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Feed2Gain, LLC

BoilerOpt™ Feed Program can Evaluate Ingredients and even Enzyme effects on Ingredients.

As we make a diet change, we can easily spot the effect of something new. The new feeding program either gives the results we predicted or the new ingredient is not properly assigned matrix values that work with the rest of our matrix. We can alter the expected energy or amino acids in the matrix value to match the observed growth.

Enzymes are a little different. They have effects on the major ingredients and release energy, phosphorus and amino acids. Do they do the same thing to all Ingredients? Our guess is probably not.

Looking at enzymes, I wondered how much energy and protein, did we have to get from the use of an enzyme to be cost effective. Was there enough in the ingredients that were not digestible to the bird to give enough?

Using BroilerOpt™ Feed Program, I thought I would try to identify the increase in nutrients from the two digestible sources in the Feeding Trial reported in Rios et al. Reference is "Energy and nutrient utilisation of maize-soy diet supplemented with a xylanase-β-glucanase complex from Talaromyces versatilis" H.V. Riosa , S.L. Vieiraa,∗ , C. Stefanellob , L. Kindleinc , P. Sostera , P.I. dos Santosa , Animal Feed Science and Technology, Volume 232, October 2017, Pages 80-90.

The concept was to use the amount of energy and protein in corn and soybean meal that was contributed in each diet . The level is different in each diet due to inclusion level. Then I searched for the fraction of increase that would be closest to the observed outcomes of the two treatments. These were the treatment with −0.50MJ/kg AME and −3% less protein (treatment 4) and the same diet with added enzyme (treatment8).

The program was calibrated to the growth of the control diet (Treatment 4). The percent of ingredients was from the paper. The matrix for corn and soy bean meal were mine.

In every case and on average, the enzyme treatment appeared to release only a small amount of additional energy from corn . The protein increase from corn was comparable to that from soy bean meal in this test.

Table 1. Results of a grid search for best fit of energy and protein coming from Corn and Soybean meal in Test 3 of Rios et al.

Deviation	Energy from Corn	Protein from Corn	Energy from Soybean Meal	Protein from Soybean Meal
2.4E-04	0.005	0.045	0.045	0.04
5.3E-04	0.01	0.035	0.035	0.045
6.8E-04	0.005	0.05	0.035	0.045
1.5E-03	0.01	0.04	0.025	0.05
2.6E-03	0.005	0.04	0.03	0.05
3.9E-03	0.005	0.045	0.03	0.045
Average	0.007	0.043	0.033	0.046
Std. Dev	0.0026	0.0052	0.0068	0.0038

Given that the trial results are the result of a study with its own variation, the only conclusion can be that, in this comparison, soy bean meal release of energy and protein were higher than for corn by the enzyme.

However, corn brings more energy in than soybean meal and soybean meal brings more protein. We can see that the amount of energy is lower than soy but not by the 1 to 4 ratio of the average release.

Table 2. Content of Energy and Protein from Corn and Soy In the three Diets and Enzymatic Increase based on the average values of fractional release of protein and energy. Protein release from soybean meal is about double that from corn.

Martix Value		Content from corn Diet 1	Diet 2	Diet 3
3364	Kcal/kg	1812	2190	2374
7.86	% P	4.23	5.12	5.55
		Content from Soybean Meal		
2396	Kcal/kg	884.84	662.01	546.29
46.5	% P	17.17	12.85	10.60
		Additional from Corn		
	Kcals	12.7	15.3	16.6
	Prot, %	0.182	0.220	0.238
		Aditional from Soybean Meal		
	Kcals	29.2	21.8	18.0
	Prot, %	0.738	0.552	0.456

An interesting point is that the energy from protein is very close to 4 kcal/g. The energy from protein released in corn would estimate to be 7.28 kcal, 8.8 and 9.52 while the energy from Soybean meal is almost exactly the energy from the extra protein, 29.5 kcal, 22.1, and 18.24.

Energy from corn appears to be the result of more carbohydrates being liberated while soybean meal appears to add no energy beyond the released protein.

Repeating the process with the fourth Control and Control plus Treatment gave these results:

Deviation	Energy from Corn	Protein from Corn	Energy from Soybean Meal	Protein from Soybean Meal
	0.005	0.035	0.045	0.015
	0.005	0.04	0.035	0.02
	0.005	0.045	0.025	0.025
	0.015	0.025	0.02	0.03
	0.02	0.005	0.03	0.025
Average	0.010	0.030	0.031	0.023
Std. Dev.	0.0071	0.0158	0.0096	0.0057

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