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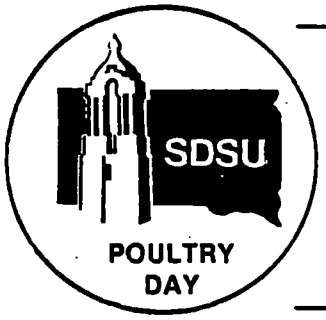

MEAT AND BONEMEAL IN A SINGLE PHASE OR STEP-DOWN PROTEIN PROGRAM FOR GROWING PULLETS

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With increased use of least cost formulation more information is needed about individual ingredients, particularly when sub-optimal levels of nutrients are provided. Meat and bonemeal, for example, has been shown to be an inadequate source of protein when used at over 50% of the total supplement for layers receiving low protein diets. The purpose of this study was to determine the effect of meat and bonemeal for growing pullets fed two types of feeding programs.

As shown in Table 1, one feeding was a traditional step-down protein program where chicks are fed a 20% protein diet up to 10 weeks of age and then a 12% protein diet up to 20 weeks (program A). With this program, meat and bonemeal provided 0 or 25% of the total protein supplement during the first 10 weeks and 0 to 100% of the total protein supplement from 10 to 20 weeks of age (treatment 1 and 2). The second program (program B) involved feeding a 14% protein diet from 0 to 20 weeks of age. Diets for program B contained either corn-soy (treatment 3) or corn-soymeat and bonemeal (treatment 4). Each treatment was replicated ten times using initially 46 chicks per replicate. Birds were weighed at 7, 10, 14 and 20 weeks of age in groups. At 20 weeks the pullets were transferred to a layer house and placed in cages in groups of four and fed a 14% protein layer diet for a two-week transitional period, following which a mostly oats layer diet was offered.

Using the conventional step-down protein program resulted in production of significantly heavier pullets up to 14 weeks of age (Table 2). However, the 20-week body weights were not significantly affected by the feeding program. Pullets fed soybean meal as the only source of protein supplement were heavier up to 14 weeks as compared with those which received meat and bone meal. The differences related to protein supplement source at 20 weeks did not prove to be significant. The overall feed consumption was reduced by 4% when the single phase 14% protein diet was compared to the step-down protein feeding regimen. Feed efficiency during growth was variable, although the overall effect favored program B. Mortality, on the other hand was significantly increased as the result of feeding the low protein starter diet as compared to the conventional diet.

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The ultimate goal of pullet rearing, which is subsequent egg laying performance, was not significantly affected by either method of feeding or source of protein supplement during the first six weeks of egg production (Table 3).

Based on these data, meat and bonemeal appears to be a satisfactory source of protein supplement for growing pullets when its limits as determined by mineral contents are considered. Further studies should be conducted to confirm the feed savings experienced by using single phase protein feeding programs.

Table 1. Composition of Experimental Diets

Ingredient	Feeding Program A				Feeding Program B			
	Treatment 1		Treatment 2		Treatment 3		Treatment 4	
	0-10wk	10-20wk	0-10wk	10-20wk	0-10wk	10-20wk	0-10wk	10-20wk
Yellow corn	64.0	80.0	66.5	84.0	80.0	80.0	82.0	82.0
Soybean meal	27.5	8.0	20.0	--	12.0	13.5	5.0	5.5
Meat & bonemeal	--	--	6.5	7.0	--	--	6.0	7.5
Alfalfa meal	2.0	6.0	3.0	6.0	2.0	3.0	3.0	3.0
Fish meal	2.0	--	2.0	--	2.0	--	2.0	--
Yellow grease	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0
Dicalcium phosphate	1.5	2.0	--	--	1.5	2.0	--	--
Limestone	1.0	1.0	--	--	1.0	1.0	--	--
Vitamin premix	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Salt premix	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DL-methionine					.05	.05	.08	.08
L-lysine					.10	.10	.15	.15
Calculated Analysis								
Protein, %	20.4	12.0	20.4	12.0	14.5	14.2	14.5	14.2
ME, Kcal/kg	3016	3133	3055	3204	3162	3155	3188	3168
Ca, %	.91	.92	.90	.83	.88	.89	.81	.84
P, %	.69	.66	.72	.62	.64	.69	.64	.65
Lysine	1.12	.46	1.05	.38	.76	.71	.79	.70
Methionine + cystine	.70	.45	.66	.40	.62	.56	.63	.61

Table 2. Effects of feeding program and protein source on body weight and feed consumption

	Avg body wt					Avg feed consumption/bird		
	0 wk	7 wk	10 wk	14 wk	20 wk	0-10 wk	0-14 wk	0-20 wk
			(g)				(g)	
Feeding program A	34	498**	817**	1096**	1470	2658**	4824**	7694**
Feeding program B	34	416	731	1065	1454	2444	4567	7378
Protein source								
soybean meal	34	462*	792**	1088*	1471	2590	4773	7618
soybean meal + meat + bonemeal	34	452	774	1073	1454	2513	4617	7455
Treatment 1	34	499	840	1107	1480	2708	4932	7855
Treatment 2	34	496	794	1086	1460	2609	4715	7534
Treatment 3	34	425	744	1069	1462	2472	4614	7380
Treatment 4	34	408	717	1059	1446	2416	4520	7377

* P<.05.
** P<.01.

Table 3. Effect of feeding program and protein source on feed efficiency mortality and subsequent egg production rate.

	Feed gain			% mortality	% hen day production (age in days)		% mortality (age in days)	
	0-10 wk	0-14 wk	0-20 wk	0-20 wk	138-154	155-183	138-154	155-183
Feeding Program A	3.46	4.54*	5.36*	1.3*	61.6	84.9	1.2	0.8
Feeding Program B	3.51	4.43	5.26	3.8	61.4	83.8	0.8	1.5
Protein Source								
soybean meal	3.42	4.53	5.30	3.3	61.8	84.1	0.8	1.5
soybean meal + meat + bonemeal	3.55	4.44	5.20	1.8	61.3	84.6	1.1	0.8
Treatment 1	3.36	4.60	5.43	1.52	62.7	84.6	1.0	1.2
Treatment 2	3.56	4.48	5.28	1.09	60.9	83.6	1.5	0.5
Treatment 3	3.48	4.46	5.17	5.00	60.6	85.2	0.8	1.7
Treatment 4	3.54	4.40	5.22	2.60	62.0	84.0	0.8	1.2

* $P<.05$.