



# FATS AND PROTEINS RESEARCH FOUNDATION, INC.

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THE DIRECTOR'S DIGEST  
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## INFLUENCE OF PROCESSING CONDITIONS ON THE NUTRITIVE VALUE OF FEATHER MEAL IN BROILER RATIONS

Professor S. L. Balloun and his associates at Iowa State University, with grant support from FPRF have been studying the influence of processing conditions on the nutritive value of hydrolyzed feather meal in broiler diets. For this study National By-Products, Inc. produced hydrolyzed feather meal using the following processing conditions.

Feather Meal A - 30 minutes at 40 pounds pressure

Feather Meal B - 60 minutes at 40 pounds pressure

Feather Meal C - 30 minutes at 50 pounds pressure

Feather Meal D - 60 minutes at 50 pounds pressure

Intermittent agitation during hydrolysis on  
the above.

Feather Meal E - 30 minutes at 35 pounds pressure with  
continuous agitation

The different feather meals were used to replace 5% or 7.5% of the protein in a basic corn-soybean meal ration fed to male broiler chicks in pens. Diets at each protein level were made isocaloric and isonitrogenous by adjustment with soybean oil and alphacel. Since chemical analyses indicated that all diets might be deficient in lysine and methionine these two amino acids were added to bring all diets up to NRC standards for these amino acids.

The data (Table 1) clearly indicate that all five feather meals exhibited high amino acid availability and produced excellent results when used to supply no more than 5% of the protein in a reasonably adequate diet. Feather meals C and D, when supplying 5% of the protein in 18, 20 and 22% protein diets produced better weight gains and feed efficiency than did the corn-soybean meal diets.

Gains and feed efficiency were generally lower when the feather meals were used to supply 7.5% of the protein in the diet. This was especially true for the low protein diets in which almost all of the soy protein was replaced with feather meal protein.

In one experiment, the biological value of all five feathermeals was evaluated when used to add 6% protein to a 14% corn-soybean meal diet. The feather meal replacement was made at the beginning of the experiment for some lots and after four weeks for other lots. The data (Table 2) again show that diets containing 6% protein from feather meal are just as effective as the basal 20% corn-soybean meal diets. The chicks made more efficient use of the feather meal diets when the feather meal was included after 4 weeks only.

Although the results do not indicate any highly significant differences between the feather meals, feather meal E was somewhat inferior in many cases. In some cases, feather meals C and D gave better results than the other samples. This suggests that (1) intermittent mixing during hydrolysis is better than continuous mixing and (2) 30 minutes at 50 pounds pressure constitute the minimum processing conditions that should be used for hydrolyzing feather meal.

Table 1. The Value of Feather Meal in the Diet of Chicks  
(five week feeding)

% Protein:	22		20		18		16	
	Wt.	Feed	Wt.	Feed	Wt.	Feed	Wt.	Feed
Diet	g.	gain	g.	gain	g.	gain	g.	gain
Corn-soy	841	1.92	831	1.72	807	1.86	625	1.93
FM A-5%	763	1.95	750	1.92	762	1.90	670	2.31
FM A-7.5%	773	1.97	771	1.97	645	2.11	417	2.84
FM B-5%	817	1.91	825	1.94	765	2.03	647	2.29
FM B-7.5%	795	1.91	750	1.97	692	2.24	348	3.14
Corn-soy	761	2.06	765	2.11	736	2.14	707	2.30
FM C-5%	744	2.06	791	2.07	763	2.03	668	2.49
FM C-7.5%	815	2.04	671	2.24	583	2.41	290	4.58
FM D-5%	785	2.02	772	2.04	781	2.09	663	2.26
FM D-7.5%	760	2.25	768	2.15	670	2.21	398	2.23
Corn-soy	816	1.90	814	1.81	723	2.23	725	2.19
FM E-5%	855	1.85	790	2.12	742	2.11	642	2.29
FM E-7.5%	705	2.22	761	2.01	679	2.28	366	3.51

Table 2. The Value of Feather Meal Fed to Chicks for 7 Weeks and for 4-7 Weeks

Diet Treatment		4 Weeks		4-7 Weeks		7 Weeks	
1-4 Weeks	4-7 Weeks	Wt. g.	Feed gain	Gain g.	Feed gain	Wt. g.	Feed gain
Corn-soy-20%	Corn-soy-20%	573	1.80	813	2.55	1387	2.27
"	Corn-soy-14%	588	1.89	790	2.50	1379	2.23
"	+ FM A-6%	592	1.71	833	2.28	1426	2.07
"	+ FM B-6%	583	1.88	827	2.31	1411	2.15
"	+ FM C-6%	598	1.77	826	2.28	1424	2.09
"	+ FM D-6%	592	1.77	821	2.40	1413	2.17
"	+ FM E-6%	613	1.73	857	2.38	1470	2.07
Corn-soy-14%	Corn-soy-14%	478	2.13	734	2.56	1212	2.31
+ FM A-6%	+ FM A-6%	580	1.82	828	2.39	1407	2.13
+ FM B-6%	+ FM B-6%	603	1.82	847	2.45	1449	2.21
+ FM C-6%	+ FM C-6%	586	1.86	848	2.46	1434	2.25
+ FM D-6%	+ FM D-6%	585	1.84	861	2.43	1446	2.32
+ FM E-6%	+ FM E-6%	576	1.89	838	2.45	1414	2.24

EFFECTS OF ANTIOXIDANT ON POULTRY BY-PRODUCT MEAL

Professor H. L. Fuller, University of Georgia, with grant support from FPRF, has been investigating the influence of ethoxyquin on the chemical and nutritional changes of poultry by-product meal. Results from this study have just been published in the January, 1971 issue of Poultry Science. A reprint of this article may be obtained upon request from the Foundation office.