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The effect of different levels of poultry by-product meal (PBPM) on performance of broiler

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Abstract

In order to study the effect of different levels of poultry by-product meal (PBPM) in diet on production performance in broilers, an experiment was conducted on 321 broilers for a period of 42 days. Treatments included control group (without PBPM) and two levels of poultry by-product with 5 and 10%. During experiment, Weight gain traits (starter, grower, finisher and entire periods), feed intake (starter, grower, finisher and entire periods), feed conversion ratio (starter, grower, finisher and entire periods) were measured. The obtained results showed that weight gain and feed conversion ratio were significantly improved in level 5% PBPM group without affecting the feed intake. The results showed that PBPM had no negative effect up to 10% in diet of broiler chickens, however, better results could be obtained at 5% inclusion level.

Keywords: Poultry By-Product Meal, Diet, Broiler Chicken, Performance

Introduction

In poultry industry, 75-80 percent of the cost is incurred on feed purchase (Coon, 2002) and undoubtedly protein is the most expensive nutrient in the diet of domestic animals (NRC, 1994). In a report in it was mentioned that more than 55.5 million broilers were slaughtered having average slaughter weight was 1.8 Kg and about 300g was by-product (Hertrampf and Piedad-Pascual, 2000). Thus total waste of broilers can be about 17 million tons a year and this assessment excluded laying hens (Hertrampf and Pascual, 2000; FAO, 2011). Therefore, we can use PBPM as a cheap source for poultry production. PBPM protein could be better (Bednar et al., 2000; Yamka, 2003), equal (Bednar et al., 2000) or poorer (Clapper et al., 2001) digestible protein than soybean meal. The crude protein effective degradability of PBMP is lower than that of soybean (Da Silva et al., 1999; De Souza et al., 2000; Kamalak et al, 2005) and rapeseed meal with a ratio of 0.7-0.8 and much lower than that of whole cotton seed (Ilghami et al., 2008).

PBPM is a product obtained from drying and grinding of waste materials from poultry slaughter, usually processed by heating, grinding and drying (Pesti, 1987; Nikkhah and Kazemishirazi, 1995; Webster et al., 1996; El Boushy et al., 2000; Sarabian, 2005; Kamyab, 2006; Watson, 2006; Porreza et al., 2008). The content of PBPM varies and depends on process method (Dale et al., 1993; Watson, 2006). Combination and process can influence in PBPM quality (Dozier et al., 2003; Locatelli and Hoehler, 2003).

There are different reported about the levels of PBPM used in poultry feed. Martosiswoyo and Jensen (1998) reported that we can use this product by 5% in diet without any harmful effects. Hosseinzadeh et al. (2010) showed that it can be used up to 7.5 percent in diet of laying hens and has no deleterious impact on performance and egg quality. In another study, PBPM replaced up to 10% with soybean protein (Bhargava and O'Neil, 1975). In an experiment, Samli et al. (2006) studied the effect of PBPM (0, 5 and 10%) and the results showed that PBPM in the diets of laying hens had no negative effects on performance of laying hens. Also, Raja et al. (2001) replaced, in an experiment, concluded that PBPM in the diet can be replaced up to 7.5% with fish meal. Khosravinia and Mohammadzadeh (2006) concluded that PBPM can be a good replacement for fish meal in finisher diet but not in starter diet in broiler chickens. Also, Azman and Dalkilic (2006) conducted a study on the effect of 0, 4

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Table 1: Composition of feed

Ingredients	Starter			Grower			Finisher		
	control	Experimental		control	Experimental		control	Experimental	
	0 %	5 %	10 %	0 %	5 %	10 %	0 %	5 %	10 %
Corn	40.18	43.48	46.77	46.82	51.42	54.70	44.72	49.56	54.41
Soybean meal (44 %)	48.94	42.17	35.40	42.14	34.27	27.51	43.49	35.41	27.34
PBPM	-	5	10	-	5	10	-	5	10
Soybean Oil	6.56	5.45	4.36	7.19	5.87	4.78	8.26	6.9	5.55
Limestone	1.36	1.36	1.36	1.13	1.13	1.13	1.08	1.08	1.09
Dicalcium phosphate	1.79	1.53	1.27	1.6	1.34	1.08	1.43	1.18	0.92
Salt	0.37	0.21	0.04	0.37	0.21	0.04	0.38	0.21	0.04
Vitamin premix	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Mineral Premix	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
DL- Methionine	0.28	0.27	0.26	0.23	0.23	0.23	0.15	0.15	0.15
L Lysine	-	0.02	0.02	-	0.01	0.03	-	-	-
Total	100	100	100	100	100	100	100	100	100

Table 2: Chemical composition of the feed ingredients

	Starter			Grower			Finisher		
	control	Experimental		control	Experimental		control	Experimental	
	0 %	5 %	10 %	0 %	5 %	10 %	0 %	5 %	10 %
ME (kcal/kg)	3025	3025	3025	3150	3150	3150	3200	3200	3200
Crude protein (%)	25.11	26.01	26.01	22.66	22.74	23.20	23.02	23.02	23.02
Calcium (%)	1.05	1.05	1.05	0.9	0.9	0.9	0.85	0.85	0.85
Available Phosphorus (%) avai	0.50.16	0. 5	0.5	0.45	0.45	0.45	0.42	0.42	0.42
Sodium (%)	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Lys (%)	1.28	1.27	1.27	1.13	1.1	1.1	1.16	1.12	1.07
Met (%)	0.61	0.61	0.61	0.53	0.54	0.54	0.45	0.46	0.46
Met+ Cys (%)	0.94	0.94	0.94	0.84	0.84	0.84	0.76	0.76	0.76
Thr (%)	0.83	0.83	0.83	0.74	0.73	0.73	0.76	0.74	0.73
Val (%)	1.06	1.06	1.06	0.95	0.94	0.94	0.97	0.95	0.94
Ile (%)	0.98	0.94	0.94	0.87	0.84	0.82	0.89	0.85	0.81
Arg (%)	1.6	1.57	1.57	1.41	1.37	1.3	1.45	1.40	1.35
Try (%)	0.28	0.26	0.26	0.25	0.23	0.22	0.25	0.24	0.21

Table 3: Comparison the average relate to Weight gain in different experiment groups based on gram 0-9 9-20 20-31 31-42

Experimental Diets	Average weight gain in different periods (gm)			
	0-11 days	11-24 days	24-42 days	0-42 days
Control (without PBPM)	218.50	772.50	1350.00[b]	2415.81
5 % PBPM sample A	219.25	717.33	1425.50[a]	2245.27
10 % PBPM sample A	206.00	720.00	1240.75[b]	2123.76
SEM	4.295	16.490	26.419	226.428
P- Value	0.182	0.175	0.001	0.283

[ab]different superscripts in a column differ significantly (P<0.05)

Table 4: Comparison the average relate to feed intake in different experiment groups based on gram

Diets experiment	Average feed intake in different periods (gm)			
	0-11 days	11-24 days	24-42 days	0-42 days
Control (without PBPM)	313.75	1279.75	2580.00	4169.01
5 % PBPM sample A	319.25	1190.33	2473.00	4065.34
10 % PBPM sample A	305.00	1161.66	2449.75	3933.27
SEM	6.571	45.032	56.230	89.860
P- Value	0.283	0.283	0.488	0.320

Table 5: Comparison the average relate to feed conversion ratio in different experiment groups based on gram

Diets experiment	average feed conversion ratio in different periods(gram)			
	0-11 days	11-24 days	24-42 days	0-42 days
Control (without PBPM)	1.43	1.66	1.97[b]	1.72
10 % PBPM sample A	1.48	1.61	1.98[b]	1.84
5 % PBPM sample B	1.45	1.71	1.75 [a]	1.73
SEM	0.63	0.62	0.07	0.04
P- Value	0.02	0.08	0.05	0.31

[ab]different superscripts in a column differ significantly (P<0.05)

and 6 % PBPM in diet of broiler chickens as feed source and the results showed that PBPM can be used up to 6% in chicken diet. Kalantar and Fahimi (2005) and Sahraei et al. (2010) concluded that PBPM in diet of broiler chickens 6% of PBPM in the diet can be used. The purpose of this study was to evaluate the effect of two different levels (5 and 10%) of PBPM in feed of broiler chickens on some performance parameters.

Materials and Methods

Total of 321 broilers were randomly divided into 3 treatments (5 replicates per treatment). Treatments consisted of a control group (without PBPM) and two levels of PBMP with 5 and 10%. Chemical composition of feed items used in this experiment is based on NRC (1994) (Table 1&2). The experiment lasted for 42 days. Body weight, feed intake and feed conversion were determined at different intervals of the experiment. Mean comparison was calculated by SPSS software (version 12.0).

Results and Discussion

The result of weight gain in table 3 indicated that it was significantly high in birds fed 5% PBMP. There was no significant difference between the control and experimental groups in term of feed intake (Table 2). However, feed conversion ratio was significantly high in birds fed 5% level of PBMP. The obtained results did not match with results of Sahraei et al. (2010) and Azman and Dalkilic (2006) but with the study of Jafari et al. (2010). Sahraei et al. (2010) used levels of 0, 3, 6 and 9 percent of PBPM in broiler chicken diet and the results showed that there was no significant difference between different levels of PBPM on weight gain. Azman and Dalkilic (2006) used 0, 4 and 6% of PBPM at the age of 22 to 35 days in broilers and found no significant difference in weight gain. Jafari et al. (2010) found significant difference in production performance at the level of 0, 5 and 10% of PBPM. The reasons of these differences may be due to commercial strain, different in used levels amount, chemical combination of PBPM and technique of processing. The present results indicated that 5% PBMP could be used as supplement for better production performance.

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