Methionine and Chick Growth

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Methionine is one of the amino acids essential for chick growth. The production of synthetic methionine is increasing. As this product becomes more available, its use in poultry rations, particularly formulated feeds, raises certain questions. These questions are primarily, will synthetic methionine, when added to a practical ration, increase growth and improve feed efficiency sufficiently to justify its use. An experiment was undertaken to determine the answers to these questions in starting and growing rations.

TRIAL I

For the first trial approximately 900 birds were paired in three lots (6, 7, and 8) according to breed and breeding. Hot water brooding was used, the brooders all being on the same thermostat. A mixture of ground corn cobs and shavings was used as litter. Feed was kept before the birds at all time.

The basic ration had the following composition:

	Per cent	Lbs. per ton
Standard Wheat Middlings	20	400
Ground Barley	20	400
Ground Proso Millet	20	400
55% Meat Scrap	5	100
Dried Fish Solubles	1	20
Dried Buttermilk	5	100
Soybean Oil Meal	20	400
Dehydrated Alfalfa Leaf Meal	5	100
Oyster Shell Flour	2	40
Dicalcium Phosphate	1.25	25
Iodized Salt	.50	10
400D 2000A Cod Liver Oil	.125	2.5
Manganese Sulphate	.0125	.25
Sulfa Quinoxaline	.025	.50

The chicks in Lot 6 received the basal ration only. Those in Lot 7 received the basic ration to which had been added 1.5 pounds of d. l. methionine per ton (0.075 per cent) and those in Lot 8, the basal plus 3.0 pounds of d. l. methionine per ton (0.15 per cent). These rations are so designed, with the exception of two ingredients, sulfa quinoxaline and d. l. methionine, to meet the nutrient requirements of the chick as set forth in the publication of the National Research Council[3]. The sulfa quinoxaline was included only as a coccidiosis preventative and is considered to have no nutritional value. The d. l. methionine was the nutrient under study.

The birds were grown to 49 days of age on the above rations and the results obtained are shown in Table I.

The data here presented indicate negligible improvement in growth by the addition of methionine to the basal ration; 0.075 per cent addition improved growth of White Plymouth Rocks 2.5 per

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Table 1. COMPOSITION, GROWTH, EFFICIENCY AND LIVABILITY.

	Lot No. 6	7	8
Composition at 49 days			
No. White Plymouth Rocks	278	278	284
No. Barred Plymouth Rocks	13	13	11
No. New Hampshires	96	96	97
Total No. of Birds	387	387	392
Growth to 49 days	Pounds per bird		
White Plymouth Rocks	1.63	1.67	1.68
Barred Plymouth Rocks	1.62	1.71	1.72
New Hampshires	1.66	1.77	1.77
Pen Average	1.63	1.70	1.70
Efficiency			
Feed Consumed Per Bird (Pounds)	4.19	4.31	4.26
Lbs. Feed Per Lb. of Grain	2.565	2.541	2.501
Livability (Percent)	96.99	96.75	97.76

cent, Barred Plymouth Rocks 5.6 per cent and New Hampshires 6.6 per cent. When 0.15 per cent was added, similar results were obtained; the actual percentage figures for the three breeds being 3.1, 6.2 and 6.6 per cent over that of the basic ration. When examined on a feed efficiency standpoint the improvement was 0.8 per cent for those fed the lower level of methionine and 2.3 per cent for the higher level.

TRIAL 2

This experiment was repeated using a ration that did not supply as much methionine from natural sources. The basic ration used had the following composition:

	Per cent	Lbs. per ton
Ground Yellow Corn	25	500
Standard Wheat Middlings	25	500
Wheat Bran	10	200
Meat Scrap (55%)	5	100
Soybean Oil Meal	26	520
Dehydrated Alfalfa Leaf Meal (17%)	5	100
Oyster Shell Flour	2	40
Iodized Salt	.5	10
Dicalcium Phosphate	1.25	25
400D 2000A Cod Liver Oil	.125	2.5
Manganese Sulphate	.0125	0.25
Synthetic Riboflavin	40 mg.	800 mg.

Four lots of approximately 315 birds each were used in this trial. The birds in Lots 11, 12 and 13 received the basic ration to which had been added 15 grams per ton of choline chloride. In addition those chicks in Lot 11 received 1.5 pounds per ton of d. l. methionine and those in Lot 12 received 3.0 pounds per ton of d. l. methionine. The chicks in Lot 14 received the basic ration only.

The only major differences in these rations exists in the level of synthetic d. l. methionine and the choline chloride. The addition of the d. l. methionine follows a similar pattern to that in Trial I.

The use of choline chloride was made on the theory that even a small addition might be detectable in the growth results if choline were slightly deficient. Synthetic riboflavin replaced the riboflavin obtained from buttermilk in Trial I.

The same basic patterns of brooding and management were followed as in the previous trial. An attack of Newcastle Disease, as diagnosed by the North Dakota Agricultural College, department of veterinary science, was experienced during the period 14 through 30 days of age. Mortality was not excessive for such an attack and growth apparently was not adversely affected. The results of growing the birds to 56 days of age are shown in Table II.

Table II. COMPOSITION, GROWTH, EFFICIENCY AND LIVABILITY.

Lot No.	11		12		13		14	
Composition (At Start)	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
White Leghorns	114	35.6	112	35.5	111	35.0	111	35.5
New Hampshires	140	43.8	137	43.5	139	43.9	139	20.1
Barred Rocks	66	20.6	66	21.0	67	21.1	63	44.4
Total	320		315		317		313	
Composition (56 days)								
White Leghorns	106	35.2	100	35.1	99	36.0	103	36.9
New Hampshires	134	44.5	130	45.6	123	44.7	124	44.4
Barred Rocks	61	20.3	55	19.3	53	19.3	52	18.7
Total No. of Birds	301		285		275		279	
Livability		94.06		90.48		86.75		89.14
Growth to 56 days (Pounds Each)								
White Leghorns	1.41		1.44		1.49		1.46	
New Hampshires	1.79		1.86		1.81		1.92	
Barred Rocks	1.74		1.79		1.78		1.81	
Pen Average	1.65		1.70		1.69		1.73	
Efficiency								
Feed Consumed per bird (lbs.)	5.32		4.91		5.52		5.35	
Lbs. Feed per Lb. of Gain	3.230		2.910		3.273		3.090	

The mortality due to Newcastle Disease accounted for 74.4 per cent of the total experienced. An additional 15.2 per cent of the total mortality occurred during the first week of age. It is highly doubtful that any mortality could be directly attributed to the feed. The results are similar to those experienced in Trial I. In only one breed was there an improvement in growth on the part of the birds receiving methionine and this was of negligible size. Apparently the small choline addition was of no value. The feed efficiency was not markedly affected by the addition of methionine.

SUMMARY

The addition of synthetic d. l. methionine at the rate of 1.5 and 3.0 pounds per ton of feed to two practical types of starting and growing rations proved of no significant value in tests involving a total of approximately 2100 chicks of four breeds when the chicks were grown to seven and eight weeks of age.