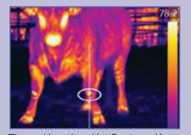
OXIDATIVE STRESS CAN IMPACT YOUR HERD IN A VARIETY OF WAYS.

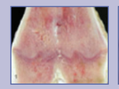
JOINT HEALTH



Thermal Imaging- Hot Spots on Knees

Are you sure the problem is in the hoof? Time to look up and see the real problem.

Knee Structure



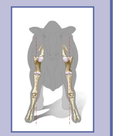
Normal Growth Plate

Abnormal Growth Plate

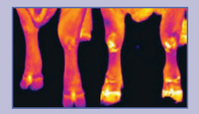
Oxidative stress attacks fast growing tissues, like the growth plates. Free Radicals attack the plates, causing abnormal growth and cell death, leading to crushing of the plate and uneven growth

Uneven growth results in awkwardness of stance leading to uneven wear of joints. This uneven wear causes lesions of the cartilage and eventually bone-on-bone erosions. As you can imagine, uneven hoof wear is also a symptom.

Straight Bone Structure



Splayed Bone Structure



Thermal Image

Normal Knees Hot Knees

Dairy Cow Joint with Erosion

GUT INTEGRITY

Stressor

↓

Oxidative Stress

↓

Tight Junction Dysfunction

↓

Increased Luminal Permeability (Leaky Gut)

↓

Endotoxins & Other Large Compounds Leak Into Bloodstream

↓

Immune Activation/ Inflammation

No other product can measure up to the positive effect of DuoPort

These *Bypass Minerals* provide new and innovative pathways for increased mineral levels in the animal

After a year of consistent DuoPort usage, one farm reported 38% decrease in total drug costs and another eliminated 50.5% of their drug costs. This translates to tens of thousands of dollars in savings.

www.tracerminerals.com

The real Amino Acid Chelated trace minerals from Tracer come from a history of nearly 60 years of industry and university research.

Bypass Minerals provide new and innovative pathways of absorption resulting in the increase of mineral levels in animals.

DUOPORT GPX

Zn Cu Mn Mg K

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"You can trace every sickness, every disease, and every ailment to a mineral deficiency."
-Dr. Linus Pauling, Two Time Nobel Prize Winner

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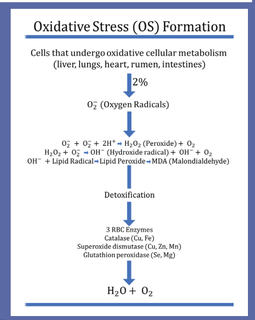
What is Oxidative Stress?

Cells utilize a metabolic system to produce energy that also produces free radicals as a byproduct. These free radicals bind to proteins, genetic material, and cell membranes resulting in cellular damage/death, tissue destruction, and organ malfunction. Essentially, it is the body producing Free Radicals faster than the body can clear them, resulting in oxidative stress.

What Causes Oxidative Stress?

Free Radicals are naturally produced as a part of metabolism. Stressors ramp up this production and outpace the body's coping system. Stressors can vary from heighten production, partition, environmental factors, immune challenges, etc.



Symptoms

- Retained Placenta
- Metritis
- Subclinical Fatty Liver Disease
- Ketosis
- Mid to late lactation indigestions
- Abomasal ulcers
- HBS (Hemorrhagic Bowel Syndrome)
- Lower milk quality
- SARA (Subacute Ruminal Acidosis)

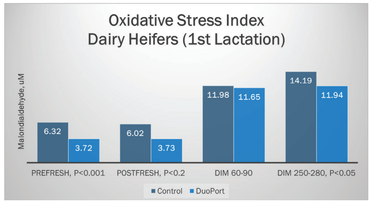
How to Alleviate Oxidative Stress?

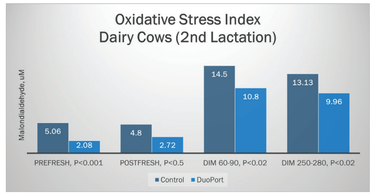
1. Remove Initial stressor
   - Time
   - Money
   - Effort
   - Sometimes noncontrollable
2. Give the animal the correct nutrition to clear the Free Radicals
   - Copper and Iron to make Catalase
   - Copper, Zinc, and Manganese for Superoxide Dismutase (SOD)
   - Selenium and Magnesium for Glutathione Peroxidase (GPX)

Not all minerals are created equal
Amino Acid Chelated Minerals stand apart from the others in a multitude of ways.
-Small molecular size/weight
-Amino acid ligand
-1:1 molar ratio
-Heterocyclic ring structure
-Electrically neutral

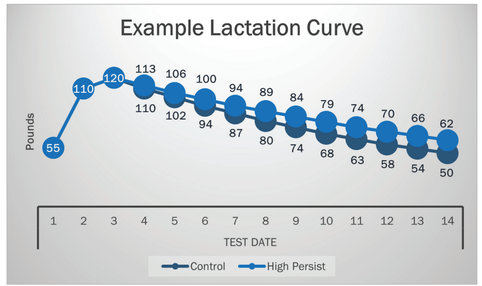
Only a True Amino Acid Chelated Mineral bypasses the duodenum and is absorbed as an amino acid in the Jejunum. This gets more of the mineral into the animal's circulatory system to build enzymes to break down Free Radicals and reduce oxidative stress.

EXTEND PEAK PERSISTENCY, ENCOURAGE ANIMAL LONGEVITY, AND INCREASE PROFITABILITY.





One way to quantify Oxidative Stress is to measure circulating levels of Malondialdehyde in the blood. This simple test can speak volumes to what we miss until the animal has progressed to the point of being symptomatic.



Value of High Persistency: Both groups peaked at 120 pounds of milk, with the high-performing animal declining in milk at 6 percent and the control declining at 8 percent. At the first measured decline, the control animal was only 3 pounds behind the high performer, but the gap in production steadily widens. By test day 14, the spread is at 12 pounds of milk, and the high-performing animal has out-produced the control by more than 2,665 pounds of milk, even though they peaked at the same level. If the value of this milk is 15 cents per pound, that would be **$400 per cow.**

Progressive Dairyman, 2018

Ovarian Activity of Animals Fed Amino Acid Chelated Minerals vs. Controls		
	Control, %	AA Chelates, %
Follicle 1 (Small)	40.5	45.1
Follicle 2 (Medium)	11.9	19.6
Follicle 3 (Large)	0	1.9
Corpus Luteum	16.7	9.8
No Activity	26.2	21.6
Cysts	4.9	1.9

"Cattle may not absorb enough minerals from inorganic sources to meet the needs of those animals under the stress of parturition and lactation."

Addition of amino acid chelated minerals to the ration resulted in:
- Increased ovarian activity
- More effective involution and regeneration of endometrial tissue
- Fewer persistent bacterial infections
- Less scarring
- Less incidence of endometritis
- Fewer embryonic deaths
- 45 days earlier conception

"Results of this study indicate that the mineral and nutritional status at the cell level is vital to endometrial pathology, embryonic viability, and overall fertility in cattle."

Manspeaker et al., 2004 University of Maryland

Montana Dairy Field Study

Treatment with Amino Acid Chelated Minerals Pack Resulted In:
1) Increased growth rate
2) Renewed black and white pigment in hair coat
3) Elimination of nasal discharge
4) Reduced incidence of ringworm
5) IgM levels increased to almost normal, IgG:IgM ratios returned to normal

Trace mineral nutrition is very important for maximizing performance in terms of reproduction, immunity, milk, and meat production as well as overall herd health. The digestive system is unable to absorb sufficient amounts of inorganic trace minerals in many situations, especially during periods of stress. To overcome this shortfall, Tracer bypass minerals help fill this gap by providing an alternative delivery system into the body. To achieve maximum absorption, both inorganic and amino acid chelates should be fed.

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