving rumen health and yield of milk and solids, as well as overall profitability of dairy herds. Figure 1 shows milk production improvements in fresh cows. With a significantly lower cost than many yeast cultures on the market, Benelac YC can be a cost-effective alternative for improving your herd's bottom line.

	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	35.0%	43.0%
Crude fat	not less than	3.0%	10.0%
Crude fiber	not more than	9.0%	6.0%
Moisture	not more than	12.0%	8.0%
Ash	not more than	6.0%	4.0%

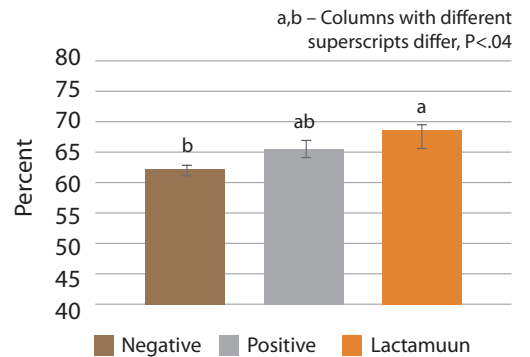
For more product details, visit [naturalbiologics.com/product/benelac-yc/](https://naturalbiologics.com/product/benelac-yc/)





- ▶ **MOS for effective pathogen-binding in the GI tract to reduce gut challenges.**
- ▶ **Algal and yeast beta glucan to improve immune response.**
- ▶ **Sarsaponin to disrupt rumen protozoa and improve nutrient availability.**

Figure 2. Organic Matter Digestion



▶ **For Feeding Rates, see page 14.**

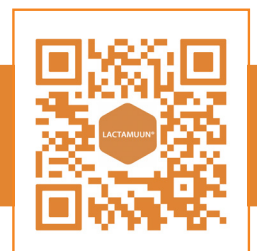
▶ **Product Description:**

Lactamuun is an all-natural, highly concentrated blend of yeast components, algae and yucca extract. This unique blend of complex carbohydrates and glycosides helps improve rumen efficiency and nutrient digestibility while increasing nitrogen retention and reducing methane production and gut pathogens. All of this works together to support overall immune function. Lactamuun blends active compounds from all-natural sources into a highly concentrated form.

Figure 2 shows that Lactamuun significantly stimulated organic matter digestion, indicating an increase in fermentation efficiency. Lactamuun can be a cost-effective, low-inclusion rate option to support lactation performance and health in dairy cows.

	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	32.0%	37.0%
Crude fat	not less than	1.5%	2.5%
Crude fiber	not more than	5.0%	4.0%
Moisture	not more than	10.0%	7.0%
Ash	not more than	8.0%	7.0%

For more product details, visit [naturalbiologics.com/product/lactamuun/](https://naturalbiologics.com/product/lactamuun/)





▶ For Feeding Rates, see page 14.

- ▶ **MOS for effective pathogen-binding in the GI tract to reduce gut challenges.**
- ▶ **Algal and yeast beta glucan to improve immune response.**
- ▶ **Sarsaponin to disrupt rumen protozoa and improve nutrient digestibility.**
- ▶ **Four *Bacillus* species to provide digestive enzymes, improve gut integrity and inhibit pathogens.**

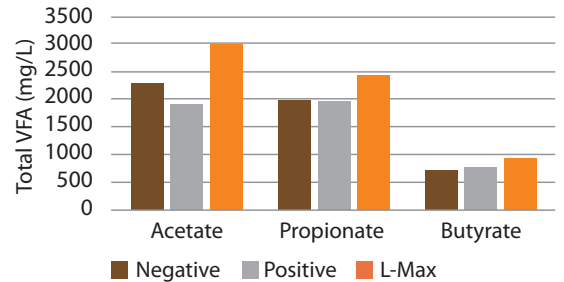
▶ **Product Description:**

L-Max is an all-natural, highly concentrated blend of natural bioactive compounds. This unique blend of complex carbohydrates, glycosides and microbial fermentation products helps improve rumen efficiency, nutrient digestibility and immune function while increasing nitrogen retention and reducing methane production and gut pathogens.

Figure 3 illustrates the combined impact of the yeast culture, anti-protozoal sarsaponins and prebiotic MOS on VFA production in the rumen, providing more energy substrates for the cow to enhance milk and component yields.

With the addition of four *Bacillus* species, L-Max reduces pathogen loads and enteric inflammation while enhancing nutrient digestion.

Figure 3. Total VFA Produced



	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	30.0%	35.0%
Crude fat	not less than	2.0%	4.0%
Crude fiber	not more than	3.5%	2.5%
Moisture	not more than	10.0%	7.0%
Ash	not more than	10.0%	7.0%

For more product details, visit [naturalbiologics.com/product/lmax/](https://naturalbiologics.com/product/lmax/)





▶ For Feeding Rates, see page 14.

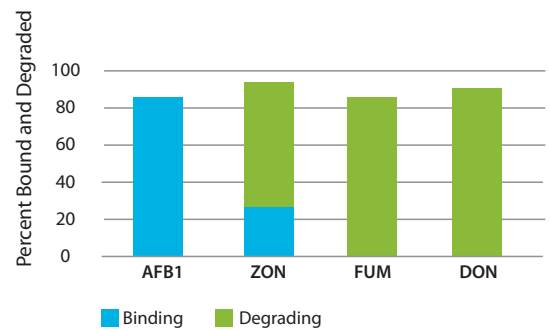
- ▶ **Proprietary formulation for broadest range of toxin binding and degrading capabilities.**
- ▶ **MOS for effective pathogen-binding in the GI tract to reduce gut challenges.**
- ▶ **Grape extract provides potent antioxidant capacity to aid in reducing oxidative stress.**
- ▶ **Algal beta glucan to improve immune response for overall animal health and productivity.**

▶ **Product Description:**

UltraDtox is an all-natural, highly concentrated proprietary formulation of refined bioactive carbohydrates, fermentation extracts and silicates proven to increase productivity and improve animal health by reducing the effects of endotoxins and mycotoxins.

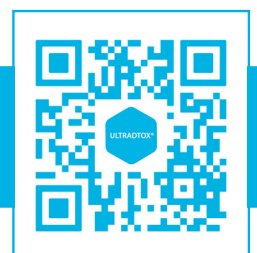
By combining the action of multiple binders with the activity of several enzymes, UltraDtox can neutralize many mycotoxins (Figure 4). Add in the pathogen binding from MOS, antioxidant effect from grape extract and immune modulation of concentrated beta glucan, and UltraDtox delivers comprehensive protection from mycotoxin, mold and pathogen challenges.

Figure 4. Relative Binding or Degrading of Mycotoxins



	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	14.0%	20.0%
Crude fat	not less than	1.0%	2.0%
Crude fiber	not more than	4.0%	1.5%
Moisture	not more than	10.0%	7.5%
Ash	not more than	49.0%	45.0%

For more product details, visit [naturalbiologics.com/product/ultradtox/](https://naturalbiologics.com/product/ultradtox/)





▶ **For Feeding Rates, see page 14.**

- ▶ **Epoxidases and esterases to reduce toxin loads.**
- ▶ **MOS to reduce pathogen loads in the gut.**
- ▶ **Algal beta glucan to support the immune system.**
- ▶ **Grape extract provides potent antioxidant capacity to aid in reducing oxidative stress.**
- ▶ **Four unique species of *Bacillus* to lower gut pathogens and improve digestive efficiency.**

▶ **Product Description:**

Dtox-Max is a concentrated version of UltraDtox with expanded capabilities. The toxin-degrading enzymes are still front and center to inactivate myco- and endotoxins in the gut. Sources of aluminosilicates are easy to come by, so we've removed those from Dtox-Max. In their place, we have added four unique *Bacillus* species, each delivering distinct benefits to the gut. High levels of MOS and beta glucan assist in lowering pathogen challenges and supporting the immune system.

We chose to include multiple *Bacillus* species because each has its own strengths. Some are active enzyme producers; some secrete potent bacteriocins. The table in Figure 5 shows the susceptibilities of different pathogens to different species of *Bacillus*. In addition, each species will produce different enzymes which aid in nutrient digestibility.

Figure 5. *Bacillus* Comparison for Ruminants

Criteria	<i>B. subtilis</i>	<i>B. amyloliquefaciens</i>	<i>B. lichniformis</i>	<i>B. pumilus</i>
Growth Performance	★★★★☆	★★★★★	★★★★☆	★★★★☆
Feed Efficiency	★★★★☆	★★★★★	★★★★☆	★★★★☆
Fiber Digestion	★★★☆☆	★★★★☆	★★★☆☆	★★★★★
Methane Reduction	★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆
Gut Health & Immunity	★★★★★	★★★★★	★★★★☆	★★★★☆
Enzyme Production	★★★★☆	★★★★★	★★★★☆	★★★★★
Pathogen Control	★★★★★	★★★★☆	★★★★★	★★★★☆

	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	20.0%	27.0%
Crude fat	not less than	0.5%	1.5%
Crude fiber	not more than	4.0%	1.5%
Moisture	not more than	10.0%	7.0%
Ash	not more than	34.0%	24.5%

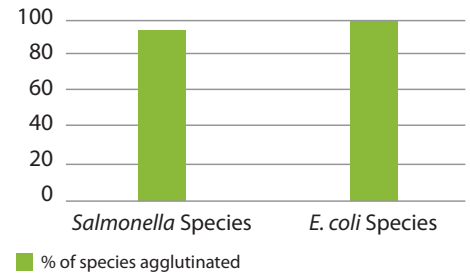
For more product details, visit [naturalbiologics.com/product/dtox-max/](https://naturalbiologics.com/product/dtox-max/)





- ▶ **MOS for effective pathogen-binding in the GI tract to reduce gut challenges.**
- ▶ **Yeast beta glucan to improve immune response.**
- ▶ **Concentrated yeast culture for efficient rumen function.**
- ▶ **Positively modulate the gut microbiome.**

Figure 6. Binding Effectiveness Against Pathogens



▶ **For Feeding Rates, see page 14.**

▶ **Product Description:**

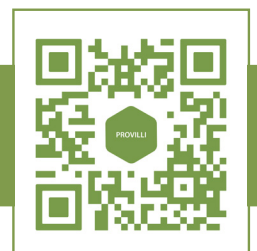
Provilli is an all-natural, highly concentrated blend of yeast components. This unique blend of complex carbohydrates and yeast culture metabolites helps improve rumen efficiency and nutrient digestibility while reducing gut pathogens and supporting immune function.

As a concentrated yeast culture, Provilli is an excellent source of amino acids, nucleotides, enzymes, MOS and beta glucan and is proven to bind 95% to 100% of the different strains of *Salmonella* and *E. coli* evaluated. In the animal, this prevents the pathogens from attaching to the gut lining and establishing an infection.

Figure 6 shows the binding efficacy against different strains of *Salmonella* and *E. coli*. Abundant nucleotides support rapid development of tissue, particularly in animals with high growth rates.

	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	35.0%	41.0%
Crude fat	not less than	2.0%	4.0%
Crude fiber	not more than	6.0%	3.0%
Moisture	not more than	10.0%	6.0%
Ash	not more than	8.0%	6.0%

For more product details, visit [naturalbiologics.com/product/provilli/](https://naturalbiologics.com/product/provilli/)





► **For Feeding Rates, see page 14.**

- **Highly concentrated yeast culture for increased nutrient digestibility and positive microbiome modulation.**
- **Autolyzed yeast as a rich source of MOS for enhanced pathogen-binding to protect against infection and nucleotides to support rapidly growing tissues.**
- **Multiple species of *Bacillus* for improved nutrient digestion and gut pathogen mitigation.**

► **Product Description:**

Provilli-Max is an all-natural, highly concentrated product derived from *Saccharomyces cerevisiae*, including yeast culture and autolyzed yeast (see page 2 to learn about the autolysis process), and multiple species of *Bacillus*. These *Bacillus* species (Figure 7) were selected for their ability to mitigate challenges from pathogenic *Clostridia*, *Staphylococcus*, *E. coli* and *Salmonella*. In particular, *Bacillus subtilis* has been shown to be a potent inhibitor of *Clostridium perfringens* types A and E in livestock. The selected *Bacillus* strains have also been proven to be strong producers of amylase, protease and cellulase to improve nutrient digestion and animal performance. Together, these components provide a cost-effective solution to improve gut health, nutrient absorption and animal health.

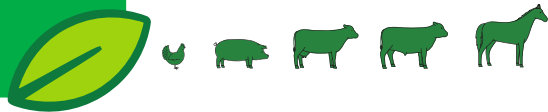
Figure 7. *Bacillus* Comparison for Ruminants

Criteria	<i>B. subtilis</i>	<i>B. amyloliquefaciens</i>	<i>B. licheniformis</i>	<i>B. pumilus</i>
Growth Performance	★★★★☆	★★★★★	★★★★☆	★★★★☆
Feed Efficiency	★★★★☆	★★★★★	★★★★☆	★★★★☆
Fiber Digestion	★★★☆☆	★★★★☆	★★★☆☆	★★★★★
Methane Reduction	★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆
Gut Health & Immunity	★★★★★	★★★★★	★★★★☆	★★★★☆
Enzyme Production	★★★★☆	★★★★★	★★★★☆	★★★★★
Pathogen Control	★★★★★	★★★★☆	★★★★★	★★★★☆

	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	35.0%	41.0%
Crude fat	not less than	2.0%	4.0%
Crude fiber	not more than	6.0%	2.5%
Moisture	not more than	10.0%	7.0%
Ash	not more than	9.0%	7.5%

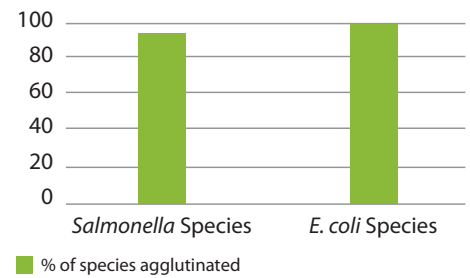
For more product details, visit [naturalbiologics.com/product/provilli-max/](https://naturalbiologics.com/product/provilli-max/)





- ▶ **Highly concentrated source of prebiotics.**
- ▶ **MOS for effective pathogen-binding to prevent colonization.**
- ▶ **Rich source of nucleotides to support rapid tissue growth.**
- ▶ **Yeast beta glucan to support robust immune responses.**

Figure 8. Binding Effectiveness Against Pathogens



▶ **For Feeding Rates, see page 14.**

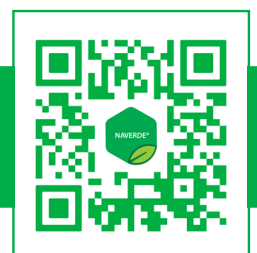
▶ **Product Description:**

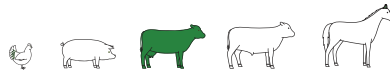
Naverde is a USDA certified organic product, rich in yeast oligosaccharides, nucleotides and other prebiotic compounds. Its high levels of MOS and beta glucan work together to reduce the pathogen load in the gut, feed the beneficial microbiota and support a robust immune system. Figure 8 shows the binding efficacy against different strains of *Salmonella* and *E. coli*. Abundant nucleotides support rapid development of tissue, particularly in animals with high growth rates.

Developed with similar components to other yeast products in the Natural Biologics' line, Naverde delivers superior efficacy and results in an organic package.

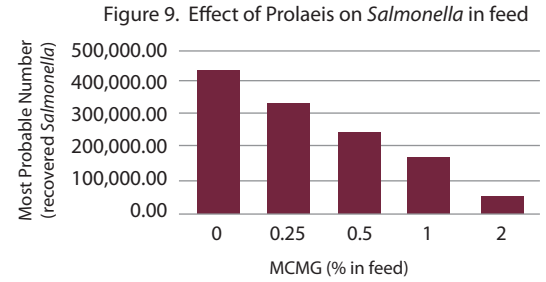
	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	35.0%	42.0%
Crude fat	not less than	0.5%	1.0%
Crude fiber	not more than	4.0%	1.0%
Moisture	not more than	10.0%	8.0%
Ash	not more than	9.0%	7.0%

For more product details, visit [naturalbiologics.com/product/naverde/](https://naturalbiologics.com/product/naverde/)





- ▶ **Monoglycerides significantly reduce infective loads of lipid-membraned viruses.**
- ▶ **Reduces challenges from gram-positive pathogens like Pneumococci, Staph. and Strep.**
- ▶ **Reduces inflammation, allowing energy to be used for more productive processes.**



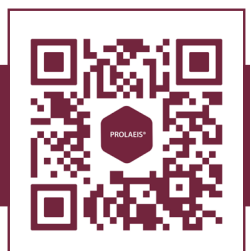
▶ **For Feeding Rates, see page 14.**

▶ **Product Description:**

Prolaeis is a highly refined form of medium-chain monoglycerides (MCMG) which are known to be effective at disrupting the membranes of various microbial and viral pathogens. As a broad spectrum mitigant, Prolaeis is 20X more potent than medium-chain fatty acids at reducing the load of infective pathogens. Prolaeis also has anti-inflammatory activity which can prevent the diversion of nutrients to fuel inflammation, making them available for more productive uses such as growth, lactation or gestation.

Guaranteed Analysis	
Total Fatty Acids (Minimum)	98.0%
Free Fatty Acids (Maximum)	1.0%
Unsaponifiable Matter (Maximum)	1.0%
Insoluble Impurities (Maximum)	1.0%
Moisture (Maximum)	1.0%

For more product details, visit [naturalbiologics.com/product/prolaeis/](https://naturalbiologics.com/product/prolaeis/)





► For Feeding Rates, see page 14.

► MOS for effective pathogen binding in the GI tract to reduce intestinal challenges.

► Beta glucan to support a robust immune response.

► Readily available nucleotides to support rapidly growing tissues.

► **Product Description:**

Proverde is an all-natural blend of autolyzed yeast and highly concentrated yeast cell wall. The autolysis process delivers larger MOS and bet glucan particles – perfect for resisting digestion by gut microbes.

Proverde is also available in a liquid formulation. Proverde Liquid delivers all the gut health and immune system benefits in a more convenient form and can be used in feed, drinking water or direct dosing for any animal.

Figure 10. Proverde Yeast Analysis

Product	MOS %	Beta Glucan %
Proverde	16.2%	17.5%
Commercial B	6.2%	11.7%
Commercial C	9.6%	8.5%

\* Analysis on yeast "concentrate" portion of Proverde Liquid vs dry powder products. Analyses completed at the Complex Carbohydrate Research Center at the University of Georgia, USA\*

Proverde	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	30.0%	37.0%
Crude fat	not less than	0.5%	1.0%
Crude fiber	not more than	3.0%	1.0%
Moisture	not more than	10.0%	6.0%
Ash	not more than	9.0%	7.0%

Proverde Liquid	Guaranteed Analysis		Typical Analysis
Crude protein	minimum	6.0%	8.4%
Moisture	maximum	83.0%	80.1%

For more product details, visit [naturalbiologics.com/product/proverde/](https://naturalbiologics.com/product/proverde/)





► For Feeding Rates, see page 14.

- MOS for effective pathogen binding in the GI tract to reduce intestinal challenges.
- Beta glucan to support a robust immune response.
- Readily available nucleotides to support rapidly growing tissues.
- Multiple species of *Bacillus* for improved nutrient digestion and pathogen inhibition.

► **Product Description:**

Proverde-Max is an all-natural blend of autolyzed yeast (see page 2 to learn about the autolysis process) and highly concentrated yeast cell wall. The unique blend of complex carbohydrates, nucleotides and peptides reduces enteric pathogen challenges, improves digestive efficiency, supports the immune system and lowers gut inflammation. Proverde-Max incorporates multiple species of *Bacillus* to enhance gut health and stimulate development of a healthy microbiota. As an endospore-forming bacteria, *Bacillus* is very resilient in many different feed applications.

Figure 11. *Bacillus* Comparison for Ruminants

Criteria	B. subtilis	B. amyloliquefaciens	B. lichniformis	B. pumilus
Growth Performance	★★★★☆	★★★★★	★★★★☆	★★★★☆
Feed Efficiency	★★★★☆	★★★★★	★★★★☆	★★★★☆
Fiber Digestion	★★★☆☆	★★★★☆	★★★☆☆	★★★★★
Methane Reduction	★★★★☆	★★☆☆☆	★★☆☆☆	★★☆☆☆
Gut Health & Immunity	★★★★★	★★★★★	★★★★☆	★★★★☆
Enzyme Production	★★★★☆	★★★★★	★★★★☆	★★★★★
Pathogen Control	★★★★★	★★★★☆	★★★★★	★★★★☆

	Guaranteed Analysis		Typical Analysis
Crude protein	not less than	30.0%	37.0%
Crude fat	not less than	0.5%	1.0%
Crude fiber	not more than	3.0%	1.0%
Moisture	not more than	10.0%	6.0%
Ash	not more than	9.0%	7.0%

For more product details, visit [naturalbiologics.com/product/proverde-max/](https://naturalbiologics.com/product/proverde-max/)



# FEEDING RECOMMENDATIONS GRAMS/HEAD/DAY

	DAIRY CATTLE					BEEF CATTLE						SHEEP/GOATS			
Feeding Rates. g/head/day	Calves	Growing Heifers	Pregnant Heifers	Dry/ Prefresh	Lactating	Calves	Receiving Calves	Stocker/ Back- grounder	Grower	Finishers	Brood	Kids	Bummers	Grower/ Finisher	Lactating
<b>BENELAC® YC</b>		4	6	9	7		7	4	6	7	4		1	2	2
<b>LACTAMUUN®</b>	1	3	4	8	5	1	6	3	4	4	4	1	2	2	2
<b>L-MAX®</b>		3	4	8	6	1	6	3	4	4	4	1	2	2	2
<b>OPTIWEAN®</b>	2-4														
<b>ULTRADTOX®</b>		10	10-20	10-20	10-20										
<b>DTOX-MAX™</b>		5	6	11	7										
<b>PROVILLI</b>	1	2	3	6	3	1	3	1	2	4	3	0.5	1	1	1.5
<b>PROVILLI-MAX</b>	1	2	3	6	4	1	3	1	2	4	3	0.5	1	1	1.5
<b>NAVERDE®</b>	1	2	2	4	3	1	3	1	2	4	3	0.5	1	1	1.5
<b>PROVERDE</b>	1	2	2	4	3	1	3	1	2	4	3	0.5	1	1	1.5
<b>PROVERDE LIQUID</b> mL/head/day	5-10	6-12	8-14	12-24	12-24	5-10	15-25	15-25	20-30	20-30	12-24				
<b>PROVERDE-MAX</b>	1-2	2	3	6	4		4	2	3	4	3	0.5	1	1	1.5
<b>PROLAEIS®</b>	4	10	*	*	*		8								

*\* Consult with your Natural Biologics representative for most current recommendations*

## CONVERSION CHART

Grams	Ounces	Pounds	Grams	Ounces	Pounds
1	0.035	0.002	6	0.211	0.013
2	0.070	0.004	7	0.247	0.015
3	0.106	0.007	8	0.282	0.018
4	1.141	0.009	9	0.317	0.020
5	0.176	0.011	10	0.352	0.022

# GETTING MORE FROM THE FULL PORTFOLIO OF NATURAL BIOLOGICS PRODUCTS:

	Nucleotide	Pathogen Agglut.	Inorg. Toxin Binding	Toxin Degrad.	Immune Modul.	Passive Immunity	Prebiotic	Anti-Protozoal	Nutrient Digest.	Pathogen Mitigation	Antiviral
BENELAC® YC	Hexagon				Hexagon		Hexagon		Hexagon		
LACTAMUUN®	Hexagon	Hexagon			Hexagon		Hexagon	Hexagon	Hexagon		
L-MAX®	Hexagon	Hexagon			Hexagon		Hexagon	Hexagon	Hexagon	Hexagon	
OPTIWEAN®	Hexagon	Hexagon			Hexagon	Hexagon	Hexagon	Hexagon			
ULTRADTOX®	Hexagon	Hexagon	Hexagon	Hexagon	Hexagon		Hexagon	Hexagon			
DTOX-MAX™	Hexagon	Hexagon		Hexagon	Hexagon		Hexagon			Hexagon	
PROVILLI	Hexagon	Hexagon			Hexagon		Hexagon		Hexagon		
PROVILLI-MAX	Hexagon	Hexagon			Hexagon		Hexagon		Hexagon	Hexagon	
NAVERDE®	Hexagon	Hexagon			Hexagon		Hexagon				
PROVERDE	Hexagon	Hexagon			Hexagon		Hexagon			Hexagon	
PROVERDE LIQUID	Hexagon	Hexagon			Hexagon		Hexagon			Hexagon	
PROVERDE-MAX	Hexagon	Hexagon			Hexagon		Hexagon			Hexagon	
PROLAEIS®					Hexagon						Hexagon
PROGLENA®					Hexagon						
PROCILLUS		Hexagon			Hexagon				Hexagon	Hexagon	

# OUR THREE PILLARS



## INTEGRITY

Personally, professionally and scientifically, we will always conduct ourselves with the highest principles and transparency.

## PARTNERSHIP

Our strength is in the lasting relationships we develop with our customers, suppliers and employees. This leads to flexibility and responsiveness to the needs of the industries we serve.

## INNOVATION

Never settling for the status quo, we will encourage exploration, critical inquiry, flexibility and responsiveness to the needs of our customers and industry.



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