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THE NUTRITIONAL CONSULTANT'S DIGEST

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ANIMAL NUTRITION
Providing Science Based Solutions

ENERGY BOOSTER Mag™

ENERGY BOOSTER MAG™ (EB Mag), with magnesium is the same high quality rumen inert saturated fatty acids as *Energy Booster 100®*, except a magnesium ion has been attached to a small portion of the fatty acids (FA). By attaching the fatty acids to magnesium, referred to as partial salting, the fat prills formed are harder and have a higher melting point than with *Energy Booster 100*. The partial salting process results in improved handling properties in feed mills and on farms during hot weather.

Why use EB Mag?
The partial salting of free FA with magnesium increases the flowability and thereby increases the amount *EB Mag* that can be included in grain or protein mixes over *Energy Booster 100*. However, it is recommended no more than 10% of any concentrate mix be *Energy Booster* for the best mixing and handling of mixes. On farms, with separate inclusion of *EB Mag* into TMRs, feeding recommendations are the same for dairy cattle as *Energy Booster 100* at 0.5 to 1.5 lb/head/day.

What is the fat content of EB Mag?
The FA composition of *EB Mag* is similar to *Energy Booster 100*. All *Energy Booster* products have FA formulations designed to increase energy density in dairy cow diets without reducing dry matter intake. *EB Mag* has a slightly lower FA percentage guarantee at 93% than *Energy Booster 100* (98%), but *EB Mag* also contains 2.3% magnesium.

Is there less energy in EB Mag than Energy Booster 100?
EB Mag has the same energy availability as *Energy Booster 100*, but the total energy value will be slightly less because of the higher mineral (magnesium) content than *Energy Booster 100* (see below for nutrient specs). The digestibility of *EB Mag* will remain high at over 75% as shown by the Dairy NRC 2001 for saturated free fatty acids.

What happens to EB Mag in the rumen?
EB Mag is predominantly saturated fatty acids so it is inert in the rumen and has no effect on rumen bacteria. Most magnesium will not be released from FA acids in the rumen, but will be hydrolyzed from fatty acids entering the small intestine.

If the rumen is the primary site of magnesium absorption in adult ruminants, is the magnesium in EB Mag available?
Because it is attached to saturated fatty acids and there is limited dissociation occurring in the rumen at the normal pH between 5.5 and 6.5, the majority of the magnesium in *EB Mag* is likely not absorbed from the rumen. Keep in mind that cattle and sheep research indicate not all magnesium is absorbed from the rumen.

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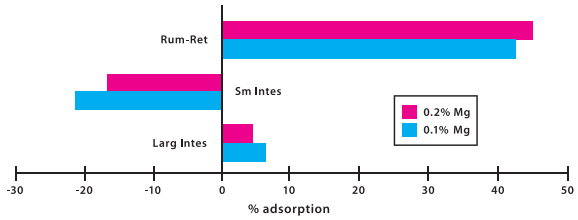
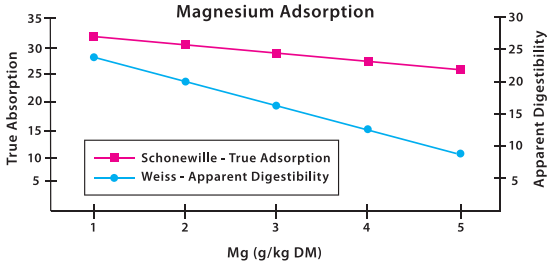


Greene et al. (1983) found 4 to 8% of dietary magnesium can be absorbed from the large intestine or bowel while Robson et al., 1997 found an inverse relationship between absorption of magnesium from the rumen and large intestine suggesting a homoeostatic mechanism for magnesium in ruminants. Other research (Field and Munro, 1977; Tomas and Potter, 1976) has also shown magnesium can be absorbed from the bowel. It is also been shown absorption of volatile fatty acids from both the rumen and colon stimulate magnesium absorption as the cation in salt formation of these acids Scharrer and Lutz, 1992).

High producing dairy cow diets should be balanced for 0.35 ± 0.05% magnesium (DM basis). Weiss (2004) and Schonewille et al. (2008) both have shown magnesium absorption from the rumen decreases as potassium content of the diet increases and probably only averages about 18% in typical high producing cow diets. Some of the magnesium in *EB Mag* will be available for absorption post ruminally and amounts absorbed will depend on physiological needs of the cow.



Reducing the *EB Mag* value from 2.3 to 0.5% in the feed nutrient specifications of your ration balancing software is a safe approach to meeting the nutrition needs of the cow. This value would be consistent with the 18% digestible values shown by Weiss (2004), Schonewille et al. (2008) and Holtenius et al. (2008).

Nutrition specifications for EB Mag in dairy ration balancing software.

Nutrient	Value – DM basis	Nutrient	Value
DM	98.5 %	Total Fatty Acids	93.7 %
Crude fat	93.7 %	Glycerol	0.0 %
Ash	4.6 %	Fatty acids	--- % of total ---
Magnesium	0.5 %	Saturated	> 80 %
ME – 3x	3.07 Mcal/lb	Unsaturated	< 20 %
NE_L – 3x	2.45 Mcal/lb		

A. B. Robson, A.B., A. C. Field, A. R. Sykes and A. E. McKinnon. 1997. Brit. J. Nutr. 78:975-992.
Greene, L.W., J. P. Fontenot and K. E. Webb, Jr. 1983. J. Anim. Sci. 57:503-510.
Holtenius, K., C. Kronqvist, E. Briland and R. Spörndly. 2008. J. Dairy Sci. 91:743-748.
Schonewille, J. T., H. Everts, S. Jittakhot and A. C. Beynen. 2008. J. Dairy Sci. 91:271-278.
Weiss, W. P. 2004. J Dairy Sci. 87:2167-2171.