

Duck Research Report No. 1
Asia Region
FAS, USDA Funded Duck Feed Trial Activities in Vietnam

Total replacement of fish meal by meat and bone meal and poultry byproduct meal
in meat duck diet.

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Abstract

A total of 720 meat type, mixed sex ducklings (Super M breed) were fed grower (G-4wks) and finisher (F-2wks) formulated with fish meal (5%G, 4%F), meat and bone meal (6%G, 4.8%F), or poultry byproduct meal (4.8%G, 3.8%F) for six weeks to evaluate the protein source effect on growth. Substitution of protein meals was based on equal total protein. Feeds were formulated to meet the common nutrients specifications and were fed ad lib in meal form. Results showed fish meal (FM) substitution by meat and bone meal (MBM) and poultry byproduct meal (PBM) had no effect on weight gain, feed conversion ratio, and survival rate. Feeding cost could be reduced by 5-10% with MBM and PBM substitution for FM in duck diets.

	Protein Source					
	FM ¹		MBM ²		PBM ³	
	G ⁴	F ⁵	G ⁴	F ⁵	G ⁴	F ⁵
<u>Formulation</u>						
FM 60%	5	4	-	-	-	-
PBM	-	-	6	4.8	-	-
PBM	-	-	-	-	4.8	3.8
SBM 44%	32.9	21.45	34.36	22.34	33.46	22.72
Rice	20	12	20	12	20	12
Cassava	20	20	20	20	20	20
Rice polishing	12.1	31	9.74	29.4	10.83	29.1
<u>Analysis</u>						
C. Protein(%)	21.1	17	21.5	17.3	21.3	17.4
ME	2853	2892	2856	289.5	2858	2897
Dig lysine(%)	1.06	.8	1.03	.8	1.03	.8
<u>Performance (6wks)</u>						
Wt gain (g)	2555.7		2605.1		2528.1	
Feed /gain	2.67		2.63		2.84	
Survival rate (%)	87.1		87.1		80.4	
¹ Fish meal	² Meat and bone meal			³ Poultry byproduct meal		
⁴ Soybean meal	⁵ Grower phase			⁶ Finisher phase		

Introduction

Vietnam is the third largest meat duck producer in Asia (after China and Thailand). Fish meal (FM) has been the most favored and trusted protein ingredient for duck feed. However, FM may lose to competitiveness in the future to other animal protein ingredients such as poultry byproduct meal (PBM) and meat and bone meal (MBM). Little research work in the area FM substitution by PBM and MBM has been done in Western countries for meat ducks due to low popularity of ducks among all poultry species. Therefore, the objective of the present study is to dominate the feasibility of substituting FM with US PBM and MBM under Vietnamese terming condition.

Table 1. Formulation and nutrient analysis of experimental diets

	Protein & Source					
	FM ¹		MBM ²		PBM ³	
	0-4 weeks	5-8 weeks	0-4 weeks	5-8 weeks	0-4 weeks	5-8 weeks
Formulation						
Corn	5	8	5	8	5	8
Rice	20	12	20	12	20	12
Cassava	20	20	20	20	20	20
Rice Polishing	12.1	31	9.74	29.4	10.83	29.1
Soybean Meal 44%	32.9	21.45	34.36	22.34	33.46	22.72
Fish meal 60%	5	4				
US MBM 50%			6	4.8		
US PBM 63%					4.8	3.8
Oyster Shell	0.82	1.2	0.39	0.87	0.76	1.16
MDCP 21	1.72	1.37	1.42	1.13	2.35	1.87
Palm oil	1.4		.2	0.4	1.68	0.37
Salt	0.3	0.37	0.31	0.38	0.33	0.38
Mineral Premix	0.25	0.25	0.25	0.25	0.25	0.25
Vit E 50	0.002		0.002		0.002	
Vit PP	0.002		0.002		0.002	
Choline	0.12	0.1	0.12	0.1	0.12	0.1
Lysine			0.02	0.04	0.04	0.03
Methionine	0.3	0.19	0.33	0.22	0.31	0.2
Tryptophane					0.001	
Anti-mold	0.05	0.05	0.05	0.05	0.05	0.05
Antioxydant	0.01	0.01	0.01	0.01	0.01	0.01
Nutrient Analysis						
ME (Kcal / kg)	2853	2892	2856	2895	2858	2897
Protein %	21.1	17	21.54	17.3	21.3	17.4
True Digestible						
Lysine%	1.06	0.8	1.03	0.79	1.03	0.79
True Digestible						
Sulfur amino acid %	0.84	0.64	0.83	0.64	0.82	0.63

¹Fish meal

²Meat and bone meal

³Poultry byproduct meal

⁴Soybean meal

⁵Grower phase

⁶Finisher phase

Materials and Methods

1. Diets

Three experimental diets were formulated (Table 1) using common local energy ingredients such as cassava and rice and three animal protein meals (FM, MBM and PBM). Diets were equalized in method table energy (ME), crude protein, and true digestible lysine, and methionine plus cystine. The three animal protein meals contributed equal amount of crude protein to the diets, and the FM inclusion rate (5) was considered the typical level used by the feed industry. All nutrients levels were considered adequate for meat week and were meeting NRC's recommendations. All diets were fed ad lib in meal form.

2. Animals:

A total of 720 day-old mixed sex meat type ducklings (Super M Breed) were randomly allocated to nine pens (80 ducklings / pen). Each dietary treatment was replicated with three pens.

3. Performance data measurements. During the six weeks trial period, weight gain, feed conversion and survival rate were measured.

Results

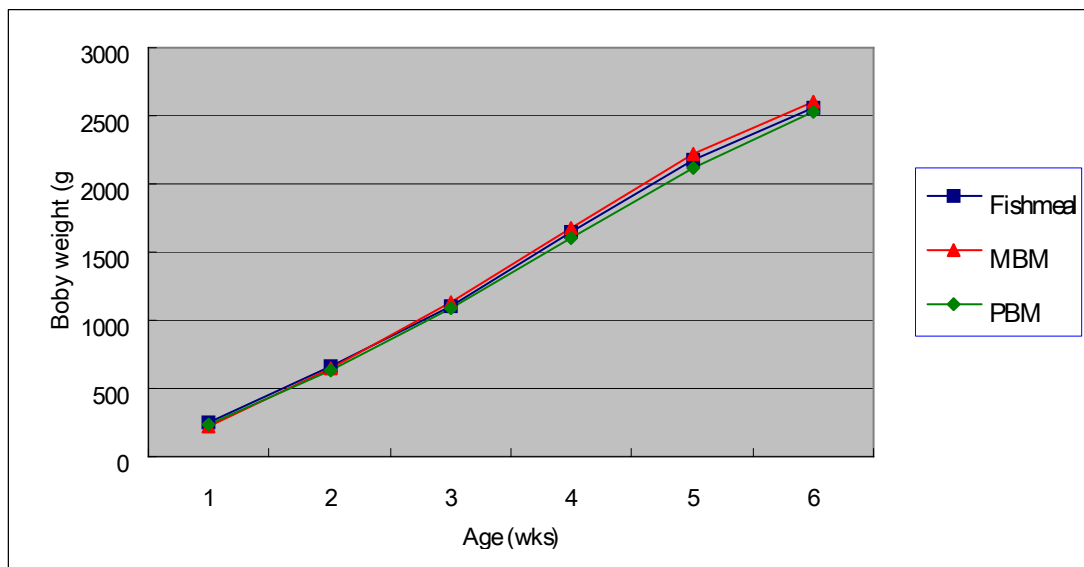
Growth performance data are presented in Table 2, and also figure 1. Protein sources no significant ($P > .05$) effect on any growth performance measured. It is apparent that under Vietnamese duck raising conditions, feeds formulated with MBM or PBM without FM were well accepted by ducks throughout the entire growth period.

Table 2. Growth performance of ducks during the six week feeding trial

	Protein Source		
	FM ¹	MBM ²	PBM ³
Weight gain (g/duck)	2555.7	2605.1	2528.1
Feed intake (kg/duck)	6.82	6.85	7.18
Feed / gain	2.67	2.63	2.84
Survival rate (%)	87.1	87.1	80.4

1. Fish meal
2. Meat and bone meal
3. Poultry byproduct meal

Figure 1. weight gain response of ducks to dietary fish meal replacement with meat and bone and poultry byproduct meal



Discussion

The present trial clearly demonstrated that modern nutritional and formulation technology allow the Vietnamese feed industry to produce high performance duck feeds without the use of FM. The similarity in feed conversion ratio noted for the three test diets would indicate that MBM and PBM are indeed suitable substitutes for FM, although the feed efficiency could be further improved showed the feeds were palletized. Growth rates as depicted in Fig. 1 are considered normal and adequate reflecting the merits of genetics and feed quality similar findings were reported from Associations earlier trials conducted in China (1997).

Based on leistered price difference between FM and MBM or PBM, the substitution of FM with MBM or PBM would result in savings of 5-10% in feed cost. This could be highly important for large duck producing country such as Vietnam.

Conclusion

Under the Vietnamese farming conditions, US MBM and PBM can totally replace FM in meat duck diets without harming the growth performance. This finding is consistent with results of similar trials conducted in China. Feed cost could be reduced by 5-10% resulting from the FM replacement by MBM and PBM.