What's new with AminoMax?

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Part of the quality control program in Watertown is sampling every load of incoming soy and canola. All of these samples are submitted to CVAS for wet chemistry. As you can imagine, once some claims are filed, the variance in crude protein decreases! Weekly composite samples of finished products are also submitted to CVAS. These results are used to update the product spec sheets and tags using a four week rolling average. By doing this, you can be assured that the specs you have available for formulation are current. With this in mind, the latest set of results show how different suppliers can impact formulation. Canola sources are currently US based and the resulting crude protein is about 2 points higher (average over 42% DM basis). Offsetting this increase is a slightly lower fat (about 1 point lower) and over a full point lower ash. Thus, the resulting base AminoMax blend now is 43.8% crude protein, 2.4% fat, and 7.7% ash. The coefficient of variation on protein, moisture, fat and ash on finished products are all below 10% thus the blends from Watertown are very consistent. Evaluate your formulation system specs to ensure you can take into account these updated specs (ask Les for your specific specs).

RUP determination on the AminoMax products is challenging. Due to the manufacturing process, standard *in situ* methods fail due to particle size and other physical properties. Sieving prior to bagging the samples does work adequately. However, whenever a sample is sieved, it must be asked if the resulting sub-sample that is analyzed truly represents the whole feed. Fortunately, Debbie Ross and Mike Van Amburgh at Cornell have been working on this! They have been developing a new method for evaluating RUP, RUP digestibility, and amino acid flows and digestibility the last few years. As a quick background, they began with the classical Minnesota Three-Step that Marshall Stern developed. The Stern method relies on a 16 hr *in situ*, exposure to acid, and then pepsin digestibility. Debbie and Mike wanted to convert this to a complete *in vitro* method so that commercial labs would be able to implement the method. Thus, they do an *in vitro* first, then exposure to acid, then a custom blend of enzymes. The custom enzyme blend differs from pepsin in that it is meant to more closely represent the intestinal enzyme blend in cows. The new method is nearly ready for commercial application. Several samples have been submitted to Debbie for AminoMax analysis. The results confirm the sieved *in situ* data and clearly indicate the effectiveness and stability of the AminoMax process. Table 1 shows the RUP and RUP intestinal digestibility of raw soy and canola (representative samples of unknown source) and AminoMax Soy and Canola. While 65 and 79% RUP for Aminomax Canola and Soy, respectively, is impressive, the RUP intestinal digestibility is even more impressive. The apparent increase in digestibility is interesting but not being promoted! The next several rounds of samples to be submitted will include raw and finished products from Watertown as this could be a source of raw soy and canola, or it may be a true increase due to the process. At this point, that answer is unknown!

Table 1. RUP and RUP intestinal digestibility results from Ross and Van Amburgh

	RUP (% protein)	RUP Intestinal Digestibility (% protein)
Representative Raw Soy[a]	32.9	76.4
Representative Raw Canola[a]	44.7	63.9
AminoMax Soy	79.5	86.4
AminoMax Canola	65.4	73.7

[a]Representive samples from Cornell. Unknown source. Included for comparison purposes only.

Amino Acid analysis and digestibilities were also done. These results are a little harder to explain due to the new methodology. At this point, we can not use the resulting amino acid values from this analysis as they are in different units then CNCPS based models currently use. The CNCPS based models (AMTS, CPM, NDS) have amino acids expressed as %ISP (or %UIP). This was the older method where a standard soluble protein assay was done and then amino acids measured on the residue (the insoluble pool). Cornell is slowly moving towards amino acids expressed as a % of total nitrogen and there is no way to convert between these units. The values supplied with the AminoMax spec sheets were done on a set of samples at Cornell using the soluble protein residue. The datasets have been compared and the absolute differences within expected ranges given the differences in methodology. The critical values from the new methodology though are amino acid digestibilities. One of the dangers when using a cooking process is that amino acid, and specifically lysine, digestibility is decreased. A classic example of this is the data Sara Boucher presented at the Cornell Nutrition Conference on blood meal a couple years ago. The reduction in lysine digestibility occurred at a faster rate then the reduction overall intestinal digestibility. Previous internal data regarding the AminoMax process has shown that the method has minimal impact on lysine digestibility. This data was based upon chick bio-assays with chicks fed lysine deficient diets. The current data supports these findings as Table 2 illustrates.

As more samples are submitted and results become available, these tables will be updated to ensure that you have the current specs for formulation.

Table 2. Amino Acid total tract digestibility results from Ross and Van Amburgh

	Lysine (% total)	Methionine (% total)	Mean of all amino acids (% total)
Representative Raw Soy[a]	92.9	not analyzed	90.7
Representative Raw Canola[a]	83.3	not analyzed	83.2
AminoMax Soy	89.6	90.7	89.2
AminoMax Canola	83.1	83.8	82.4

[a]Representive samples from Cornell. Unknown source. Included for comparison purposes only.