Evaluating Enzyme Applications

Using BroilerOpt® Feed Program

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Formulating with Enzymes

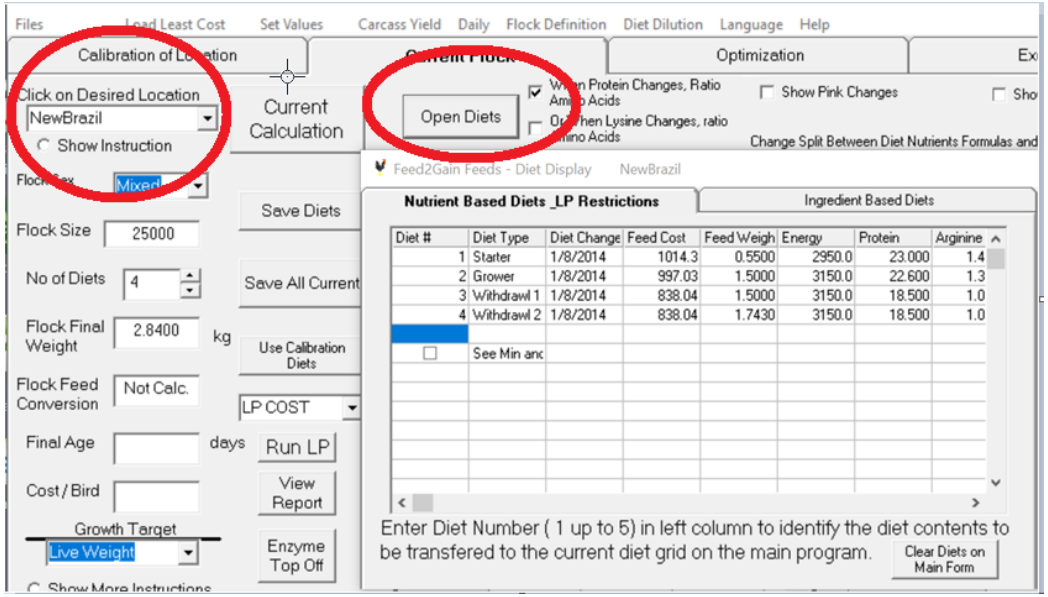
- Testing and using an enzyme can be difficult as availability of final nutrients and expected growth are not clear.
- Some use a nutrient profile for each enzyme. Others use their normal formulation and “Add the Enzyme” on top.
- The question, for me, was how big is the difference between the two approaches? Which can be used to test an enzyme in the field?
- I used BroilerOpt® Feeding Program to see.
- You can make the pictures bigger to read easier.

Start with the Program

- BroilerOpt® Feed Program is a computer program with both a least cost formulation part and a growth evaluation.
- A “Location” is calibrated automatically to match growth and nutrition.
- Then, using the Location costs, changes in growth with nutrient changes can be evaluated accurately.
- The program can optimize to the lowest cost formulas with or without an enzyme “added on top”
- All results are Cost driven, as the final nutrition is set by formulation of ingredients based on the Cost of the ingredients.

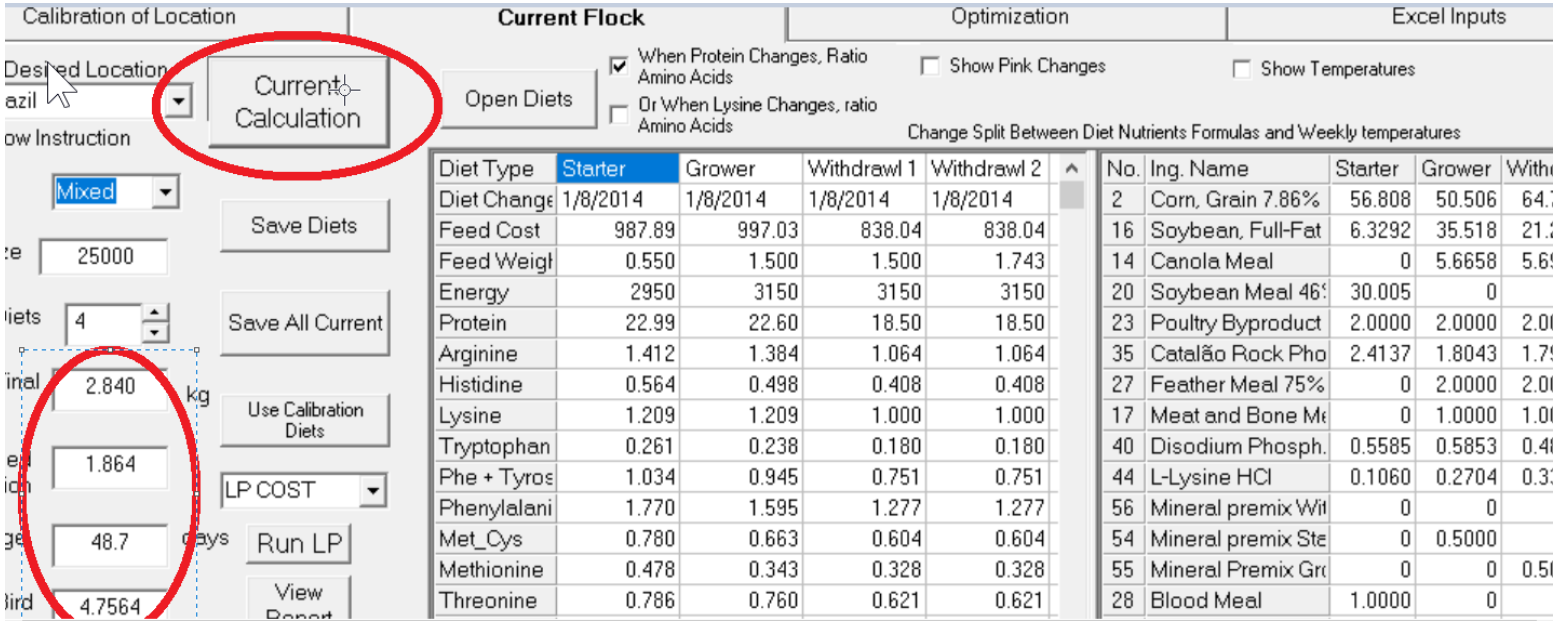
Start the Evaluation

- I made up a Location named New Brazil (the Ingredient Data for NewBrazil Matrix is from Tabelas Brasileiras parea Aves e Suinos (Rostangno et al., 2011) except enzyme matrix values. http://www.fmva.unesp.br/ppfr
- Costs are also made up to give fairly normal formulations.



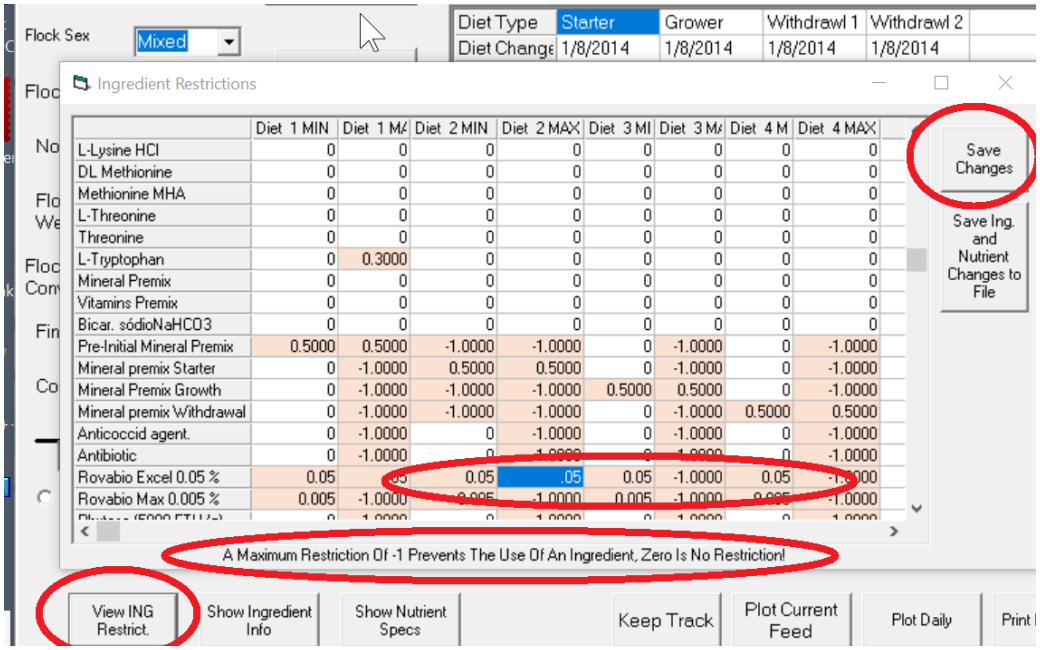
Calculate the Diets and Growth for the Initial Formulas

- We see the flock is mixed sex and the live weight we expect is 2.8 kg.
- The Diets specify the nutrients and amount of each of the four feeds.
- The result is a feed conversion of 1.864 and cost of 4.7654.



Change Restrictions on our Enzyme

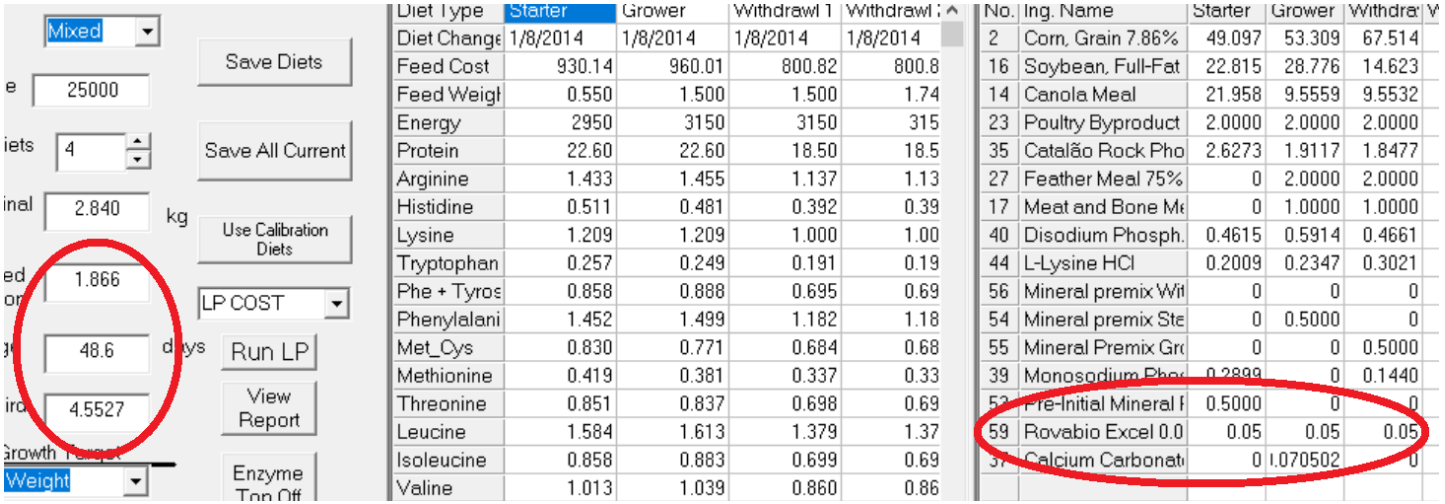
- We change the restrictions on the enzyme we choose, which is Rovabio ® Excel, applied at 0.05%. A max of -1 blocks use of an ingredient.



®Rovabio Excel Registered Trademark of Adissio Co.

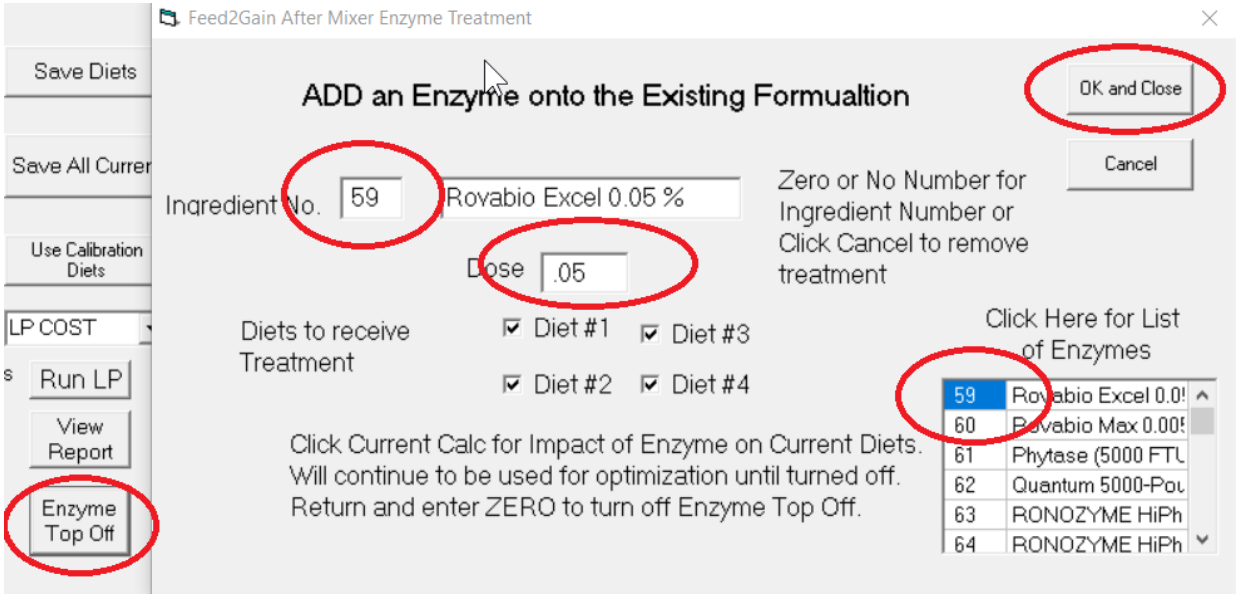
Run the Current Calculation with Enzyme

- Now, the program will formulate to the same specs, using our enzyme.
- Clicking current calc will show the result.
- Feed conversion is nearly unchanged from 1.864, but cost is down from 4.7654 . The enzyme was added, below right.



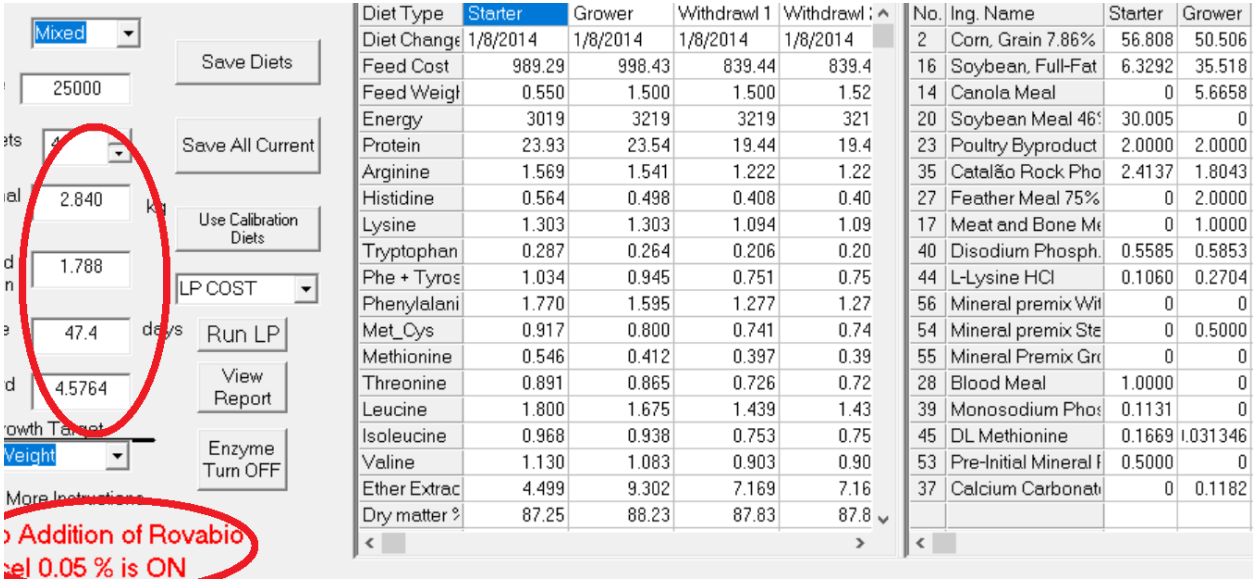
Set up for Addition on Top

- We return the restriction on the enzyme to prevent its use in formulation, just as we started.
- Then Click on “Enzyme Top Off”. Click on click here to see if your enzyme was recognized by the program.
- Select the enzyme,The example is #59 in the ingredient list (name is filled in by program) and you choose the dose and diets to dose.



Evaluate Growth with Enzyme on Top”

- The program now solves the least cost formulations, just as the initial calculation.
- The nutrient values for the enzyme are added and growth calculated.
- We are told the addition is ON. Feed conversion is down to 1.788 and Cost is down to 4.5764.

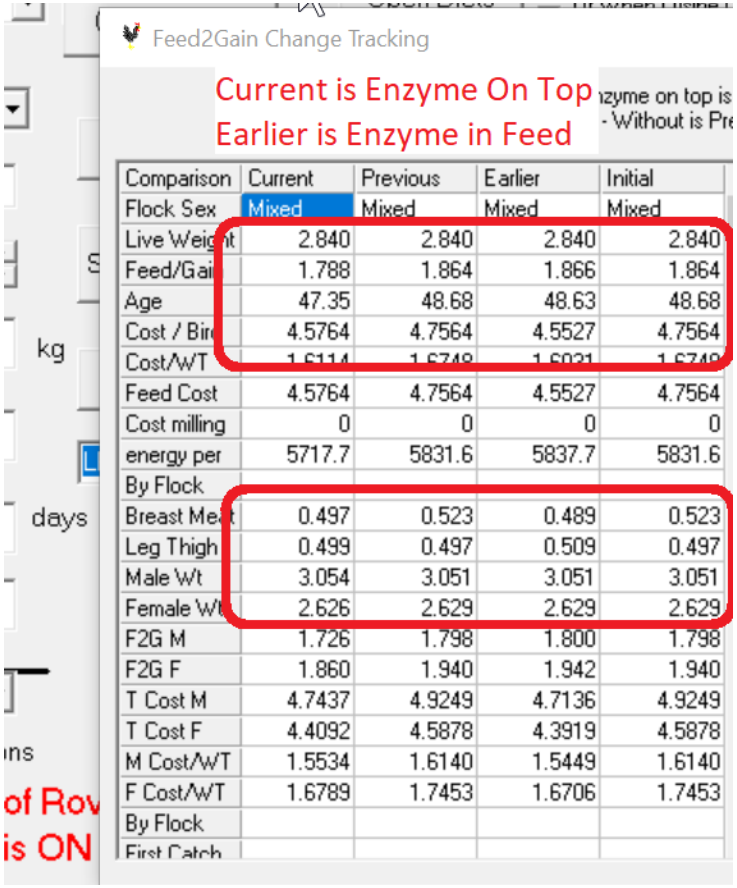


Diet Type	Starter	Grower	Withdrawl 1	Withdrawl 2
Diet Change	1/8/2014	1/8/2014	1/8/2014	1/8/2014
Feed Cost	989.29	998.43	839.44	839.4
Feed Weigh	0.550	1.500	1.500	1.52
Energy	3019	3219	3219	321
Protein	23.93	23.54	19.44	19.4
Arginine	1.569	1.541	1.222	1.22
Histidine	0.564	0.498	0.408	0.40
Lysine	1.303	1.303	1.094	1.09
Tryptophan	0.287	0.264	0.206	0.20
Phe + Tyros	1.034	0.945	0.751	0.75
Phenylalani	1.770	1.595	1.277	1.27
Met_Cys	0.917	0.800	0.741	0.74
Methionine	0.546	0.412	0.397	0.39
Threonine	0.891	0.865	0.726	0.72
Leucine	1.800	1.675	1.439	1.43
Isoleucine	0.968	0.938	0.753	0.75
Valine	1.130	1.083	0.903	0.90
Ether Extrac	4.499	9.302	7.169	7.16
Dry matter %	87.25	88.23	87.83	87.8

No.	Ing. Name	Starter	Grower
2	Corn, Grain 7.86%	56.808	50.506
16	Soybean, Full-Fat	6.3292	35.518
14	Canola Meal	0	5.6658
20	Soybean Meal 46	30.005	0
23	Poultry Byproduct	2.0000	2.0000
35	Catalão Rock Pho	2.4137	1.8043
27	Feather Meal 75%	0	2.0000
17	Meat and Bone Me	0	1.0000
40	Disodium Phosph.	0.5585	0.5853
44	L-Lysine HCl	0.1060	0.2704
56	Mineral premix Wit	0	0
54	Mineral premix Ste	0	0.5000
55	Mineral Premix Gr	0	0
28	Blood Meal	1.0000	0
39	Monosodium Phos	0.1131	0
45	DL Methionine	0.1669	0.031346
53	Pre-Initial Mineral F	0.5000	0
37	Calcium Carbonat	0	0.1182

Summary of Results

- Using the Keep Track button, we can recall the last four Growth Calculations.
- To the far right is the starting feed results.
- The program predicts carcass impact and Male and Female Weights.
- We can also find the Lowest Cost use of the Enzymes -



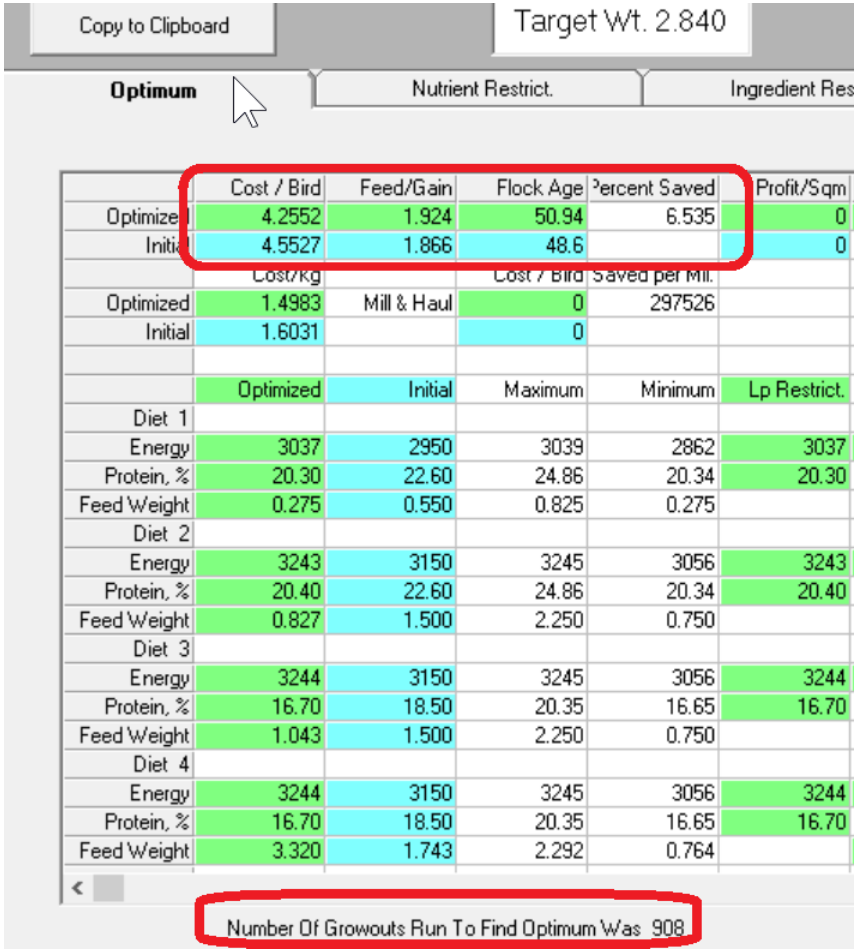
Comparison	Current	Previous	Earlier	Initial
Flock Sex	Mixed	Mixed	Mixed	Mixed
Live Weight	2.840	2.840	2.840	2.840
Feed/Gain	1.788	1.864	1.866	1.864
Age	47.35	48.68	48.63	48.68
Cost / Bird	4.5764	4.7564	4.5527	4.7564
Cost/WT	1.6114	1.6748	1.6021	1.6748
Feed Cost	4.5764	4.7564	4.5527	4.7564
Cost milling	0	0	0	0
energy per	5717.7	5831.6	5837.7	5831.6
By Flock				
Breast Meat	0.497	0.523	0.489	0.523
Leg Thigh	0.499	0.497	0.509	0.497
Male Wt	3.054	3.051	3.051	3.051
Female Wt	2.626	2.629	2.629	2.629
F2G M	1.726	1.798	1.800	1.798
F2G F	1.860	1.940	1.942	1.940
T Cost M	4.7437	4.9249	4.7136	4.9249
T Cost F	4.4092	4.5878	4.3919	4.5878
M Cost/WT	1.5534	1.6140	1.5449	1.6140
F Cost/WT	1.6789	1.7453	1.6706	1.7453
By Flock				
First Catch				

Optimized Feed Cost – No Enzyme

- Using the Formulation Program and Minimum and Maximum Energy and Protein (amino acids in ratio), the program searches for the lowest cost.
- With the costs that were made up, the feed costs with no enzyme could be reduced almost 6 percent with a higher feed conversion (6 points)
- Not shown, holding to the same f2g or better, min. cost is 4.7032 or 1.1 % and f2g 1.703.

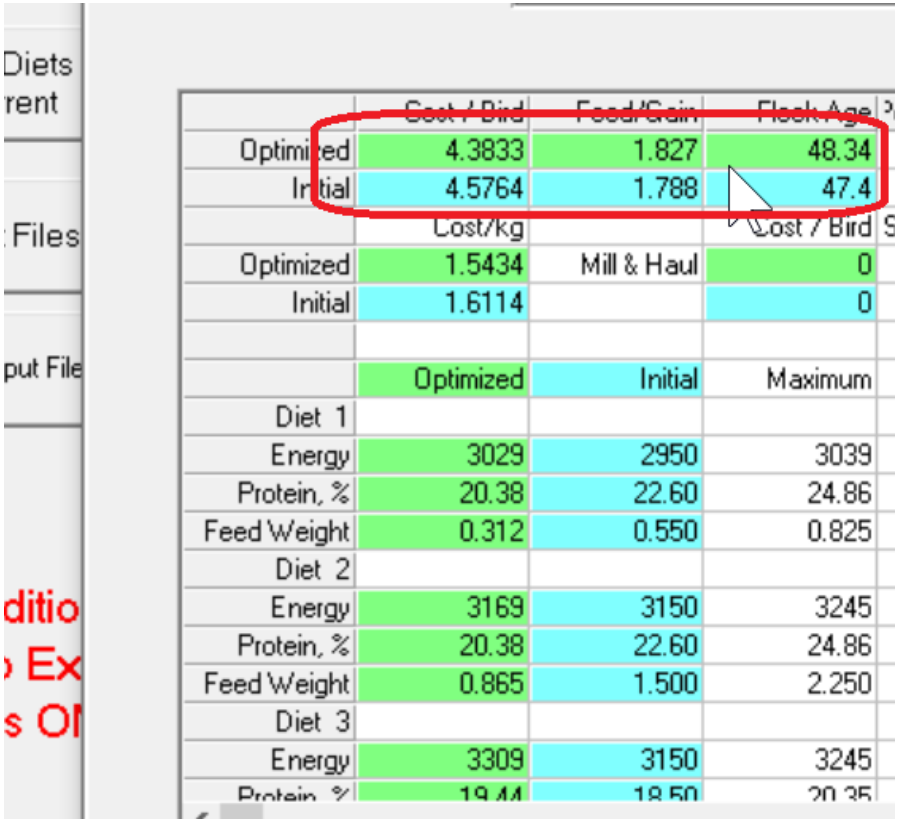
Optimized Feed Cost –Enzyme in Formula

- Optimizing with the enzyme, costs were reduced by 6 percent over using the enzyme in formulating our original feeds.
- With the enzyme, optimization predicts saving 10 percent over the original formulas.
- Not shown, when f2g was held constant, savings were 5 percent (4.518 and f2g of 1.81.



Optimized Feed Cost –Enzyme “Added on Top”

- Added “On Top” saved less on Optimization than formulation.
- Feed cost was reduced 3 percent from On Top of the original formulas and 7.8 percent from our original costs.
- Note the final energies fed were above the maximums because the Energy and protein from the enzyme were not counted.



	Cost / Bird	Feed/Gain	Flock Age
Optimized	4.3833	1.827	48.34
Initial	4.5764	1.788	47.4
	Cost/kg		Cost / Bird
Optimized	1.5434	Mill & Haul	0
Initial	1.6114		0
	Optimized	Initial	Maximum
Diet 1			
Energy	3029	2950	3039
Protein, %	20.38	22.60	24.86
Feed Weight	0.312	0.550	0.825
Diet 2			
Energy	3169	3150	3245
Protein, %	20.38	22.60	24.86
Feed Weight	0.865	1.500	2.250
Diet 3			
Energy	3309	3150	3245
Protein, %	19.44	18.50	20.35

Conclusion

- Adding the enzyme “on Top” of our formulations worked almost as well as including the enzyme as part of the formulation. Cost was 4.58 vs 4.55 when added to the formulas. Both were better than the initial non-enzyme cost of 4.76. Adding on top resulted in higher energy and lower feed conversion. Breast meat yield was also lower.
- While formulation with an enzyme gave the best cost results and kept feed conversion constant, testing an enzyme with the “On Top” application appears to be very useful.
- “On Top” Application would give visible improvement in feed conversion that formulating would not. Feed2Gain Improvement is something all can see and understand.

F. J. Ivey, Feed2Gain, LLC
Feed2Gain, LLC is responsible for all content.

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- Or lower, min. costis 4.7032 or 1.1 %
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- • Carcass composition can also be
- controlled, as well as withdrawal
- time, Age and even Total Energy.