

HIGHEST CHOLINE
CONCENTRATION
IN THE INDUSTRY

INTRODUCING NEW

ReaShure[®]-XC

Precision Release Choline



balchem[®]

INTRODUCING

ReaShure®-XC

Precision Release Choline



Combining advanced core technology and industry-leading encapsulation, ReaShure-XC is the most researched, effective, cost-efficient and concentrated form of rumen-protected choline on the market today.

Unique Core Advancements

The new refined choline core delivers a higher, more concentrated payload while eliminating the need for a carrier. ReaShure-XC delivers:

- Highest choline concentration in the industry
- Added ration balancing flexibility; higher concentration requires less space in manufactured feeds and premixes
- Reduced carbon footprint; lower transportation costs/emissions, reduced manufacturing inputs
- Reduced risk of contamination; no carrier/non-functional ingredients required
- Non-GMO

Most Advanced Coating Technology: X-Technology

Balchem's revolutionary X-Technology carefully balances feed stability, rumen stability and intestinal release to deliver the active ingredient efficiently and cost effectively.

- Durable and consistently feed stable
- Effective rumen stability to resist rumen microbial degradation
- Consistent intestinal release for absorption and utilization by the cow

ReaShure-XC is produced in Balchem's state-of-the-art European facility for consistent supply and reduced transportation costs. The unique manufacturing process delivers a consistent particle size and geometry for improved flowability while increasing on-farm shelf life and improving olfactory and visual appeal.

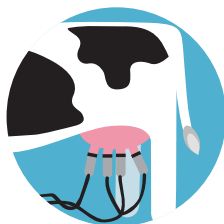


Choline – essential for every body

For cattle, choline serves many roles and is essential for health and productivity. Decades of research shows that rumen-protected choline impacts cow performance and supports a smooth transition. Choline is shown to deliver milk production responses, reduce the incidence of transition metabolic disorders and improve growth and survivability of calves born

to cows supplemented with choline. In human nutrition, choline is considered an essential nutrient, known for its many functions within the body. Studies show that higher prenatal choline intake was suggestive of improved infant cognitive function¹ and reduced instance of neural tube defects,² showing the *in utero* impact choline can have.

VLDL MOBILIZER
FOR MILK AND
MILK FAT SYNTHESIS



MASTER OF
METABOLISM



METABOLIC
REGULATOR



FUEL FOR
ACTIVE
BODIES



COLOSTRUM
QUALITY
ENHANCER



BABY
BRAIN
BUILDER



IN UTERO
DEVELOPMENT
HELPER



MOM'S
BEST FRIEND



CHOLINE PLAYS
A PIVOTAL ROLE
IN HEALTH AND
WELLNESS OF
HUMANS AND
ANIMALS

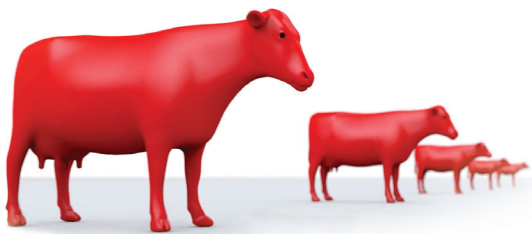
ReaShure®-XC

Precision Release Choline



¹Caudill, M.A. et al. *FASEB J.* 32, 2172-2180 (2018).
²Shaw, G.M. et al. *Epidemiology.* 714-719 (2009).

extensively researched and tested encapsulated choline on the market today. And that data consistently demonstrates the many benefits choline delivers to your cows.



CALF
HEALTH &
GROWTH

New research from the University of Florida now shows a link between prenatal choline supplementation and calf performance.

Maternal consumption of ReaShure during late gestation had a positive effect on growth and survivability of neonatal heifers during the first four weeks of life. That effect was further enhanced by feeding colostrum from dams receiving ReaShure.²

Table 3 shows that calves exposed to choline *in utero* grew .045 kg/day faster from birth to calving despite identical nutrition and management post-calving. Those calves had lower incidence rates of fever (31.3% vs. 57.7%) during the first 21 days of life and consumed more dry matter (combination of milk replacer and starter). Heifers that received colostrum from cows fed choline in late gestation, regardless of *in utero* exposure, had more efficient absorption of immunoglobulins (IgG) and had higher serum IgG and plasma protein levels (indicators of passive immunity).

TABLE 3
IN UTERO EFFECT OF PREPARTUM FEEDING REASHURE® PRECISION RELEASE CHOLINE TO DAMS ON GROWTH OF THEIR HEIFER CALVES

Age	Control	ReaShure
Birth, kg	40,4	38,3*
2 months (weaning), kg	76,7	77,6
12 months, kg	322,2	335,3**
Post-calving, kg	534,0	570,0**

*Effect of ReaShure, P<0.10. **Effect of ReaShure, P<0.05.

TABLE 4
THE VALUE OF A HEAVIER HEIFER AT FIRST CALVING¹

Additional Body Weight at First Calving	Additional Milk/Year	Milk Price €/kg	Additional Milk Income/Year From 1st Lactation Animals (35) (100 cow herd x 35% heifers=35 heifers)
36 kg ²	455 kg	€ 0,35 ³	€ 5.574
		€ 0,29 ⁴	€ 4.618
		€ 0,58 ⁵	€ 9.237

¹Staley, Gavin. "Why Heifer Maturity Matters: The Peter Pan Problem." *Progressive Dairy*. (11 March 2020): 53-55.
²Zenobi et al., *J Dairy Sci*. 101:1088-1110 (2018).

³2019 Average Milk Price EU-28
⁴2019 Lowest Milk Price EU-28
⁵2019 Highest Milk Price EU-28

Heifer milk production sets the "ceiling" for the entire herd.

Table 4 does not take into account that raising the milk production of your heifers will raise the milk production ceiling for the entire herd.



ECONOMIC
RETURNS

ReaShure is proven to help launch your cows for life.

With an investment of just pennies per day, over the lactation, you can see significant return.

- 2,10 kg of milk per day improvement, or 640,50 kg more milk over the full lactation.
- Proven reduction in metabolic disorders including ketosis, displaced abomasum and subclinical milk fever.
- *In utero* impact on her calf, leading to growth and health improvements.

How does your ReaShure investment compare to other popular feed additives? Table 5 shows that ReaShure delivers a healthy return on investment, when only considering the value of increased milk production.

Two decades of peer-reviewed research has demonstrated that cows respond in multiple ways to supplemental choline in their diets (Table 6). Though not every cow responds the same, research proves that delivering choline during transition leads to substantial return from a small investment.

To learn more, visit BalchemANH.com/Launch.

TABLE 5
ECONOMIC COMPARISON TO OTHER FEED ADDITIVES

	Cost €/d	Milk Yield kg/h/d	Increased Milk Income €/h/d ²	ROI
ReaShure	0,05 ¹	2,10	0,74	14,8-1
Monensin	0,11 ³	0,7 ⁴	0,24	2,2-1
Rumen Bypass Fat	0,36 ⁵	2,05	0,7	1,9-1

¹Cost calculated per day for a 305-day lactation.

²Milk Price €0.35/kg

³Average price for 1 bolus 35€

⁴Average results archived when using Monensin.

⁵450 gr feeding rate.

TABLE 6
REASHURE ECONOMICS (100 COWS)

Benefit	Investment ¹	Income & Savings	ROI
Full Lactation Milk Production	€ 1.500	€ 22.418 ²	15:1
Reduced Metabolic Disorders		€ 6.785	4,5:1
Improved Calf Health & Growth		€ 5.574 ²	4:1
Total		€ 34.777	23:1

¹30 grams of ReaShure-XC 21 days pre- and 21 days post-parturition. ²Milk Price € 0,35/kg

THE COUNTDOWN

3

HIGHER PEAKS
MORE FULL
LACTATION MILK

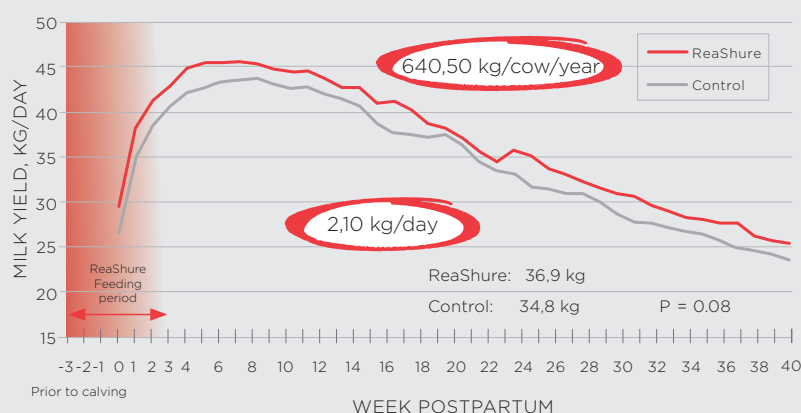
A review of university trials has consistently shown a milk production improvement for cows receiving ReaShure during the transition phase.

University of Florida data demonstrates the lasting impact choline delivers. In the study, cows fed ReaShure during the transition period had higher peaks and produced an additional 2,10 kg of milk per day during the 40-week trial period. That resulted in 640,50 kg more milk per cow over a 305-day lactation on average (Figure 1).

Results seen with 250.000 commercial cows were similar, showing an average of 1,9 kg per head per day advantage for those cows consuming ReaShure.

FIGURE 1

EFFECT OF FEEDING REASHURE® PRECISION RELEASE CHOLINE DURING TRANSITION ON MILK PRODUCTION OVER 40 WEEKS



Zenobi et al., *J Dairy Sci.* 101:1088 (2018).

TABLE 1

THE VALUE OF AN EXTRA 640,50 kg OF MILK/COW

Additional Milk/Cow/Year	Milk Price €/kg	Additional Annual Income (100 cows)
640,50 kg ¹	€ 0,35 ²	€ 22.418
	€ 0,29 ³	€ 18.575
	€ 0,58 ⁴	€ 37.149

¹Zenobi et al., *J Dairy Sci.* 101:1088-1110 (2018).

²2019 Average Milk Price EU-28

³2019 Lowest Milk Price EU-28

⁴2019 Highest Milk Price EU-28

With more than two decades of university research, on-farm data and composite summaries, the line of ReaShure® Precision Release Choline products is the most

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REDUCED
METABOLIC
DISORDERS

Greater profitability starts with a smooth, healthy transition.

Reducing health events and starting the lactation strong is imperative to high productivity and greater profitability. Research from the University of California-Davis (Table 2) measured reduction in health disorders when animals were fed ReaShure.

A second study conducted by the University of Florida showed a reduction in subclinical milk fever (52% vs. 32%). The study also showed improved milk yield, higher pregnancy at first service, and improved calf health and performance.

TABLE 2

ECONOMIC IMPACT OF REDUCED METABOLIC DISORDERS

Disease	Incidence Rate % ⁴	Cost €/Case	Cost €/100 Cows	% Reduction ⁴	Savings €/100 Cows
Mastitis	22.5	236 ¹	5.310	34.7	1.843
Metritis	8.9	225 ¹	2.003	16.6	332
Retained Placenta	9.4	162 ¹	1.523	11.5	175
LDA	4.2	321 ¹	1.348	48.5	654
Clinical Ketosis	9.6	145 ¹	1.392	55.7	775
Subclinical Ketosis	23.3	101 ²	2.353	50.5	1.188
Clinical Milk Fever	3.0	213 ¹	639	32.0	205
Subclinical Milk Fever	45.0	112 ³	5.040	32.0	1.613
Total					€ 6.785

¹Liang et al., *J Dairy Sci.* 100:1472-1486 (2017).

²Mostert et al., *Animal*, 12(1): 145-154 (2018).

³Guard, C., *CVC Kansas City Proceedings* (2009).

⁴Lima et al., *The Veterinary Journal*, 193:140-145 (2012). Incidence rates and percent reductions in diseases are calculated as the averages observed in Lima et al. Average results reported by producers from 112 herds, representing 226.630 cows that participated in the ReaShure Real Results program.

Conversion to € is based on 2019 average exchange rate €/USD.



THIS IS ANIMAL NUTRITION & HEALTH

RUMINANT

ReaShure[®]-XC
Precision Release Choline

AminoShure[™]-XM
Precision Release Methionine

AminoShure[™]-L
Precision Release Lysine

NitroShure[™]
Precision Release Nitrogen

NiaShure[™]
Precision Release Niacin

Fibrase[™]
Rumen Fermentation Enhancer

KeyShure[®]
Chelated Minerals

MONOGASTRIC

PuraChol[®]
Choline Chloride

Tannin[™] 50
Encapsulated Tannin

ProAcid[™]
Encapsulated Acid

KeyShure[®]
Chelated Minerals

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.



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