



## **LAKEVIEW ORGANIC GRAIN**

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### **So what's the scoop on Methionine?**

The role of methionine in chicken feed is probably one of the thorniest questions in organics, and therefore, gets a thorny and complicated answer!

- No one disputes that chickens require a substantial amount of methionine to produce feathers, efficiently convert feed to meat, and have a healthy immune system. A chicken that is deficient in methionine will generally be poorly feathered, may have mites and other parasites, and may peck at other chickens, drawing blood and eating feathers.

- No one also disputes that most grains are relatively low in methionine, and therefore chickens, allowed to forage naturally, supplement with insects. Birds by their evolutionary nature are usually omnivores, eating quite a lot of methionine-rich animal protein, they are really not vegetarians by choice. But in confinement, they don't have that choice. There are some grains that are higher in methionine, such as sesame hulls, corn gluten meal, and rice hulls, but these products are not widely available as organic and the methionine level in these products is not terribly consistent. Also, in order to get enough methionine from a plant-based protein, often the overall protein level of the feed may be pushed too high.

### **The question is, under organic rules, how is the best way to supply methionine?**

Early on, as the National Organic Program was being crafted, some of the designers reasoned that if synthetic methionine was prohibited, that would limit the growth of large-scale organic chickens, because those birds could never be supplied by sufficient insect protein. This would preserve the emerging market for the smaller pastured flocks, who, if the insect levels were not high enough, could use crabmeal, shrimp meal, fishmeal, worms, algae or whey. (I have serious ecological issues with fishmeal, but that is another issue or two . . .). There has also been some research on pasture grass/legume species such as clovers that are higher in methionine, and whether that can supplement adequately but the consensus appears to be yes maybe in the spring in most places, but perhaps not as well later in the year or in a drought/excessive rain.

The purists went as far as to propose that all synthetic amino acids be prohibited under organic standards.. This was effectively countered by the emerging powerful Big Organic Chicken forces, and methionine football was kicked back and forth. <http://articles.extension.org/pages/69042/synthetic-methionine-and-organic-poultry-diets>

After MUCH controversy and heated debate (that still continues), in 2012, the National Organic Program revised their original position to this -

**§ 205.603 Synthetic substances allowed for use in organic livestock production.**

In accordance with restrictions specified in this section the following synthetic substances may be used in organic livestock production:

(d) As feed additives.

(1) DL-Methionine, DL-Methionine-hydroxy analog, and DL-Methionine-hydroxy analog calcium (CAS #'s 59-51-8, 583-91-5, 4857-44-7, and 922-50-9)—for use only in organic poultry production at the following maximum levels of synthetic methionine per ton of feed: Laying and broiler chickens—2 pounds; turkeys and all other poultry—3 pounds.

At Lakeview, we have tried to walk a fine line between what the purists demand, and what appeared to produce the best chickens. For awhile, we used a Fertrell poultry mineral without synthetic methionine, with crabmeat added to the ration, but after the quality of our crabmeat source declined precipitously, it seemed best to look elsewhere. That is when we settled on the Crystal Creek Poultry Pro minerals that contains 4% methionine, or 2 lb/50 lb bag, which - since most of our poultry rations call 50 lb/T, is delivering exactly 2 lb/T. I have found that for most people, the Crystal Creek rations work very well for layers, and fairly good for broilers.

However, that said, we do have a few customers - especially those raising turkeys - who feel that this level of methionine is too low and are concerned that adding more minerals to a ration will increase methionine while overloading over minerals. I think this is possible, so we just stay firmly within the organic standards to be safe. For customers who are not themselves organically certified, there is really nothing holding them back adding a little more dl-methionine in the feed, except that a little goes a very long way and another pound or two is not easy to mix uniformly into a ton of feed. DL-Methionine is readily available, but it is not cheap, a 50 lb bag of dl-methionine last year cost about \$250.00.

If a customer wishes to enhance their methionine level beyond organic standards, they must provide rations to us and we can make the feed on a strictly custom basis and we will not label it as 'certified organic' feed if it exceeds 2 total lb/T for chickens, 3 total lb/T for turkeys. First, customers might also want to read this ATTRA publication which has some rations [.https://attra.ncat.org/attra-pub/viewhtml.php?id=336#2](https://attra.ncat.org/attra-pub/viewhtml.php?id=336#2).

**The Importance of Management**

There are some other very important management considerations regarding methionine (or shall we call it meth?), and how best to approach this issue.

- **There are natural sources** that could be supplemented or provided free-choice that would raise the methionine level such as crabmeat, shrimp meal or alfalfa meal.

**- Do you have access to any quantities of whey from cheese, ricotta, butter or yogurt?** Chickens love liquid whey, as a supplemental liquid source, and that is a good source of methionine.

**- Do you compost food waste?** If so, adding some 'red wiggler worms' to the compost (vermicompost) not only will make the process go faster and make a higher quality compost product, it will generate worms! Your customers may find it a little gross if you explain that the chickens ate live worms fed on food waste compost, but the chickens certainly will not! Worms are a fine source of methionine, and if you have ever seen a chicken eating a worm, you will know why dinosaurs still walk (and peck) among us.

**- How about raising crickets?** One of the best natural sources for methionine is chitin, the protein that makes up the shells of insects and crustaceans. Your chickens would absolutely love daily treats of crickets!

**- Go out now and frost-seed medium red or crimson clover seed,** at a rate of 10 lb/A, into the pastures that your chickens and turkeys will graze. The seed will settle itself into the soil over the next month, through freezing and thawing, and will be growing by late spring. Adding some alfalfa seed (another legume), and some kale or forage turnip (both brassicas) will increase the level of methionine produced by pasture. The idea is to add more broadleaf plant diversity to a primarily grass pasture. Chickens prefer relatively short, young and actively growing pasture - frequent mowing or co-grazing with cows, and some attention to rotational grazing, will control and improve re-growth to be more palatable. Feeding garden and vegetable processing waste to chickens will also add nutritional diversity to a grassy pasture. There is a very useful ATTRA publication on poultry pasturing that describes the value of different pasture species in detail.

**- If your chickens are NOT generally raised on pasture, this year would be a good year to start.** Not only will they be healthier, they will get fresh greens, insects, fiber, grit, more exercise, less disease, better socialization, and a clean home once a day, and the meat will be higher in vitamins & color, the yolks higher in omega-3's & color, and lower in cholesterol.

**- Feeding sprouted oats and barley** is a good way to add both enzymes or nutrients to chickens, especially during the winter. This is very labor intensive, and mold is always a risk, but we have customers who sprout grains every day in 5 gallon pails for their chickens. Whether this is feasible or not depends entirely on how many chickens you have.

**- Make sure that chickens have the right size grit** (granite dust) for the age, free choice, is also important for optimal feed utilization. We carry 4 sizes of grit - starter, grower, layer and turkey. You would be amazed how much grit some of our larger-scale Amish turkey producers go through each fall, but they feel very strongly that it makes for healthier sturdier bigger birds and lower feed bills. Most laying hens do much better if provided a pan of layer grit, free choice. Grit is insoluble small pieces of granite that lodge in the gizzard (=crop) and is used by the bird as 'teeth' to grind the food, while

oyster shell is a source of soluble calcium. Both are important, but they are NOT the same product, nor are they interchangeable. For chickens that don't peck on real dirt, providing grit is especially important.

- **Raise slower growing breeds of chickens.** The fast modern Cornish Cross birds have a very high, easily soluble methionine requirement, because that is the condition they were bred and raised for. The older slower growing heritage breeds were selected for a lower 'octane' diet, but also more exercise and variety of feed ingredients. Most people feel that slower growing birds have more flavor, but can be a little tougher, without the same meat-density that Americans are accustomed to.

- For us organic producers, the methionine level allowed under organic standards is probably adequate under normal conditions, as long there are not **social and environmental issues** going on in the flock/housing that prevents some birds from eating enough feed. If there is bullying - and believe me, that does happen with chickens - or inadequate trough space, some birds will lose out. It is worth observing the flock at feeding time to see if some birds can't get to the trough. Inadequate clean water and waterer space can also prevent good access to/utilization of feed. If there are other environmental issues that reduce bird comfort - such as poor air or temperature control, lighting issues, lice and other parasites, being overcrowded - that too will prevent good feed utilization.

- **If there is significant variation in carcass weight or meat quality that is not clearly gender-related, this could indicate environmental and social issues** that prevented some birds from eating and drinking as they should, or from being comfortable enough to optimally use what they did eat. It is always easy to 'blame it on the feed' when the end result falls short, but more often, the causes are either environmental or synergistic.

Averaging over week 4 - week 9, a Cornish Cross type chicken will eat about 0.27 lb of grower feed each day, or a little over 4 ounces (the original 'quarter pounder'!). If there is only 2 lb of dl-methionine per ton (2000 lb) of that feed, then there is 0.00027 lb or 0.004 oz of methionine in the chicken's daily feed intake. Anything that interferes with a particular chicken getting 0.27 lb each day can quickly set up deficiency.

- **Methionine is one of 3 essential amino acids that require sulfur.** Without a supply of sulfur, a plant can not build methionine. That means that clover grown in a soil deficient in sulfur will have a much lower level of methionine than one grown with no deficiency.

Sulfur is an interesting plant nutrient in that it is negatively charged (most essential elements are positively charged). That means it is attracted ironically to calcium or magnesium, forming highly soluble gypsum or Epsom salts when either are in excess or the soil is unbalanced. Once bonded, the calcium sulfate or magnesium sulfate leaches easily. We used to be well supplied with sulfur in the northeast, in the good-old-days of acid rain, but once that was cleaned up, a lot of our souls are deficient.

A soil overfertilized with manure will have excess nitrogen and phosphorus, which drives out calcium and magnesium, taking sulfur with it. If birds are grazing on pasture with overfertilized soil, such as areas where chickens heavily have been in recent years, the soil may be deficient in sulfur, which will produce plants low in methionine.

**The solutions to deficient soils?**

1. Soil tests of the pastures to check sulfur levels.
2. Gypsum (calcium sulfate ) fertilizer on pastures early in the seasons according to soil test results
3. Frequent moving of chickens so no one spot gets overloaded with manure.
4. Reseeding a pasture with sulfur accumulators like clover.

**It is important to put this whole issue of methionine in perspective because -**

1. Chickens need only a very small amount of methionine, but it is indeed an essential nutrient that chickens must get adequately in their feed in order to be healthy.
2. Anything that disrupts a chicken eating their daily 0.27 lb of feed, such as discomfort or competition, could set up deficiency of any nutrient.
3. Addressing and correcting nutrient deficiencies in chickens must be more than just a feed issue. It must be a comprehensive management approach.
4. There are plants and animal byproducts that can be used to provide supplemental methionine, but this must be done in an intentional manner, carefully evaluating the performance of the birds.
4. Little improvements can make a big difference!

The bottom line is that most commercial poultry producers, organic and conventional, find it very easy to mix some of that 'white magic meth powder' into their feed, and that cures the deficiency problem.

**But we should not forget that we do indeed have other tools and other things to consider!**