


KeyShure Plus:
More Bioavailability,
Maximum Results

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VetMed

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Applied Mineral Nutrition
A Puzzle Approach



- 1 Physiology (Dr. Jesse P. Goff)
- 2 Chemical structure (Stephen Ashmead)
- 3 Antagonists (Ralph Ward)
- 4 Delivery Form



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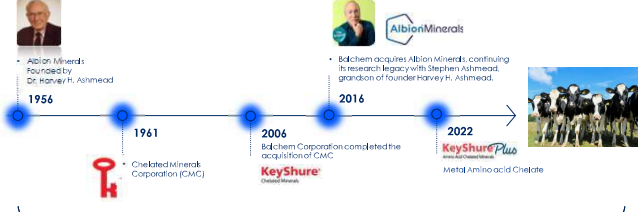

**Why Can
Balchem Speak
About Minerals?**



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How it Started
Albion/Balchem – World's largest and most respected manufacturer of chelated minerals for human nutrition



- 1956: Albion Minerals Founded by Dr. Harvey H. Ashmead
- 1961: Chelated Mineral Corporation (CMC)
- 2006: Balchem Corporation completed the acquisition of CMC
- 2016: Balchem acquires Albion Minerals, continuing its research legacy with Stephen Ashmead, grandson of founder Harvey H. Ashmead
- 2022: KeyShure Plus (MetAmino acid Chelate)



Leveraging decades of mineral expertise

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1. Physiology

Cheat Sheet: Mineral Absorption Sites

Macro Mineral	Main absorption organ
Calcium (Ca)	Small intestine (duodenum, jejunum)
Phosphorus (P)	Small intestine (jejunum)
Magnesium (Mg)	Rumen-reticulum
Sodium (Na)	Small intestine
Potassium (K)	Rumen

Micro Mineral	Main absorption organ	Key limitation
Iron (Fe)	Duodenum	Low absorption; antagonized by Ca, Cu
Manganese (Mn)	Small intestine	Very low inherent absorption
Zinc (Zn)	Small intestine	Antagonized by Cu, Fe, phytates
Copper (Cu)	Small intestine	Strongly antagonized by Mo + S
Cobalt (Co)	Rumen (B12 synthesis)	B12 absorbed in ileum
Selenium (Se)	Small intestine	Chemical form dependent
Iodine (I)	Small intestine	Highly soluble

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1) Physiology

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rumen solubility

Rumen microbial activity is a critical determinant of mineral availability and must be considered in both macro- and trace-mineral nutrition.

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molecular stability

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2. Chemical structure

Balchem molecules

Single amino acid-metal chelate

Bis-amino acid metal chelate

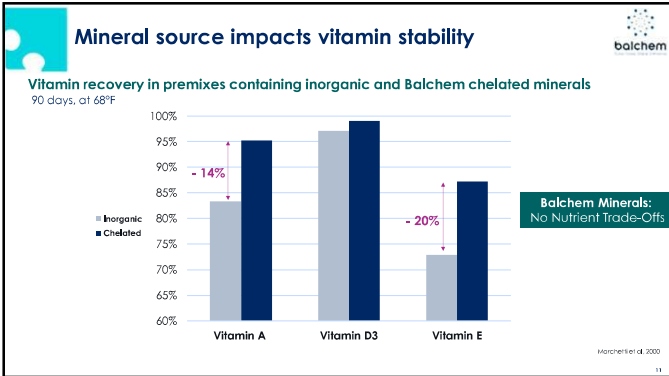
Chelated VS Complex

Zinc glycinate-chloride complex

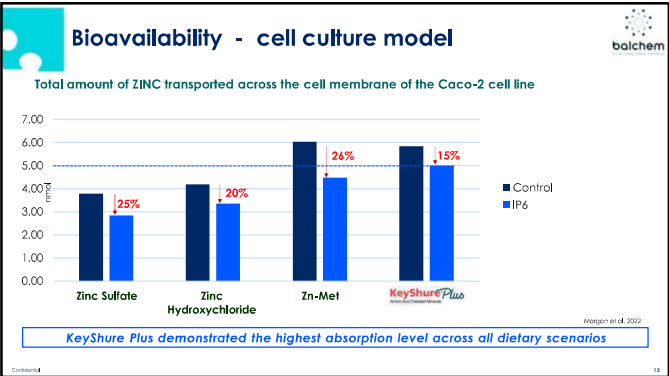
COMPLEX Zinc Methionine

Heterocyclic ring bring stability to chemical structures

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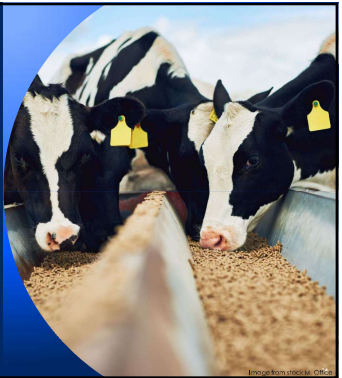
3. Antagonists

Minimum interaction with antagonists and antinutritional factors

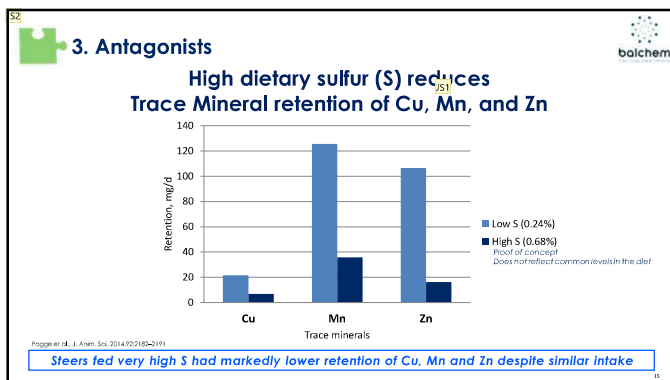


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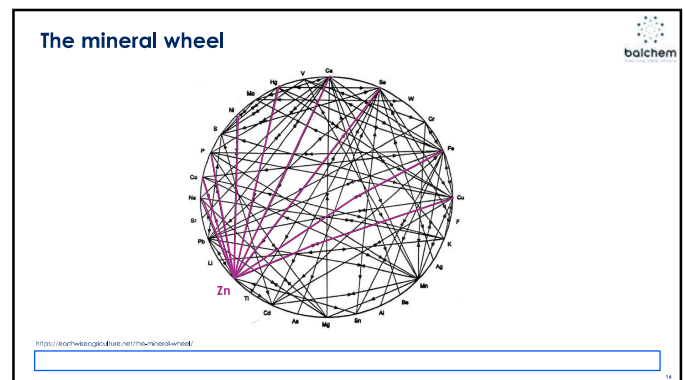
What are antagonists in our world?



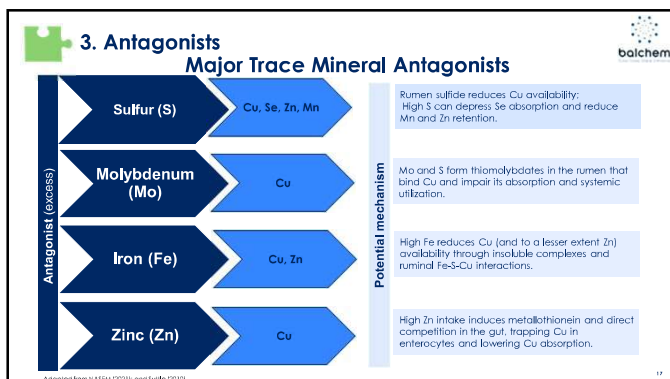
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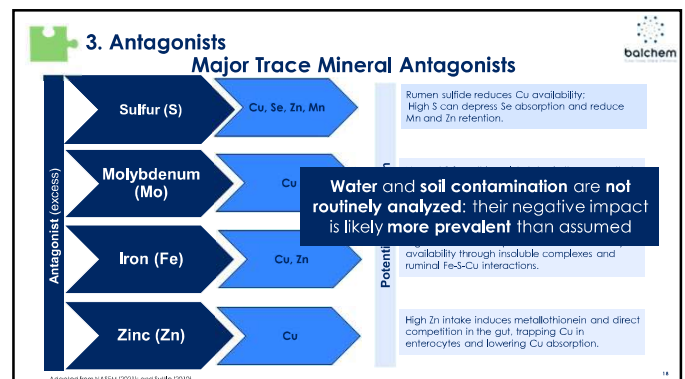
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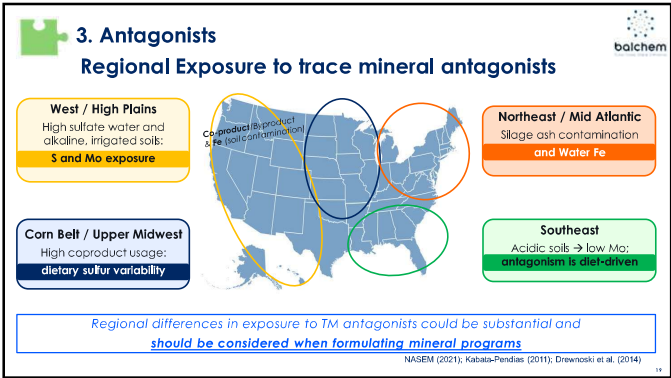
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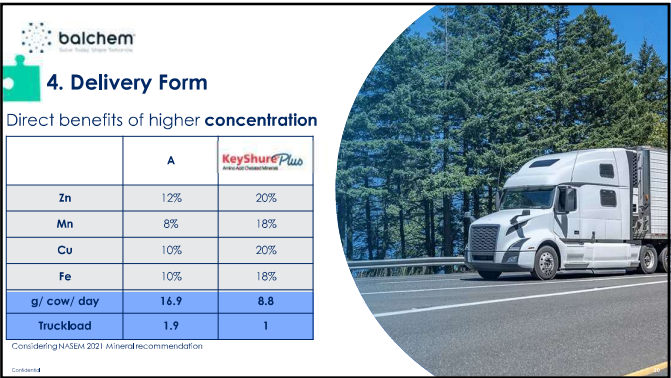
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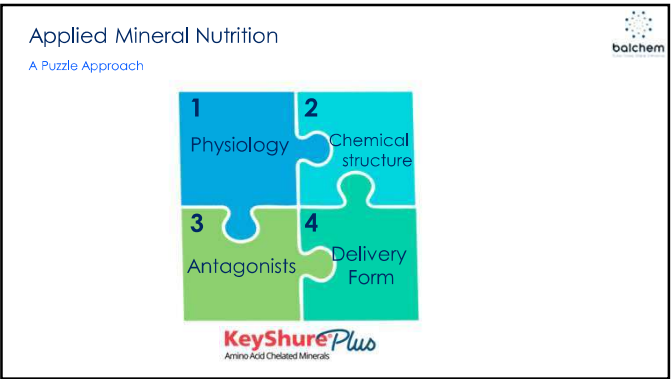
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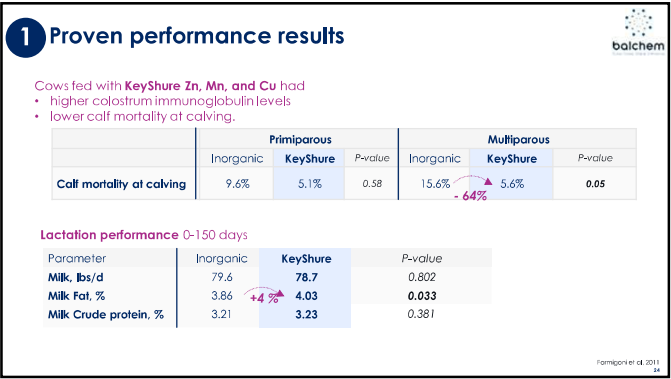
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2 Bioavailability - Independent study

University of Florida

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Estimated relative bioavailability (RBV) of Zn sources based on biomarkers

Species / Biomarker	Zn Sulfate	Zn Amino Acid	Zn Methionine	KeyShure Zinc
Broiler (Bone)	100%	96%		130%
Broiler (Mucosa)	100%	81%		109%
Lamb (liver metallothionein)	100%	111%	116%	131%

Cao et al. 2000

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How to choose the best source of chelated mineral?

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- ✓ Proprietary Chelation Technology
- ✓ Fewer nutrient interactions
- ✓ Superior Bioavailability
- ✓ Proven performance results
- ✓ Highest concentration
- ✓ Excellent physical characteristics

KeyShure^{Plus}
Amino Acid Chelated Minerals

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KeyShure minerals: check all the boxes

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