

## Nutrient Specifications

Dry Matter	97.5%
L-Methionine Activity	84%
Effective Crude Protein Value	49.4%
Calcium	12%
Metabolizable Energy Poultry	4,014 Kcal/.Kg
Metabolizable Energy Swine	4,395 Kcal/.Kg

### Product Characteristics:

- Appearance: Tan to light tan granules
- Odor: Sulfur

### Storage:

Store at ambient temperatures in a sealed container. Keep it dry at all times.

## Environmentally Sound

### NITROGEN-FREE

MHA allows for optimal feed formulation, minimizing the over formulation of nutrients. The result is increased performance, greater nutrient utilization, and ultimately lower levels of waste entering the environment. MHA has a unique nitrogen-free chemical structure, which serves to lessen the environmental impact of animal agriculture.

## About Novus

Novus International, Inc. is headquartered in St. Louis, Missouri, U.S. and serves customers in more than 80 countries around the world. An industry leader in animal nutrition and health, Novus products include ALIMET® and MHA® feed supplements, ACTIVATE® nutritional feed acid, ACIDOMIX® preservative premixture, ADVENT® coccidiosis control, MINTREX® organic trace minerals, SANTOQUIN® and FEEDGUARD™ feed preservatives and many other specialty ingredients.

### CONTACT US

If you are interested in learning more about MHA please contact your local Novus representative or visit us online at [www.novusint.com](http://www.novusint.com).

<sup>1</sup> 2003, CCL Research, P. Enthoven, AC Veghel, The Netherlands

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# Chemically Different, Functionally Better

*The Benefits of Dry Hydroxy Analogue*



### Why MHA?

- 84% GUARANTEED Minimum Methionine Delivery
- Dry, Granulated Formula
- Organic Calcium Source
- Acidification Inhibits Bacterial Growth<sup>1</sup>
- Excellent for feedmills, premixes, concentrates and farm mixing feed applications

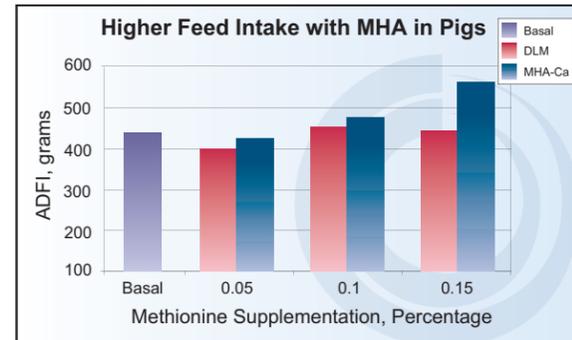
**NOVUS**  
PERFORMANCE THROUGH INNOVATION

## MHA Benefits

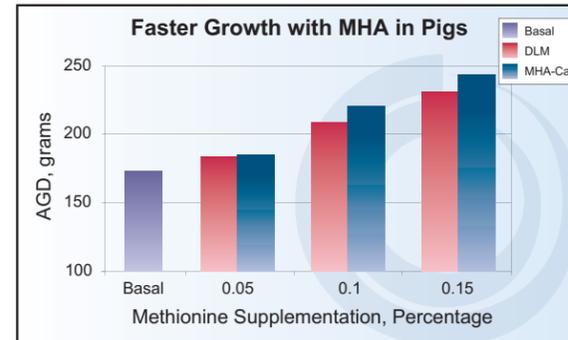
For over 50 years animal producers have relied on MHA as their preferred methionine source for livestock. MHA is a trusted solution for incorporating HMTBa into high nutrient density feeds. Because of its dry granulated form, MHA is very cost effective and provides many additional benefits beyond methionine.

### UNSURPASSED METHIONINE EFFECTIVENESS

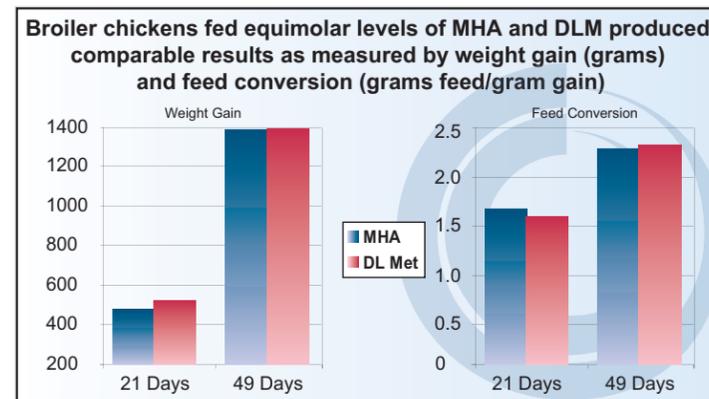
Five decades of practical experience in commercial feed production have confirmed the value of MHA as an effective methionine source. The addition of MHA has been demonstrated to improve body weight gain and feed conversion in poultry, pigs and other livestock.



Stockland showed that MHA® use resulted in better average daily feed intake, with the maximum intake occurring at the highest concentration.



The average daily gain was shown to be equivalent, or even superior, with MHA® when compared to DLM.



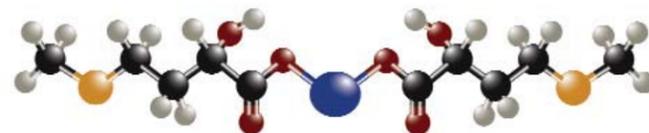
Adapted from Waldroup et al 1981 Poultry Science 60:438-443

### UNIFORM MIXING AND CONSISTENT FEED BLENDS

MHA's granulated and uniform particle size results in a product that is virtually dust-free. MHA mixes thoroughly and easily into feed to create a uniform mixture. The payoff is a consistent, more properly balanced diet for livestock day after day.

### ORGANIC CALCIUM SOURCE

MHA is a source of organic calcium. Calcium is key to improving shell strength in poultry. In addition, proper dietary calcium balance promotes structural bone integrity and the health of bone marrow.



### THE ACIDIFICATION ADVANTAGE

An additional benefit unique to MHA is that once in an acidic environment, MHA is completely dissociated into HMTBa. MHA can also have a synergistic effect with other organic acids, helping to increase their anti-bacterial properties. MHA has been shown to inhibit growth of bacteria including *Salmonella* and *E.coli*.<sup>1</sup>

## Benefits Beyond Methionine

### CHEMICALLY DIFFERENT, FUNCTIONALLY BETTER

Due to its unique chemical structure, MHA is metabolized differently by animals, resulting in many additional benefits beyond methionine.

### ABSORPTION AND BENEFITS DURING PERIODS OF STRESS

Animal's absorption of DL-Methionine is an energy dependent, active mechanism across the intestinal membrane. MHA, in contrast, is absorbed via passive non-saturable diffusion without the need of energy or an active transport mechanism. Site absorption represents another distinction between MHA and DLM. DLM is primarily absorbed across the ileum, while MHA is absorbed along the entire length of the gastro-intestinal tract. These differences translate into improved performance and profitability during periods of stress, particularly heat stress.

### MHA - A NATURAL PRECURSOR OF METHIONINE

The active compound of MHA (HMTBa) is naturally found in plants, microbes such as yeast and lactobacillus, mammals and poultry. This indicates that animals are well equipped to fully utilize MHA as a source of L-Methionine.

## MHA Livestock Applications

### POULTRY

MHA is an effective, economical source of methionine for broilers, layers, turkeys, and ducks. Benefits for poultry include:

- Reduced Nitrogen Excretions
- Organic Acid Benefits
- Better Performance During Heat Stress

Usage Guidelines: 0.125 to 0.25% of Complete Feed

### SWINE

Modern swine genetics demand methionine supplementation for optimal performance and MHA is the preferred solution. Benefits for pork include:

- Effective Source of Methionine
- Organic Acid Benefits
- Valued Calcium Source
- Accelerated Growth Rate at Higher Supplementation Levels

Usage Guidelines:

**Nursery (6-30 kg):** 0.1 to 0.2% of complete feed

**Grower (30-60 kg):** 0.04 to 0.15% of complete feed

**Finisher (on Paylean®):** 0.04 to 0.10%

## Key Facts About MHA

### METHIONINE ACTIVITY

- 84% Guaranteed Minimum Methionine Delivery
- 100% Monomeric Form

### DRY, GRANULATED FORMULA

Excellent for feedmills, premixes, concentrates and farm mixing feed applications.

### ORGANIC CALCIUM SOURCE

Properly balanced dietary calcium improves shell strength, bone integrity, and the health of bone marrow.

### ACIDIFICATION INHIBITS BACTERIAL GROWTH<sup>1</sup>

In an acidic environment, MHA has been shown to inhibit the growth of bacteria including *Salmonella* and *E. Coli*.

# MHA®