AminoShure®-XL

Precision Release Lysine

35% MORE
MP Lysine
than the leading competitor

100% MORE
Consistent
than blood meal

balchem

The Difference is

Balchem has invested more than 50 years perfecting the art and science of nutrient encapsulation. And with X-Technology, nutrient encapsulation has taken a leap forward. This advanced encapsulation system optimizes core dynamics and coating composition to create a revolutionary new rumen-protected lysine product with superior MP lysine content.

Core Technology
Balchem's proprietary engineered core provides the foundation for an exceptional product, resulting in a higher payload and increased MP lysine content.

Coating Technology
Balchem has developed a unique, true encapsulation method comprised of specialized layers of lipid around an engineered core. This design creates a protective barrier that shields the core from damage in both feed and the rumen, ensuring the nutrient reaches the small intestine where it can be effectively utilized by the cow. Several competitive products utilize matrix encapsulation, where the active ingredient is suspended within a lipid matrix. However, this method often results in some of the active ingredient being exposed on the surface, leading to premature coating failure in the feed and rumen before the nutrient can reach the small intestine.

Consistent Release
AminoShure-XL is engineered to release its lysine payload consistently in the small intestine, where it can be absorbed and utilized by the cow and converted into greater milk and milk component production.

Discover the value X-Technology can have on your herd.
Contact your local Balchem representative or visit Balchem.com/AminoShureXL to learn how AminoShure-XL can take the guesswork out of amino acid balancing and reliably deliver the lysine your cows need.

AminoShure®-XL *Precision Release Lysine* is the latest advancement in rumen-protected lysine and the perfect complement to AminoShure®-XM *Precision Release Methionine*.

Why Balance for Lysine

Lysine is one of the first limiting amino acids in the lactating dairy cow's diet. Cows cannot synthesize lysine, so it must be obtained from exogenous sources. By incorporating rumen-protected lysine into the feed, nutritionists can enhance milk and milk component production while also gaining the flexibility to lower dietary protein levels. This approach not only improves nitrogen utilization but also reduces nitrogen excretion, benefiting both the cow's health and environmental sustainability.

A recent meta-analysis by Arshad et al., (2024) examined the impact of feeding rumen-protected lysine to lactating dairy cows and found the following (Figure 1):

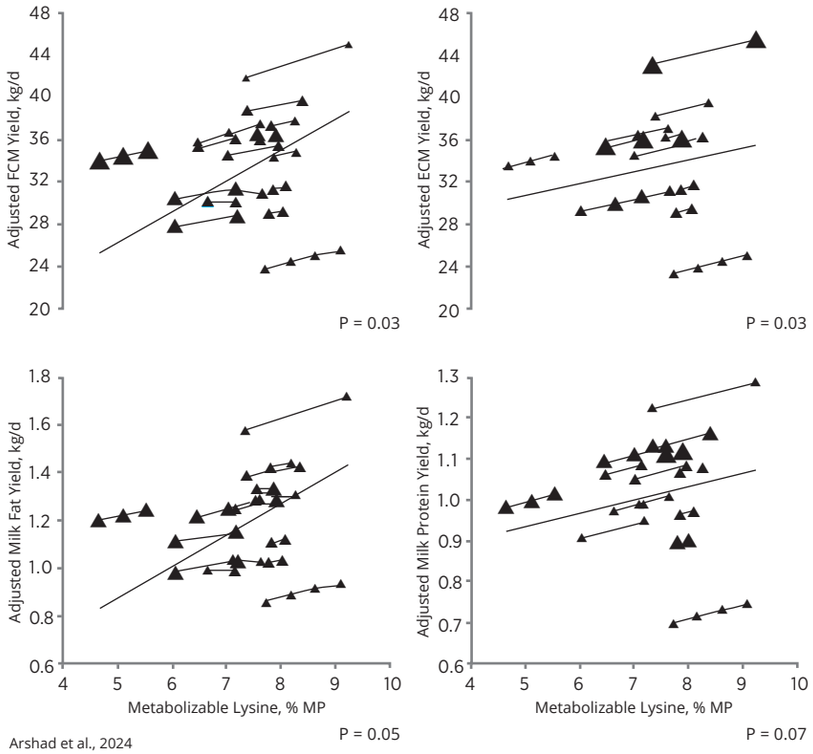
Benefits:

- Milk production increased by 3.3 lbs. (1.51 kg)/cow/day
- Increasing digestible lysine as a % of MP from 6.5% to 8.5% linearly improved yields.
  - Milk production by 3.9 lbs. (1.8 kg/cow/day)
  - Fat-Corrected Milk by 5.5 lbs. (2.5 kg)/cow/day
  - Energy-Corrected Milk by 5.3 lbs. (2.4 kg)/cow/day
- Enhanced milk fat percentage and milk protein yield
- Improved feed efficiency

Other benefits of feeding rumen-protected lysine include:

- Reduced dietary protein content
- Lower ration costs
- Improved nitrogen utilization
- Reduced nitrogen excretion

Figure 1 Result of feeding rumen-protected lysine



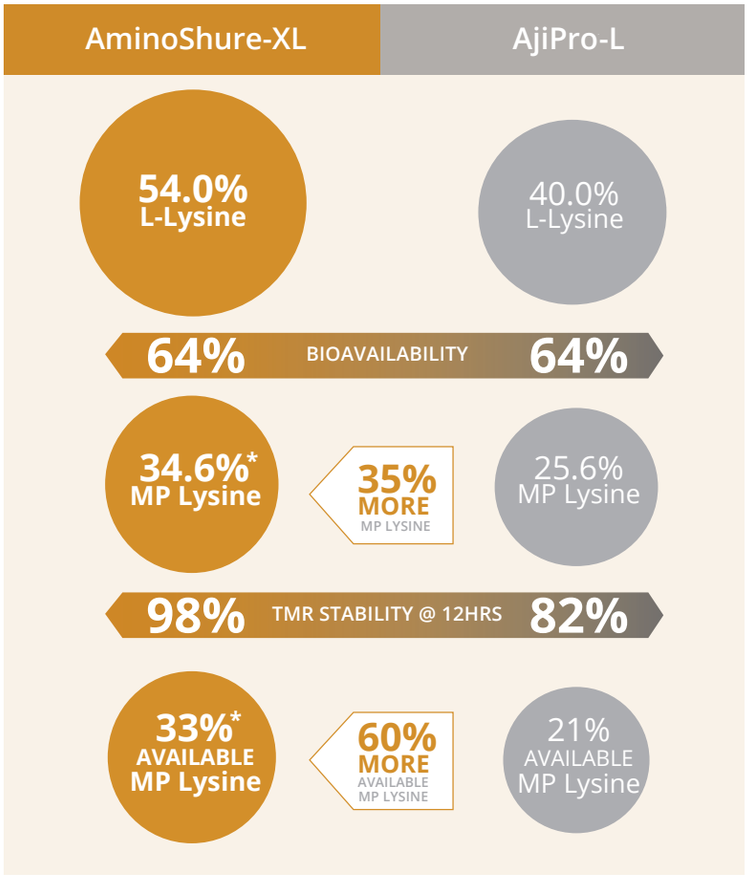
Arshad et al., 2024

AminoShure®-XL

Precision Release Lysine

WHY CHOOSE AMINOSHURE®-XL

AminoShure-XL has **35% more MP lysine** than the leading competitor. This is the result of more than a decade of dedicated research and development designed to create an exceptional rumen-protected lysine product with superior performance.



*Stable Isotope method, Fernandes et al., 2024

The bioavailability parameters are based on each manufacturer's bioavailability claims and content declarations.

Consistent

When balancing for precise amino acid levels, nutritionists need a reliable and consistent source that delivers the exact amount required to meet the nutritional needs of dairy cows. Unpredictable blood meal quality can significantly impact the amino acid content of the diet, reduce the effectiveness of amino acid balancing, and lower profitability.

Table 1 illustrates the impact of blood meal quality on amino acid delivery. Though no one expects to purchase poor quality blood meal, the delivered MP lysine could be less than half of the expected levels.

Table 1 Blood meal MP lysine quality comparison

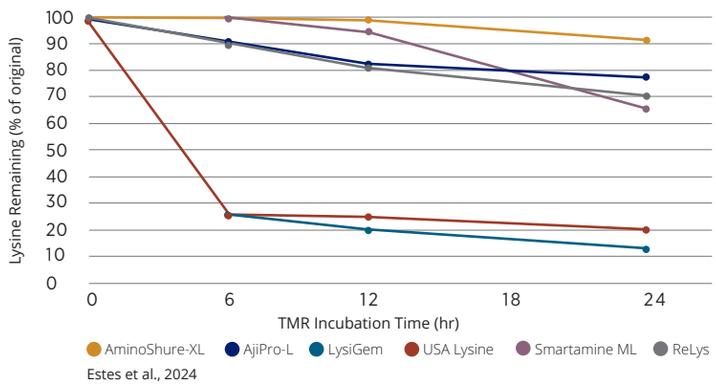
Blood Meal Quality	DM (%)	CP (%)	RUP (%)	Intestinal Digestibility	Lysine % of CP	MP-Lys %
Poor	90.0%	93.0%	81.0%	40.0%	9.0%	2.4%
Average	90.0%	93.0%	81.0%	65.0%	9.0%	4.0%
High	90.0%	93.0%	81.0%	90.0%	9.0%	5.5%

Reliable

New AminoShure-XL has undergone the same rigorous testing and development as other rumen-protected nutrients in the Balchem line-up, ensuring precise nutrient delivery. Driven by research and technical teams with expertise in rumen biology, animal physiology, and protein nutrition, Balchem is uniquely positioned to deliver innovations that improve dairy performance and profitability.

Estes et al., 2024, (Figure 2) shows the impact that time in a TMR can have on coating integrity of several rumen-protected lysine products. The equivalent of 1 g of lysine from each product was gently mixed with 200 gms of TMR and tested for remaining lysine content at several time points.

Figure 2 TMR stability of RP lysine products



Estes et al., 2024

Cost Effective

AminoShure-XL's enhancements in metabolizable lysine content provides a consistent, reliable and less expensive source of metabolizable lysine, reducing both ration costs and variability while improving cow productivity. These advantages make it possible to effectively replace blood meal in dairy diets, helping dairy farmers to achieve greater and more consistent economic returns.

Table 2 compares the cost of 0.25 lb (114 gm) of high-quality blood meal at three different price points with the cost of 19 gm of AminoShure-XL, which contains an equivalent amount of MP lysine.

Table 2 Cost of replacing 0.25 lb of high-quality blood meal with AminoShure-XL

	Manufacturers Suggested Retail Price ($/ton)	Feeding Rate (gms)	Lysine % of DM	MP Lysine (%)	MP Lysine (gms)	$/head/day
Blood Meal	$1,200	114	8.4%	5.5%[1]	6.2	0.15
	$1,000	114	8.4%	5.5%[1]	6.2	0.13
	$800	114	8.4%	5.5%[1]	6.2	0.10
AminoShure-XL	$5,000	19	54.0%	32.4%	6.2	0.11

[1]Assumes high-quality blood meal

BACKED BY SCIENCE

AminoShure®-XL represents more than a decade of dedicated research and development designed to create a superior rumen-protected lysine product with exceptional bioavailability. Accurately determining the amino acid bioavailability of rumen-protected amino acids (RP-AA) used in dairy rations is an extremely important, yet challenging, task. *In vivo* stable isotope methods have demonstrated superior precision and accuracy in assessing RP-AA absorption. (Estes et al., 2018; Rebelo and Lee, 2024).

AminoShure-XL Bioavailability Research Results

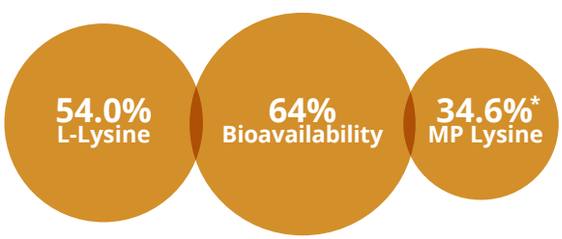
Accurately estimating the bioavailability of rumen-protected amino acids is crucial, as it significantly impacts the nutrient's effectiveness in the animal.

In vivo stable isotope approaches have emerged as the preferred method for assessing the bioavailability of rumen-protected nutrients across multiple encapsulation technologies.

Using the *in vivo* stable isotope methodology, the bioavailability of AminoShure-XL was determined to be 64%. Since AminoShure-XL contains 54% L-lysine, the calculated metabolizable lysine content is 34.6% (Table 3).

Fernandes et al., 2024 – In this study cows were given a base ration sufficient in metabolizable methionine and metabolizable lysine according to NASEM (2021). AminoShure-XL was added daily to the treatment diets at a rate of 118.5 g per cow per day (66.4 g lysine, 30% above diet supply). On the last day of the experiment, a saline solution with U-[13C]-labelled amino acids was infused into the jugular vein of each cow for 12 hours. Blood samples were collected to measure the isotopic enrichment of plasma amino acids. This was analyzed using a 3-pool model to determine amino acid plasma absorption rates. Bioavailability was then calculated, assuming a 7% loss of amino acid during the first pass through the splanchnic tissues.

Table 3 AminoShure-XL bioavailability results



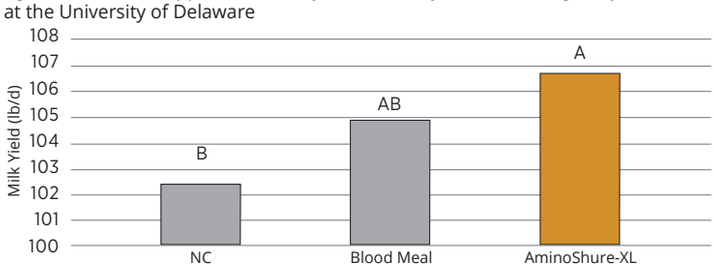
AminoShure-XL: Stable Isotope method, Fernandes et al., 2024

AminoShure-XL Production Study Results

Three production studies were conducted to evaluate the milk and milk component response to supplementing lactating diets with AminoShure-XL.

Barnard et al., 2016 shows cows supplemented with AminoShure-XL produced 4.3 lbs (1.95 kg) more milk than the control (P < 0.05), and numerically yielded 1.8 lbs (0.83 kg) more milk when the diet was supplemented with an equal amount of lysine from blood meal.

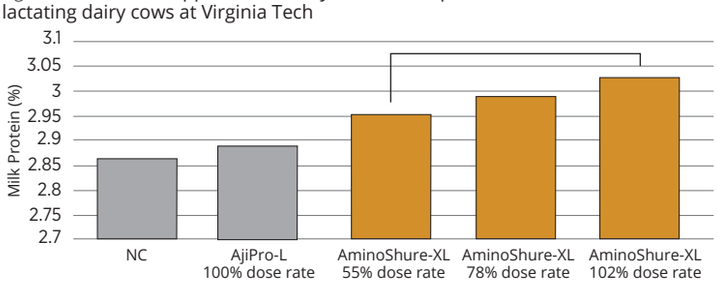
Figure 3 Effects of supplemental RP lysine on milk yield in lactating dairy cows at the University of Delaware



Barnard et al., 2016 P < 0.05

Fleming et al., 2019 demonstrated that cows supplemented with AminoShure-XL had a significant linear increase (P = 0.025) in milk protein percentage and outperformed AjiPro-L in both milk protein percentage and total milk protein yield.

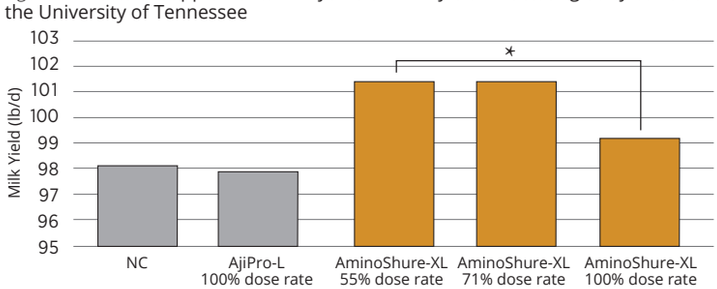
Figure 4 Effects of supplemental RP lysine on milk protein concentration in lactating dairy cows at Virginia Tech



*Significant linear dose response (P = 0.025). For every 1 g of lysine fed from AminoShure-XL = 0.002% increase in milk protein (%).
Fleming et al., 2019

Bailey et al., 2019 shows cows supplemented with AminoShure-XL produced 3.3 lb/d (1.51 kg/d) more milk over the control. Additionally, increasing doses of AminoShure-XL resulted in a quadratic trend (P=0.07) for increased milk protein concentration.

Figure 5 Effects of supplemental RP lysine on milk yield in lactating dairy cows at the University of Tennessee



*Significant linear dose response (P = 0.03). In this experimental condition, an optimum dose of 17.9 g/d of lysine supplied from AminoShure-XL promoted an overall benefit of 3.3 lb/d (1.51 kg/d).
[1]NC = Negative control diet; AjiPro-L = NC supplemented with AjiPro-L; AminoShure-XL 55% dose rate = NC supplemented with AminoShure-XL at 71% of the lysine content of AjiPro-L; AminoShure-XL 100% dose rate = NC supplemented with AminoShure-XL at 100% of the lysine content of AjiPro-L.
Bailey et al., 2019

THIS IS ANIMAL NUTRITION & HEALTH

RUMINANT

ReaShure®
Precision Release Choline

AminoShure®-XM
Precision Release Methionine

AminoShure®-XL
Precision Release Lysine

NiaShure™
Precision Release Niacin

NitroShure™
Precision Release Nitrogen

VitaShure®-C
Precision Release Vitamin C

KeyShure®
Chelated Minerals

KeyShure® Plus
Chelated Minerals

MONOGASTRIC

PuraChol®
Choline Chloride

KeyShure®
Chelated Minerals

KeyShure® Plus
Chelated Minerals

COMPANION ANIMALS

OptMSM®

PurforMSM®

PetShure®
TURNING IMAGINATION INTO REALITY

POROSITY & TEXTURE MANAGEMENT

pH CONTROL SYSTEMS

STRUCTURING & FORMING TECHNOLOGIES

CHOLINE

SENSORY SYSTEMS

Balchem Animal Nutrition and Health is the global leader in choline production, chelation and encapsulation technology. With a growing portfolio of nutrition products and a dedication to innovation and industry sustainability, Balchem is leading the charge to meet the nutritional needs of ruminants, monogastrics and companion animals.

WE ARE:

Real People

With a passion for animal nutrition, we are intense advocates for our customers and the animals they feed. You can count on us to provide honest, candid advice to address your toughest challenges.

Real Science

Balchem delivers proven science backed by years of success. Our products are some of the most extensively researched in the industry, further supported by documented, on-farm results.

Real Results

In the end, it all comes down to results. We deliver real results you can count on, results that exceed your expectations and deliver value to your customers and your bottom line.

balchem

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