MetaSmart®
THE UNIQUE ISOPROPYL METHIONINE ANALOG FOR RUMINANTS

METHIONINE
MORE THAN MILK

MetaSmart®
MetaSmart®
Methionine - More than Milk

ESSENTIAL FOR MILK PROTEIN / FAT SECRETION

In all dairy rations, there is a shortfall in the amount of methionine available compared to the methionine requirement.

MetaSmart® is the isopropyl ester of the hydroxy analogue of methionine (HMBi). It is available in both liquid and dry formulas.

AN EXCELLENT SOURCE OF METHIONINE

The keys to the success of MetaSmart® are:

- Provides HMB to the rumen microorganisms
- Effective source of metabolizable methionine
50% of MetaSmart® is available as HMB for utilization in the rumen. The other 50% is absorbed through the rumen wall, hydrolyzed to HMB and is available as a metabolizable methionine source to the cow.

MetaSmart®:
- is very stable in liquid feeds
- can be pelleted
- can be included in most protein blends and base mixes*

* See User’s Guide for details on MetaSmart® handling and application
MEETING METHIONINE REQUIREMENTS
Milk is Just the Tip of the Iceberg

ENERGY CORRECTED MILK (ECM)
Optimal ration concentrations of MET and LYS maximizes milk volume, protein and fat

MORE THAN MILK

PROTEIN SYNTHESIS
Methionine is the key AA needed to initiate protein synthesis

LIVER HEALTH
Methionine plays a key role in the formation of VLDLs to export fat out of the liver

ANTIOXIDANT
Methionine is the precursor of taurine and glutathione, a very important antioxidant

EPIGENETICS
Methionine influences genetic expression through methylation of DNA
Elevating blood plasma methionine levels promotes better liver function, increases antioxidant levels, decreases inflammation and improves oxidative stress capacity.

### Liver Function and Antioxidant

<table>
<thead>
<tr>
<th>Liver Function and Antioxidant</th>
<th>Control</th>
<th>MetaSmart®</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carnitine, nmol/g tissue</td>
<td>37.5</td>
<td>98.2</td>
<td>.01</td>
</tr>
<tr>
<td>Glutathione, mM</td>
<td>1.27</td>
<td>1.55</td>
<td>.09</td>
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</tbody>
</table>

### Inflammation and APP

<table>
<thead>
<tr>
<th>Inflammation and APP</th>
<th>Control</th>
<th>MetaSmart®</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceruloplasmin, umol/L</td>
<td>3.02</td>
<td>2.68</td>
<td>.03</td>
</tr>
<tr>
<td>Serum Amyloid A, ug/mL</td>
<td>61</td>
<td>40.7</td>
<td>.17</td>
</tr>
</tbody>
</table>

### Oxidative Stress

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Oxygen Radical Absorbance Capacity, mmol/L</td>
<td>11.9</td>
<td>12.9</td>
<td>.05</td>
</tr>
</tbody>
</table>

(Chen et al., 2011 Journal of Dairy Science 94:1978)

Osorio et al., J. Dairy Sci. 94:7437
PRACTICAL STEPS TO BALANCING DAIRY RATIONS FOR AMINO ACIDS

Feed a balanced ration that provides a blend of fermentable carbohydrates and physically effective fiber to optimize yield of microbial protein and optimize rumen health.

Minimize Rumen Undegradable Protein inclusion, as on average, RUP has lower concentrations of both Lys and Met than microbial protein.

A rumen protected methionine source will need to be included to achieve the optimal ratio of LYS to MET.

Feed adequate, but not excessive, levels of Rumen Degradable Protein to meet rumen microbial needs for amino acids and ammonia.

To reach the target formulation level of LYS as a % of MP, include high LYS protein ingredients and a rumen protected lysine as needed.

Only use rumen protected sources of MET or LYS whose efficacy has been validated by the Plasma-Free Amino Acid Dose-Response Method.

Respecting the target formulation LYS and MET concentrations allows daily metabolizable protein supply to be decreased by 100 to 150 gs economizing on expensive RUP and creating formulation space for other nutrients that can further enhance the cows performance.