



# The AminoMax Digest

*The Future of Amino Acid Nutrition.*

*Fall 2015*

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## AminoMax Updates.

AminoMax is a blend of high protein bypass canola meal and high-protein bypass soybean meal formulated to provide an amino acid profile that meets the needs of dairy cows. Research has demonstrated the value of the product, and we are continuing to conduct research to allow the product to be used in dairy rations with confidence. Here are some of our most recent findings:

### AminoMax goes to ADSA!

Two poster presentations at ADSA meetings in July demonstrated the benefits of the AminoMax process.



The first was presented by Dr. Heather Tucker from the Miner Institute. Diets were formulated with 7.7% AminoMax (41.6% crude protein) or 7.7% AminoPlus (50.8% crude protein). The diets were given to 42 mid-lactation cows (21 per treatment) for an 8 week feeding period. Even though AminoMax provided less protein, there were no differences in milk or milk component yields. Milk urea nitrogen averaged 9.6 mg/dL for the AminoMax fed cows, as compared to 11.4 for the cows that were given AminoPlus. AminoMax is a compact source of essential amino acids for dairy cows.

The second poster was presented by University of Nevada student Eduardo Paula. In this experiment, cows were given diets (15.7% crude protein) with either 8.6% untreated soybean meal, 11.4% untreated canola meal, or 11.4% canola meal from the AminoMax process.

#### Summary of Results

Measurement	Soybean Meal	Canola Meal	Treated Canola
DMI, Lb/day	57	58.3	59.6
Milk, Lb/day	86.7	88.7	92.2
FCM/DMI	1.64	1.67	1.7
Fat, Lb/day	3.41	3.52	3.67
Protein, Lb/day	2.6	2.66	2.86
MUN, mg/dL	14	12.9	12.5

As the results show, cows given canola meal out-performed those given soybean meal. And results only got better with the AminoMax processed canola meal.

### Let's talk digestibility!

In addition to feeding studies, Afgritech has been investing in research to fully understand how processing influences the nutritive value of AminoMax.



#### AminoMax: High RUP digestibility

Ingredients with low rumen undegraded protein (RUP) values tend to have low RUP digestibility values. That sounds strange, but there is a reason for it: the indigestible material (ADF crude protein, or C fraction) is more concentrated in the RUP fractions.

The RUP fraction of protein consists of bypass protein that can be absorbed, as well as indigestible material that cannot be absorbed. Processes that improve RUP of proteins often result in increased indigestible protein, with some loss of the benefit of the higher RUP.

Let's look at the example. Sample 1 has 30% RUP, but only 20% of the total protein is digestible in the small intestines. Now this protein is processed to increase RUP. Sample 1 increases RUP without altering the C fraction. However, Sample 3 increases RUP, but some of the RUP is rendered unavailable.

#### Examples of RUP Digestibility – % of Total Protein

Sample	RUP	C Fraction	Digestible RUP
1	30	10	20
2	50	10	40
3	50	15	35

If sample 3 is compared to Sample 1, there is still an improvement in digestible RUP. However, the indigestible material, which will be lost in manure, also increased.

Thus, it is not really meaningful to compare ingredients based on RUP. It is important to be aware of the indigestible fraction as well.

Most forage analysis laboratories are now providing results for the Multi-Step Protein Evaluation (MSPE). This test provides information on the makeup of the digestible vs. indigestible distribution of the protein.

As noted, many processes improve RUP, but result in some increase in indigestible material-like sample 3 illustrates.

A study conducted at Cornell University revealed that the opposite occurs with AminoMax. Yes, the process improved RUP and RUP digestibility, but it also improved total tract digestibility at the same time, and improved the digestibility of the protein!

**Examples of RUP Digestibility – % of Total Protein**

Sample	RUP	C Fraction	Digestible RUP
Before	59	16	43
After	81	12	69

**But what about Lysine?**

Excessive heating reduces the availability of amino acids, and in particular lysine. Process control is critical to protect this amino acid, as losses in digestibility for lysine can often be greater than for less reactive amino acids.

Afgritech invested in a biological assay to determine the availability of lysine after processing. The study was conducted by Dr. R.M. Hulet at the Penn State Poultry unit.

A total of 1,728 broiler chicks were used in the study that included the following 4 treatments:

**TREATMENTS:**

1. Negative control-0.90% lysine
2. +0.15% Lysine Sulfate-0.98% lysine
3. +5% AminoMax-0.98% lysine
4. Positive control-1.02% lysine

There were no differences in weight gains at 18, 28 and 42 days of age for birds receiving treatments 2 and 3. Birds on the negative control diet were lighter, and those on the positive control diets were heavier than the two middle treatments.

Lysine sulfate is assumed to be 100% bioavailable. Results suggest that the lysine from AminoMax was as available as the lysine from lysine sulfate in supporting weight gain in the birds. This indicated that the process used to produce AminoMax is not damaging the protein.

**Canola meal fiber: Better than we thought**

Approximately 23% of the NDF in canola meal is in the form of lignin. Older models estimated the indigestible component of NDF by multiplying lignin \*2.4. This calculation suggests that over half of the fiber would never be digested. ME and NE-L were then calculated using the very poor fiber digestibility value. As a result, many nutritionists resisted using canola meal because the energy value was too low!



A joint research project conducted at Miner Institute and Cornell University clearly demonstrated that there is no relationship between lignin and fiber digestion for concentrate ingredients. Forage testing labs now routinely determine NDF digestibility. In fact, the NDF digestibility of canola is much better than previously calculated, contributing to higher calculated energy values.

**Want to know more?**

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