



**INTAKE AND
DIGESTIBILITY...
MY SECRET FOR GREAT
MILK PRODUCTION!**

ORIGINAL
XPC™

**Feed the bugs.
Fill the tanks.™**



BETTER INTAKE AND DIGESTIBILITY

FEEDWORKS
"Performance through Science"

 **Diamond V**[®]
The Trusted Experts In Nutrition & Health™

For more information, contact Feedworks at +61 (03) 5429 2411

FDA | Dry Matter Intake Claim

**FDA
Reviewed
and
Accepted**

**SUPPORTS
DMI**

NEW

FAR-REACHING BENEFITS OF INCREASING DMI

Milk Production

Together, DMI and the diet's net energy concentration determine the cow's total energy intake. Because energy intake is the primary driver of milk yield in the first 70 days postpartum (when milk production increases rapidly), the inclusion of the Diamond V Original Product in the TMR supports her metabolic demands when she needs it most.

Increases in DMI during early lactation are associated with:

- Reducing the impact and severity of negative energy balance (NEB) around calving
- Improved liver function leading to increased availability and conversion of propionate to glucose, a key driver of milk synthesis
- Higher Peak Milks
- Increases in total lactation milk production

Reproductive Performance

Reproduction efficiency improves when energy intake is sufficient during early lactation:

- Shorter intervals to first ovulation and first estrus
- Reduced incidence of silent estrus
- Higher first service conception rates
- Fewer days open
- Shorter calving intervals

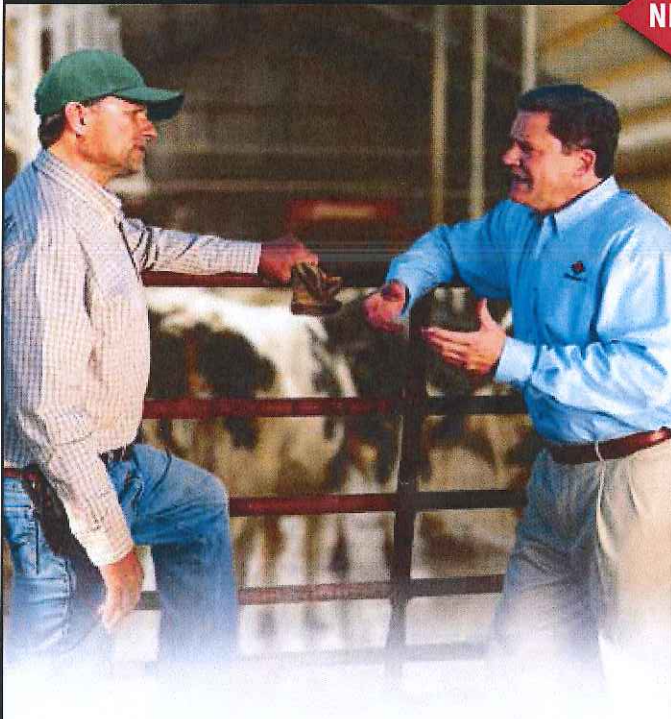
Cow Health

Hundreds of research studies have demonstrated the benefits of higher DMI in early lactation. Increasing DMI has a profound impact on overall cow health by reducing the incidence of metabolic disease during this critical phase of the production cycle. This increase helps alleviate excessive body fat mobilisation, thus reducing both the incidence and severity of metabolic disorders most often encountered in early lactation.*

Profitability

When it comes to making money, top dairies rely on the very best products to assist them in their quest to optimise milk production, achieve reproductive success and promote healthy herds. They demand Diamond V Original Product be included as part of their overall feeding program to maximise Income Over Feed Cost (IOFC) 365 days a year.

*Metabolic disorders associated with early lactation include Milk Fever, Retained Placenta, Metritis, Displaced Abomasum, Mastitis and SARA (Sub-Acute Ruminant Acidosis).



“Helps support the dry matter intake of dairy cows when fed as part of a total mixed ration during the first 70 days of lactation.”

FDA FUNCTIONAL CLAIM

Functional claims relate to the effect of a nutrient, ingredient, or feed to the body's function. A product with a functional claim is not intended to diagnose, treat, cure or prevent a disease. The U.S. Food and Drug Administration's (FDA) position is that functional claims for feeds must be based on the component's taste, aroma or nutritive value (reference: CVM Guide 1240.3605). For example: "Diamond V Original Product supports dry matter intake".

ONLY DIAMOND V

Only Diamond V, from among all the companies in its category of the feed industry, has a product with a FDA functional claim for DMI.

SIGNIFICANCE

Dairy nutritionists and producers now have more proof of the critical role the Diamond V Original Product plays in supporting dry matter intake (DMI) during the early lactation phase.



Who is Diamond V?

A Nutrition & Health Company

Diamond V is a global company that manufactures all-natural products to improve animal performance.

We connect our unique competencies in microbial-based fermentation technologies with our specie specific expertise and world-class research to create profitable solutions for customers around the world.

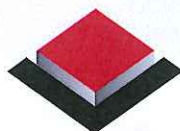
Additionally, our human business segment focuses fermentation technologies on human health.

Our Brand Promise

The Trusted Experts In Nutrition & Health™

This is our commitment and promise to the world...

- *Creating innovative products to meet the current and future needs of industry*
- *Building relationships that result in partnerships*
- *Transferring knowledge to achieve sustainable profitable solutions for our customers*



Diamond V®

The Trusted Experts In Nutrition & Health™



Frequently Asked Questions

What is Original XPC¹?

Original XPC is an all-natural, fermentation-based feed additive used in all classes of livestock, poultry, equine and pet diets.

Why is it unique?

Original XPC is not a single compound, but rather a fermentation product composed of numerous beneficial metabolites (proteins, peptides, antioxidants, phytosterols, organic acids and nucleotides) together with betaglucans and mannans to support animal health and performance.

How is it made?

Since 1943, Diamond V has been leading the industry in microbial-based fermentation research and technology innovation. The bioactive components in Original XPC are produced using our proprietary anaerobic fermentation technology of *Saccharomyces cerevisiae*. This closely guarded fermentation process produces unique metabolites that provide beneficial health effects and cannot be replicated outside of Diamond V.

How does Original XPC work?

The unique metabolites in Original XPC support robust digestive health by balancing rumen microbiota and optimising rumen environment. The prebiotic-like activity of Original XPC helps promote a healthy balance of bacteria in the rumen and optimise rumen function.

Is Original XPC safe?

Yes, the product is safe to be fed to all animals. It is generally Recognized As Safe (GRAS) by the U.S. Food and Drug administration.

How stable is Original XPC?

Because Original XPC is a fully fermented product, it is very stable. The effectiveness of the bioactives is not compromised by extreme temperature or processing.

How does Original XPC differ from other products in it's category?

Original XPC is not a single compound as are many functional ingredient products in the marketplace. But, rather a fermentation product composed of numerous beneficial metabolites (proteins, peptides, antioxidants, phytosterols, organic acids and nucleotides) together with beta-glucans and mannans to support animal health and performance.

Is Original XPC a live yeast product?

NO. Diamond V Original XPC is a unique *Saccharomyces cerevisiae* fermentation product.

Is Original XPC the same as mannan oligosacchride (MOS) or beta-glucan products?

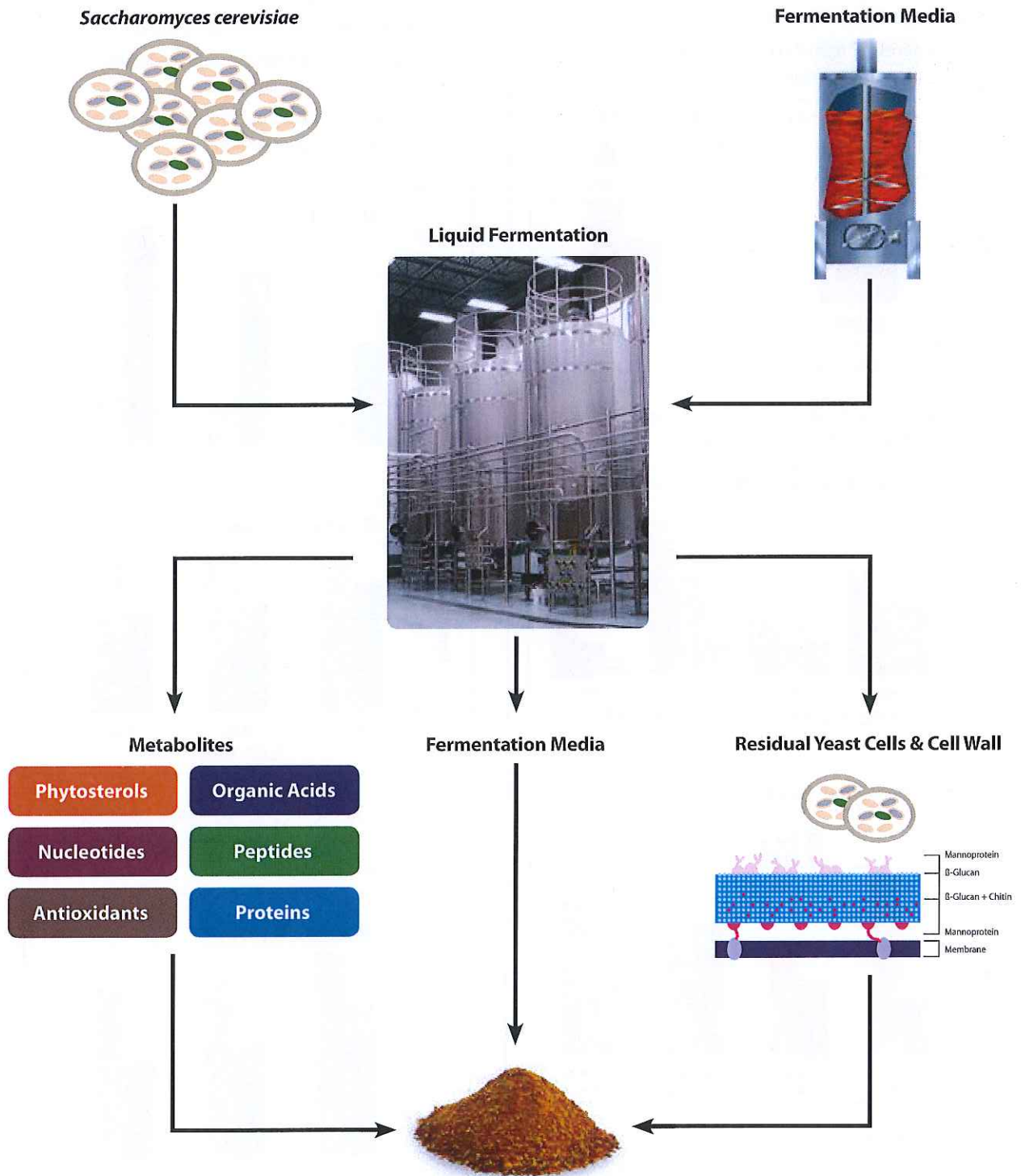
NO. Most MOS and beta-glucan feed additives are by-products of other manufacturing processes. Our proprietary fermentation technology of *Saccharomyces cerevisiae* results in a unique product that contains beneficial metabolites in addition to the mannan oligosacchride and beta-glucan fractions.

Are there any restrictions to feeding Original XPC?

No, it is safe to be fed to all stages of production.

Product Composition

KEY BIOACTIVE COMPONENTS



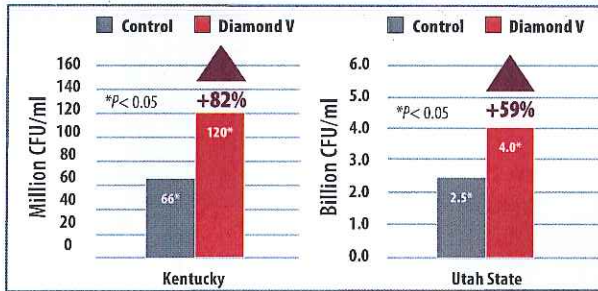
Better Lactation Efficiency

Mode of Action Research

1. INCREASES THE NUMBER OF IMPORTANT RUMEN BACTERIA

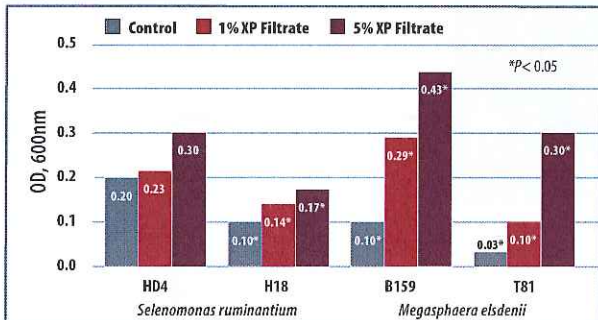
Stimulates Rumen Bacteria

- Diamond V Original products increase the number of fiber-digesting rumen bacteria.



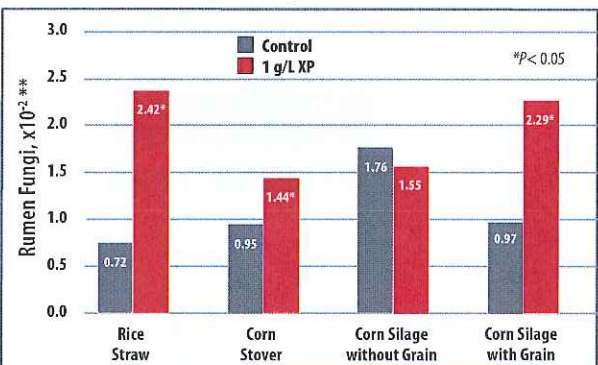
Harrison et al. 1988. *J. Dairy Sci.* 71:2967-2975.
 Wiedmeier et al. 1987. *J. Dairy Sci.* 70:2063-2068.

- Diamond V Original products increase the number of lactate-utilising bacteria.



Callaway and Martin. 1997. *J. Dairy Sci.* 80:2035-2044.

Stimulates Rumen Fungi

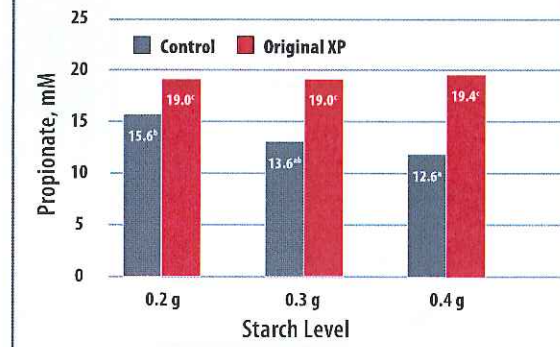
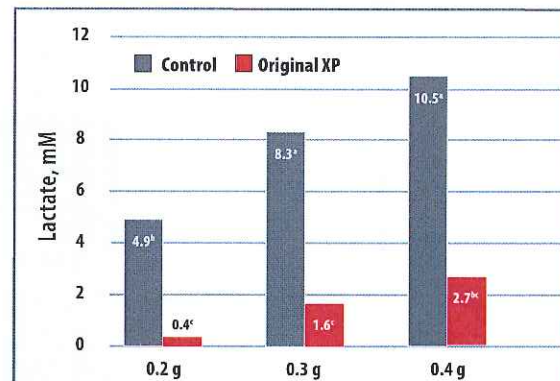


Mao et al., 2013. (In press)
 ** Percentage of total microbes.

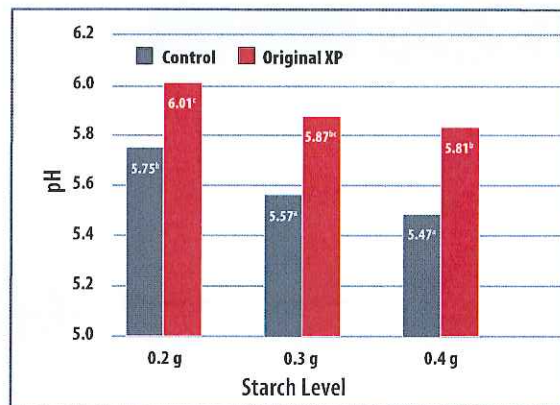
2. STABILISE THE RUMEN ENVIRONMENT

Rumen Challenge

- Under high starch feeding condition
 - Diamond V Original products decrease lactate accumulation
 - Diamond V Original products increase propionate production



- Under high concentrate feeding condition Diamond V Original products can maintain higher ruminal pH

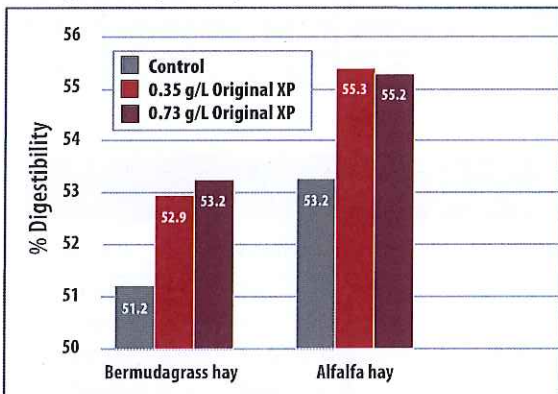


3. IMPROVE RUMINAL AND TOTAL TRACT DIGESTION

Ruminal Forage Digestibility

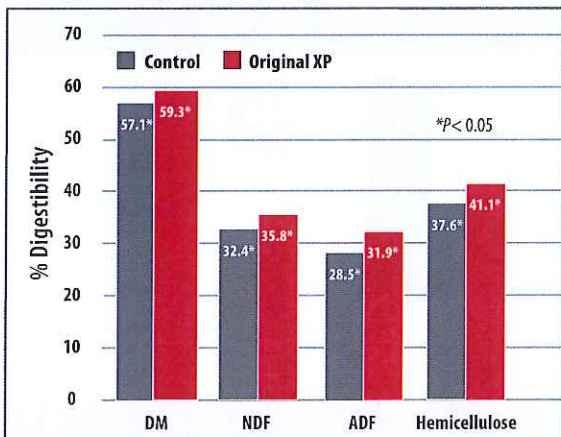
- Diamond V Original products improve ruminal forage digestibility

Digestibility of Hay



Sullivan and Martin. 1999. *J. Dairy Sci.* 82:2011-2016.

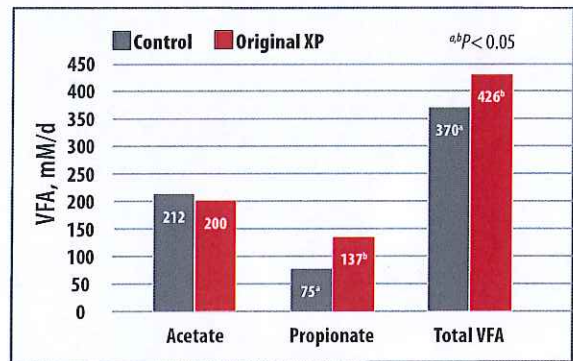
Digestibility of Corn Silage



Yoon and Garrett. 1998. *World Anim. Prod.* Vol 1:322-323.

4. INCREASES ENERGY AND PROTEIN AVAILABILITY

Increase Energy (VFA) Supply



Miller-Webster et al. 2002. *J. Dairy Sci.* 85:2009-2014.

Increase Protein Supply

Reference ¹	MN ² (g/d)	Improvement (%)
Hristov et al.		
Control	333 ^a	9.3
Original XP	364 ^b	
Allen & Ying		
Control	362	3.6
Original XP	375	

¹ Hristov et al. 2010. *J. Dairy Sci.* 93:682-692; Allen and Ying, 2012. *J. Dairy Sci.* 95:6591-6605

² Microbial nitrogen

^{a,b} Significant ($P < 0.1$)

**SCIENCE IS KNOWLEDGE IN THE FORM OF PREDICTABLE RESULTS.
DIAMOND V PUTS THAT KNOWLEDGE INTO EVERY BAG OF PRODUCT.**



Transition and Early Lactation



UNDERSTANDING RUMEN FUNCTION

During the transition and early lactation periods, cows cannot physically consume enough feed to meet their energy needs because of the major physiological and metabolic changes at calving. This makes nutrition management critical. Cows that maintain dry matter intake have:

- Improved energy status
- Improved reproductive function
- Improved milk production

ENGINEERED TO DELIVER RESULTS

Digestibility is absolutely critical to maximising feed efficiency. Feeding Diamond V Original products is one of the most effective and cost-efficient ways to optimise rumen function and digestibility. Research has shown cows supplemented with Diamond V Original products during transition and in early lactation improved dry matter intake by 0.62 kg and milk production by 1.37 kg, plus improved body reserves and cow health.

CHANGE IN MILK YIELD AND DMI

Stage of Lactation	Difference in Milk Yield		Difference in DMI	
	kg/head/day	P-value	kg/head/day	P-value
Early	1.37	0.001	0.62	0.003

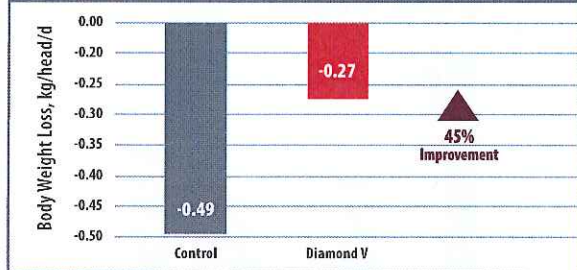
Poppy et al., 2012.

CHANGE IN MILK PRODUCTION

Item	kg/head/day	P-value
3.5% FCM	1.61	0.001
ECM	1.65	0.001
Fat Yield	0.06	0.009
Protein Yield	0.03	0.026

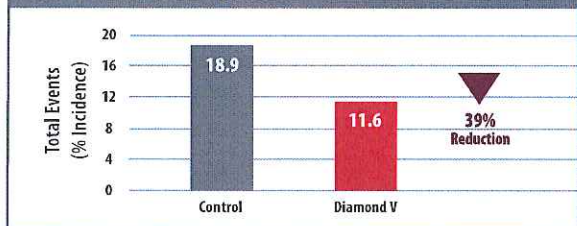
Poppy et al., 2012.

BODY RESERVES



Average of 5 Studies

COW HEALTH EVENTS



Diamond V Field Trial (2009, DA024-s).

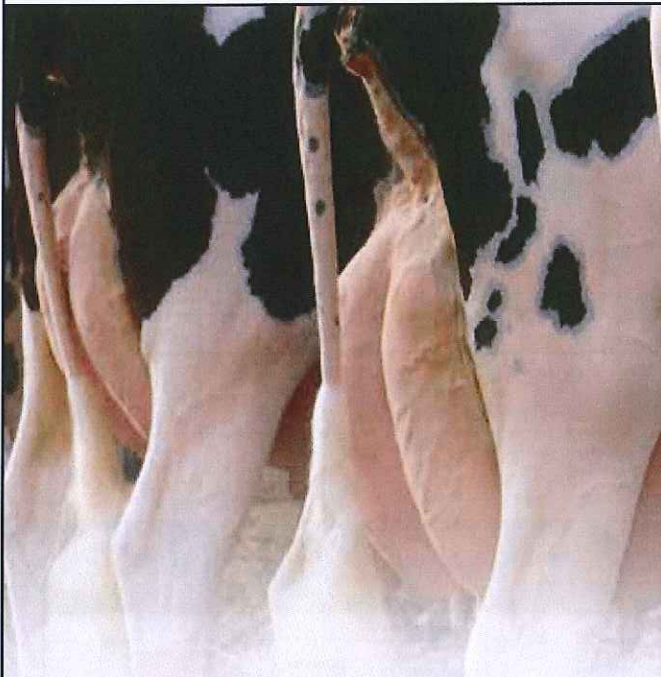


PRODUCT BENEFITS:

All-natural and science-based, Diamond V's Original line of products help provide the critical nutritional support needed to improve rumen integrity and efficiency. Improved rumen function translates into healthy cows performing to their potential. Research has shown it supports:

- Dry Matter Intake and Digestibility
- Feed Efficiency
- Milk Production





UNDERSTANDING FEED EFFICIENCY

Feed efficiency, sometimes called dairy efficiency, represents how well a dairy cow converts feed to milk. Feed efficiency for lactating cows can vary from <1.0 to 2.0 with improvements resulting from any one of the following three scenarios:

- Increase milk production with no change in feed intake
- Decrease in feed intake with no change in milk production
- Combination of decrease in feed intake and increase in milk production

ENGINEERED TO DELIVER RESULTS

Research has shown cows supplemented with Diamond V Original products during mid-late lactation improved milk production 0.98 kg while consuming 0.78 fewer kg of dry matter, thereby optimising feed utilisation. Improved feed efficiency also lays the groundwork for proper body condition moving into the dry period.

Mid-Late Lactation

CHANGE IN MILK YIELD AND DMI

Stage of Lactation	Difference in Milk Yield		Difference in DMI	
	kg/head/day	P-value	kg/head/day	P-value
Mid to Late	0.98	0.049	-0.78	0.008

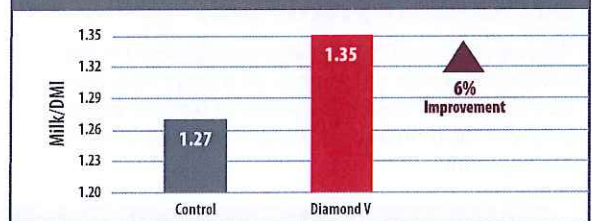
Poppy et al., 2012.

CHANGE IN MILK PRODUCTION

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3.5% FCM	1.61	0.001
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Poppy et al., 2012.

FEED EFFICIENCY



Average of 5 Studies

ECONOMICS

Variable	Inputs	Mid	Late
Improved Milk Production, kg			0.98
Product Cost ¹			\$0.05
Change in DMI, kg			-0.78
Value of Milk ²	\$0.38		\$0.37
Feed Cost ³	\$0.26		\$(0.20)
IOFC ⁴			\$0.52
ROI			10:1

¹ Diamond V product cost = \$0.05/hd/day

² Value of milk = \$0.38/kg

³ Feed cost = \$0.26/kg

⁴ IOFC = Income - Feed Cost - Product Cost

\$ = USD



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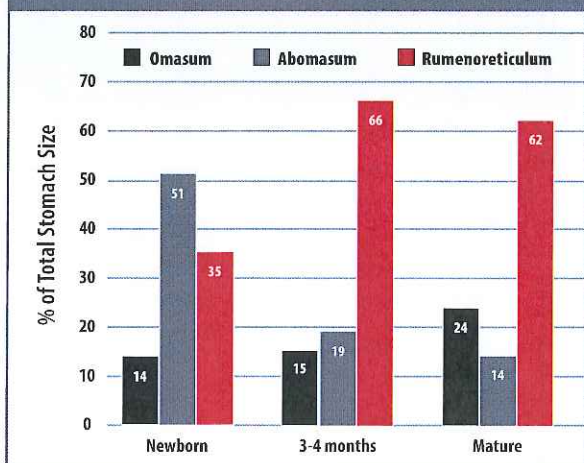




GREATER RUMEN DEVELOPMENT

The populations of beneficial microorganisms in the developing rumen of a young calf change from almost zero to billions within a few weeks of birth. A thriving colony of microorganisms is essential for early rumen development.

DEVELOPMENT OF THE CALF STOMACH OVER TIME



Church, D.C. 1993. The Ruminant Animal: Digestive Physiology and Nutrition. Pg 50. Waveland Press, Inc. Prospect Heights, IL.

A Better Start for Calves and Heifers

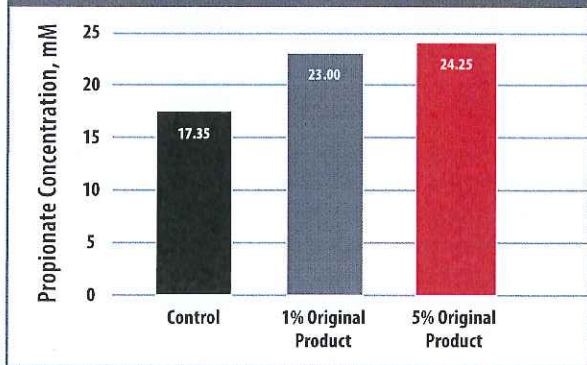
Original XPC™ is a rich nutrient source for rumen microorganisms and aids in the digestion of complex feedstuffs which support rumen development.

EFFECT OF ORIGINAL PRODUCT ON RUMEN DEVELOPMENT

Treatment	Papillae	
	Length (cm)	Width (cm)
Control	1.26	0.77
2% Original Product	1.58	0.88

Lesmeister et al. 2004. J. Dairy Sci. 87:1832-1839.

EFFECT OF ORIGINAL PRODUCT ON PROPIONIC ACID PRODUCTION

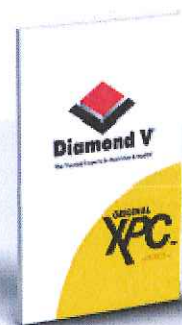


Callaway and Martin. 1997. J. Dairy Sci. 80:2035-2044.

FEEDING RECOMMENDATIONS

- Pre-weaning Calves 3.5 g/hd/day
- Post-weaning Calves 7 g/hd/day
- Calf Grain Starter 5 kg/MT
- Heifers 14 g/hd/day

Available in additional concentration: Original XP™



PRODUCT BENEFITS:

All-natural and science-based, Original XPC™ helps provide the critical nutritional support needed for early rumen development. Improved rumen function translates into increased ration intake and daily gain. Research has shown it supports:

- Rumen development
- Starter ration intake
- Growth and feed efficiency
- Calf health



MAXIMISING GENETIC POTENTIAL

Experts recognise that in order to develop a Holstein replacement heifer weighing 544.3 kg after calving at 22-24 months, the following practices should be used:

- Feed high-quality colostrum within an hour of birth and again within 12 hours.
- Maximise starter feed intake through weaning to stimulate rumen papillae development.
- Provide clean, fresh water at all times to stimulate starter intake.
- Wean calf when starter intake reaches 1 kg for two consecutive days.
- From weaning to calving, adjust nutrition program to ensure 0.82 to 0.91 kg average daily gain.
- Breed when heifers reach 363-385 kg body weight at 13-14 months of age.



Rumen development in response to a milk, hay and starter grain diet. (8 wks)

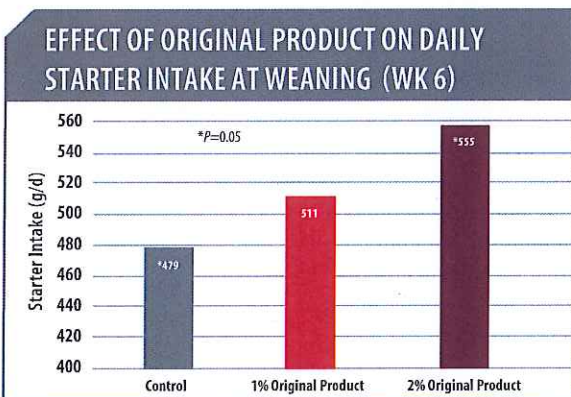


Rumen development in response to a milk and starter grain diet. (8 wks)

Photographs courtesy of Penn State University

STARTER RATION INTAKE

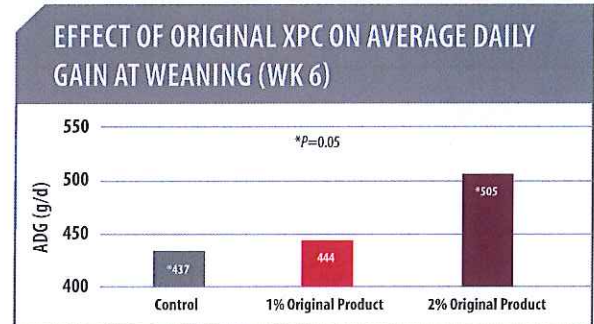
With successful rumen development, calves are better able to transition into dry feeds at weaning. Research shows Original XPC helps calves flourish through this stressful phase by encouraging starter feed intake.



Lesmeister et al., 2004.

AVERAGE DAILY GAIN

Improved nutrient intake may result in improved growth rates. Research shows Original XPC supports average daily gain in the early stages of a calf's life.



Lesmeister et al., 2004.

CALF HEALTH

The genetic potential of replacement heifers can be stunted by many factors: a slow switch to dry starter feed, long days to weaning, inconsistent nutrient intake and challenged calf health. Research shows Original XPC helps meet the challenge by maintaining calf health. Under challenging conditions feeding Diamond V Original XPC to young calves decreases frequency of medical treatments, reducing incidence of fever and diarrhea and reduced overall morbidity and mortality in calves.

EFFECTS OF ORIGINAL PRODUCT ON CALF HEALTH ¹			
Item	Control	Original Product	P-value
Fever, % ^a	41.6	34.1	0.08
Diarrhea, % ^b	99.6	97.3	0.07
Respiratory, % ^c	14.0	13.7	0.92
Mortality, %	12.1	7.5	0.05

^a Rectal temperature >39.5°C

^b Presence of watery feces for at least 2 d during the study

^c Calves with signs of respiratory disease and fever

¹ Magalhaes et al., 2008. J. Dairy Sci. 91: 1497-1509.

Recommended Feeding Rates

STAGE	ORIGINAL XPC™
Pre-weaning Calves	3.5 g
Post-weaning Calves	7 g
Calves Grain Starter	5 kg/MT
Non-Lactating Cows	14 g
Lactating Cows	14 g

If you would like more information, please contact your local Diamond V representative.

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FEEDWORKS
Performance through Science

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DAIRY BEEF POULTRY SWINE EQUINE MULTI-SPECIES AQUA PET SPECIALTY

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