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**Short communication**

# The effect of different levels of poultry by product meal on carcass quality in broiler

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## Abstract

In order to study the effect of different levels of poultry by-product meal (PBPM) in diet on carcass in broilers, an experiment on 321 broilers was conducted for 42 days. The treatments include a control group (without PBPM) and two experimental poultry by-product meal levels (5 and 10%). At the end of the experiment from each replicate, 5 birds were selected randomly, slaughtered and carcass, breast, thighs, wings, abdominal fat, heart, liver, gizzard, gall bladder, skeleton, pancreas and spleen percentages were determined. Breast and liver weights were significantly high in 5% fed PBPM, while wing weight was significantly higher in 5 and 10% fed PBPM. Skeleton percentage was significantly high in birds fed 10% PBPM. The results indicated that 5% level of PBPM was superior in enhancing the carcass characteristics in broilers.

**Key words:** Poultry By-Product Meal, Diet, Broiler, Carcass Traits

## Introduction

The value of poultry by-product as a feed additive for the first time was published in 1950s (Senkoylu et al., 2005). PBPM is the by-product of slaughtered poultry (Pesti, 1987; Webster et al., 1996; Senkoylu et al., 2005), produced by heating (142°C) under high pressure for 30-40 minutes (El Boushy et al., 2000). This product contains about 20-25% live weight and has high food value (Nazeradl, 1991). PBPM is a good source of protein (Wang and parsons, 1998), fat and ash (Ravindran and Bryden, 1999; Senkoylu et al., 2005). The degradability of crude protein of the PBPM is higher than that of bone meal (Klemesrudet al., 1997), feather meal (Klemesrud et al., 1998), blood meal and corn gluten meal (Bohnert et al., 1998; Bandegan et al., 2010). Also dietary use of PBPM increases duodenal flow (Wilsonet al, 1998; Kim and Patterson, 2003). PBPM has been added up to 6-10% in broiler and layers diets (Azman and Dalkilic, 2006; Samli et al., 2006; Geshlog et al., 2010; Sahraei et al., 2010). With processing of these wastes and their uses in poultry diets, we can reduce feed costs and environmental pollution (Akkilic, 1977; Haque et al., 1990). The aim of this experiment was to use low cost PBPM on broiler carcass traits.

## 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 poultry by-product meal 5 and 10%. Chemical composition of feed items used in this experiment is based on NRC (1994) (Table 1 & 2). At the end of the experiment, five birds from each replicate were slaughtered. After slaughtering, feathers were removed and carcass was weighed. Carcass was eviscerated and weight of breast, wings, liver, heart weight, skeletal, abdominal fat, gizzard, crop, gallbladder, pancreas and spleen were measured. To calculate the percentage of each of the above mentioned traits, live weight was divided by the weight of each component and the number was multiplied by one hundred. Mean comparison was calculated by SPSS software (version 12.0).

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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 | 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: Carcass, breast thigh, wings, abdominal fat, heat, liver gizzard, gall bladder, skeleton, pancreas spleen percentage of broilers fed 5 and 10% PBMP**

| Experimental diets | Carcass | Breast | Thigh | Wings | Abdominal fat | Heart | Liver | Gizzard | Gall bladder | Skeleton | Pancreas | Spleen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | 72.73 | 24.47$^{ab}$ | 20.34 | 7.56$^{ab}$ | 1.87 | 0.505 | 2.18$^{ab}$ | 1.43 | 0.037 | 18.43$^{b}$ | 0.23 | 0.120 |
| 5% PBMP | 72.76 | 25.83$^{a}$ | 19.93 | 7.83$^{a}$ | 2.05 | 0.502 | 2.35$^{a}$ | 1.46 | 0.035 | 19.11$^{ab}$ | 0.21 | 0.147 |
| 10% PBMP | 72.11 | 22.38$^{b}$ | 20.03 | 7.80$^{a}$ | 2.40 | 0.535 | 2.32$^{ab}$ | 1.49 | 0.032 | 20.27$^{a}$ | 0.25 | 0.120 |
| SEM | 0.80 | 0.64 | 0.45 | 0.18 | 0.26 | 0.036 | 0.115 | 0.08 | 0.08 | 0.528 | 0.230 | 0.027 |
| P value | 0.43 | 0.08 | 0.57 | 0.12 | 0.63 | 0.653 | 0.169 | 0.38 | 0.25 | 0.193 | 0.573 | 0.831 |

$^{a,b}$ Different superscripts in a column differ significantly (P<0.05)

## Results and Discussion

Breast and liver were significantly high in 5% PBMP compared to the other treatment and control, while wing percentage was significantly higher in treated groups compared to control. Skeleton percentage increased significantly in 10% PBMP treated group. Most of the improvement was observed in 5% PBMP compared to 10% inclusion level. The reason may be that the higher level is not favourable for further growth in broilers. Some of our resulted did not match with the results of Hosseinpour et al. (2010) Kalvandi et al. (2011) Seifdavati et al. (2008) Jaffer, (2010) Sahraei et al. (2010). Some reason of this difference could be the type and protein quality of PBPM, age, weight and strain of the birds as well as percentage of PBPM inclusion.

It may be concluded from the present results that 5% inclusion level of PBPM is better for the growth of carcass and internal organs in broilers.

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