PLANE OF NUTRITION AND FEED COST PER POUND OF MEAT

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In an effort to determine the plane of nutrition that will give the lowest feed cost per pound of meat, a series of four feeding trials have been conducted. It was hoped that by getting weight and feed conversion data on four different planes of nutrition, current ingredient prices could be plugged in and thereby point up the plane of nutrition that will give the lowest feed cost per pound of meat.

The four planes of nutrition were based on four different energy levels, ranging from 3080 kilocalories of M.E./kilogram to 3520 in the starter and 3135 to 3575 in the grower as listed below:

	M.E. kilocalories/kg.	
Energy Level	Starter	Grower
1	3080	3135
2	3190	3245
3	3300	3355
4	3410	3465
5	3520	3575

Four week data for all trials are given below:

Trial #1 (Initiated 11-19-74)

Energy Level	Bird Weight In Grams	Feed to Weight Ratio
1	664 a	1.66 a
2	681 a	1.58 b
3	712 b	1.55 bc
4	718 b	1.52 c

L.S.D. (<.05) for weight = 21 grams
L.S.D. (<.05) for feed to weight ratio = .04

Trial #2 (Initiated 2-18-75)

Energy Level	Bird Weight In Grams	Feed to Weight Ratio
1	686 a	1.69 a
2	692 a	1.65 a
3	748 b	1.51 b
4	761 b	1.48 b

L.S.D. (<.05) for weight = 37 grams
L.S.D. (<.05) for feed to weight ratio = .07

Trial #3 (Initiated 5-20-75)

Energy Level	Bird Weight In Grams	Feed to Weight Ratio
1	613 a	1.62 a
2	626 a	1.59 a
3	652 b	1.50 b
4	661 b	1.46 b
5	671 b	1.45 b

L.S.D. (<.05) for weight = 21 grams
L.S.D. (<.05) for feed to weight ratio = .06

Trial #4 (Initiated 9-2-75)

Energy Level	Bird Weight In Grams	Feed to Weight Ratio
1	726 a	1.52 a
2	742 a	1.51 ab
3	763 b	1.48 bc
4	778 b	1.43 c

L.S.D. (<.05) for weight = 20 grams
L.S.D. (<.05) for feed to weight ratio = .06

Eight week data for all trials are given below:

Trial #1 (Initiated 11-19-74)

Energy Level	Bird Weight In Grams	Feed to Weight Ratio
1	1928 a	1.95 a
2	1994 b	1.85 b
3	2028 bc	1.84 b
4	2040 c	1.81 b

L.S.D. (<.05) for weight = 49 grams
L.S.D. (<.05) for feed to weight ratio = .05

Trial #2 (Initiated 2-18-75)

Energy Level	Bird Weight in Grams	Feed to Weight Ratio
1	2033 a	2.15 a
2	2038 a	2.08 b
3	2082 ab	1.97 c
4	2101 b	1.97 c

L.S.D. (<.05) for weight = 59 grams
L.S.D. (<.05) for feed to weight ratio = .05

Trial #3 (Initiated 5-20-75)

Energy Level	Bird Weight in Grams	Feed to Weight Ratio
1	1834 a	2.03
2	1859 a	1.95
3	1864 ab	1.95
4	1899 ab	2.02*
5	1950 b	1.94

L.S.D. (<.05) for weight = 76 grams
L.S.D. (<.05) for weight to gain ratio = .13

*Unexplained mortality in one rep and the feed to weight ratio for that one rep was 2.20.

Trial #4 (Initiated 9-2-75)

Energy Level	Bird Weight in Grams	Feed to Weight Ratio
1	1847 a	2.07 a
2	1862 a	2.05 a
3	1934 b	1.99 b
4	2006 c	1.85 c*

L.S.D. (<.05) for weight = 60 grams
L.S.D. (<.05) for feed to weight ratio = .06

*Fat was added to this diet after the diet was pelleted.

Along with trial one, a trial (1A) was conducted by formulating to tryptophan and glycine minimums and adding lysine and methionine plus cystine back instead of formulating to lysine and methionine plus cystine minimums. In addition lower levels of amino acids were also compared to the control diet. The experimental treatments are given on the next page.

1. Control (formulating to lysine and methionine plus cystine minimums)
2. Formulating to tryptophan and glycine minimums
3. Amino acids levels 95% of diet number 2
4. Amino acids levels 90% of diet number 2
5. Amino acids levels 80% of diet number 2

Four week data are given below:

Treatment	Bird Weight In Grams	Feed to Weight Ratio
1	712 a	1.55 a
2	705 a	1.58 a
3	684 b	1.58 a
4	666 b	1.63 b
5	622 c	1.70 c

L.S.D. (<.05) for weight = 21 grams
L.S.D. (<.05) for feed to gain ratio = .04

Eight week data are given below:

Treatment	Bird Weight In Grams	Feed to Weight Ratio
1	2028 a	1.84 a
2	2015 a	1.86 a
3	1980 a	1.84 a
4	1914 b	1.88 a
5	1788 c	1.95 b

L.S.D. (<.05) for weight = 49 grams
L.S.D. (<.05) for feed to weight ratio = .05

In conjunction with trial two, treatments one and two of trial 1A were repeat

Four week data are given below:

Treatment	Bird Weight In Grams	Feed to Weight Ratio
1	748	1.51
2	733	1.58

L.S.D. (<.05) for weight = 37 grams
L.S.D. (<.05) for feed to weight ratio = .073

Eight week data are given below:

Treatment	Bird Weight In Grams	Feed to Weight Ratio
1	2082 a	1.97 a
2	2101 a	2.05 b

L.S.D. (<.05) for weight = 59 grams
L.S.D. (<.05) for feed to weight ratio = .05

In conjunction with trial number 4, another trial (4A) was conducted. In trial 4A additional methionine and lysine was added to energy levels 2, 3 and 4 of trial 4 in the following amounts.

Energy Level	% of Added Methionine	% of Added Lysine
2	.05	.05
3	.10	.10
4	.15	.15

Four week data are given below:

Energy Level	Bird Weight In Grams		Feed to Gain Ratio	
	No Added M or L	Added M & L	No Added M or L	Added M & L
2	742 a	761 a	1.51 a	1.50 a
3	763 ab	770 ab	1.48 ab	1.46 ab
4	778 b	794 b	1.43 b	1.40 b

L.S.D. (<.05) for weight = 20 grams
L.S.D. (<.05) for feed to gain ratio = .059

Eight week data are given below:

Energy Level	Bird Weight In Grams		Feed to Gain Ratio	
	No Added M or L	Added M & L	No Added M or L	Added M & L
2	1861 a	1922 b	2.05 a	2.03 a
3	1934 b	1890 ab	1.99 b	2.03 ab
4	2006 c	2022 c	1.85 c	1.87 c*

L.S.D. (<.05) for weight = 60 grams
L.S.D. (<.05) for feed to weight ratio = .060

*Fat was added to this diet after pelleting.

Starting Diets for Trial #1

Energy Level	1 %	2 %	3 %	4 %
Bakery Products	5.70	10.00	10.00	10.00
Fat (Blended)	---	1.37	3.76	6.31
Corn	60.19	53.37	48.63	43.97
Corn Gluten (60%)	.36	1.04	2.50	2.98
Meat Meal (Blended)	8.00	8.00	8.00	8.00
Fish Meal (60%)	4.00	4.00	4.00	4.00
Soybean Meal (48%)	19.70	20.97	22.07	23.70
Dicalcium Phosphate	.45	.45	.45	.46
Limestone	.78	.12	.11	.10
Trace Mineral	.05	.05	.05	.05
Coccidiostat	.05	.05	.05	.05
3-Nitro (10%)	.05	.05	.05	.05
Vitamin Premix	.25	.25	.25	.25
Salt	.34	---	---	---
Methionine Hydroxy Analog	.088	.098	.090	.105
Calculated Analyses				
M.E. calories/kg.	3080	3190	3300	3410
N.E. calories/kg.	2237	2350	2453	2560
Protein, %	23.0	23.8	24.8	25.5
Lysine, %	1.24	1.29	1.32	1.36
Methionine, %	.50	.53	.55	.57
TSAA, %[1]	.86	.90	.93	.96
Available Phosphorus, %	.64	.65	.65	.65
Total phosphorus, %	.80	.80	.80	.80
Calcium, %	1.25	1.00	1.00	1.00
Sodium, %	.30	.21	.21	.21
Fat, %	4.63	6.28	8.50	10.89

[1] TSAA (total sulfur amino acids) is the same as methionine plus cystine.

Growing Diets for Trial #1

Energy Level	1 %	2 %	3 %	4 %
Bakery Products	6.22	10.00	10.00	10.00
Fat (Blended)	---	1.41	3.83	6.37
Corn	63.31	57.31	52.08	47.52
Corn Gluten (60%)	1.92	2.54	4.03	4.50
Fish Meal (60%)	2.00	2.00	2.00	2.00
Meat Meal (Blended)	8.00	8.00	8.00	8.00
Soybean Meal (48%)	16.61	17.82	19.15	20.70
Dicalcium Phosphate	.24	.23	.24	.24
Limestone	.93	.26	.25	.24
Trace Mineral	.05	.05	.05	.05
Coccidiostat	.05	.05	.05	.05
3-Nitro (10%)	.05	.05	.05	.05
Vitamin Premix	.25	.25	.25	.25
Salt	.34	---	---	---
Methionine Hydroxy Analog	.027	.028	.016	.032
Calculated Analyses				
M.E. calories/kg.	3135	3245	3355	3465
N.E. calories/kg.	2281	2389	2495	2603
Protein, %	21.5	22.3	23.3	24.0
Lysine, %	1.08	1.12	1.16	1.20
Methionine, %	.44	.46	.47	.50
TSAA, %	.78	.81	.84	.87
Available Phosphorus, %	.54	.55	.55	.55
Total Phosphorus, %	.70	.70	.70	.70
Calcium, %	1.15	.90	.90	.90
Sodium, %	.30	.20	.21	.21
Fat, %	3.93	6.26	8.52	10.90

Starting Diets for Trial 2

Energy Level	1 %	2 %	3 %	4 %
Fat	---	2.04	4.68	7.19
Corn	61.52	58.16	53.36	48.80
Corn Gluten (60%)	1.85	2.29	2.33	2.82
Fish Meal (60%)	4.00	4.00	4.00	4.00
Poultry Offal Meal	8.00	8.00	8.00	8.00
Soybean Meal (48%)	21.84	23.36	25.44	26.96
Dicalcium Phosphate	1.00	1.00	1.00	1.00
Limestone	1.02	.37	.36	.35
Trace Mineral	.05	.05	.05	.05
Methionine Hydroxy Analog	.032	.058	.08	.096
3-Nitro (10%)	.05	.05	.05	.05
Coccidiostat	.05	.05	.05	.05
Vitamin Premix	.16	.16	.16	.16
Salt	.34	.34	.34	.34
Choline Chloride (50%)	.133	.133	.133	.133
Calculated Analyses				
M.E. calories/kg.	3080	3190	3300	3410
Protein, %	24.4	25.1	25.7	26.3
Lysine, %	1.23	1.27	1.32	1.36
Methionine, %	.50	.53	.55	.58
TSAA, %	.86	.90	.93	.96
Available Phosphorus, %	.59	.59	.60	.60
Total Phosphours, %	.80	.80	.80	.80
Calcium, %	1.25	1.00	1.00	1.00
Sodium, %	.20	.20	.20	.20
Fat, %	3.93	5.86	8.30	10.65
Assay Analyses				
Protein, %	23.13	24.31	24.57	24.8
Fat, %	4.62	6.26	8.32	10.58
Total Phosphours, %	.73	.73	.72	.73
Calcium, %	1.20	1.10	1.20	1.20
Sodium, %	.23	.20	.23	.20

Starting Diets for Trials 3 & 4

Energy Level	1 %	2 %	3 %	4 %
Fat	---	2.2	5.0	7.6
Corn	61.5	57.2	52.4	47.7
Corn Gluten (60%)	.6	2.6	2.6	3.1
Fish Meal (60%)	4.0	4.0	4.0	4.0
Poultry Offal Meal	8.0	8.0	8.0	8.0
Soybean Meal (48%)	23.7	23.8	25.8	27.4
Dicalcium Phosphate	1.1	1.1	1.1	1.1
Limestone	.3	.3	.3	.3
Trace Mineral	.05	.05	.05	.05
Methionine Hydroxy Analog	.069	.073	.096	.110
Coccidiostat	.05	.05	.05	.05
3-Nitro (10%)	.05	.05	.05	.05
Vitamin Premix	.05	.05	.05	.05
Salt	.33	.33	.33	.33
Choline Chloride (50%)	.132	.132	.132	.132
Calculated Analyses				
M.E. calories/kg.	3080	3190	3300	3410
Protein, %	24.1	24.9	25.5	26.2
Lysine, %	1.26	1.27	1.32	1.36
Methionine, %	.51	.54	.56	.58
TSAA, %	.86	.90	.93	.96
Available Phosphorus, %	.59	.59	.60	.60
Total Phosphorus, %	.80	.80	.80	.80
Calcium, %	1.00	1.00	1.00	1.00
Sodium, %	.20	.20	.20	.20
Fat, %	3.90	6.00	8.60	11.00
Assay Analyses for Trial 3				
Protein, %	23.54	24.06	23.90	25.08
Fat, %	4.22	5.86	8.44	10.80
Total Phosphorus, %	.67	.75	.73	.76
Calcium, %	1.00	1.09	.98	1.00
Sodium, %	.23	.24	.23	.22
Assay Analyses for Trial 4				
Protein, %	24.67	25.70	23.54	25.08
Fat, %	3.88	5.66	7.58	7.92
Total Phosphorus, %	.69	.69	.70	.68
Calcium, %	.80	.83	.89	.98
Salt, %	.20	.20	.24	.22

Growing Diets for Trials 2, 3 & 4

Energy Level	1 %	2 %	3 %	4 %
Fat	---	2.64	5.15	7.78
Corn	66.02	61.16	55.95	51.10
Corn Gluten (60%)	1.54	2.00	3.43	3.90
Fish Meal (60%)	2.00	2.00	2.00	2.00
Poultry Meal (58%)	8.00	8.00	8.00	8.00
Soybean Meal (48%)	20.02	21.61	22.99	24.58
Dicalcium Phosphate	.92	.94	.95	.96
Limestone	.46	.45	.43	.42
Trace Mineral	.05	.05	.05	.05
Methionine Hydroxy Analog	.36	.52	.42	.58
Coccidiostat	.05	.05	.05	.05
3-Nitro (10%)	.05	.05	.05	.05
Vitamin Mix	.05	.05	.05	.05
Salt	.35	.35	.35	.35
Choline Chloride (50%)	.132	.132	.132	.132

Calculated Analyses

M.E. calories/kg.	3135	3245	3355	3465
N.E. calories/kg.	2070	2185	2292	2407
Protein, %	22.10	22.70	23.80	24.40
Lysine, %	1.08	1.12	1.16	1.20
Methionine	.45	.47	.49	.51
TSAA	.78	.81	.84	.87
Available Phosphorus	.50	.50	.50	.50
Total Phosphorus	.70	.70	.70	.70
Calcium	.90	.90	.90	.90
Sodium	.20	.20	.20	.20
Fat	3.96	6.42	8.77	11.22

Assay Analyses for Trial #2[1]

Protein, %	21.60	22.45	23.44	24.12
Fat, %	4.50	6.50	8.60	10.90
Total Phosphorus, %	.61	.63	.62	.62
Calcium, %	1.01	.99	1.05	.99
Sodium, %	.21	.20	.21	.19

[1]These values are the average of three assays.

Energy Level	1 %	2 %	3 %	4 %
Assay Analyses for Trial #3				
Protein, %	22.36	23.54	24.57	24.42
Fat, %	4.20	6.40	8.48	10.34
Total Phosphorus, %	.68	.69	.70	.70
Calcium, %	.87	.94	1.00	.94
Sodium, %	.20	.24	.21	.20
Assay Analyses for Trial #4				
Protein, %	22.51	22.51	24.42	25.19
Fat, %	4.10	6.40	8.60	10.72