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The Effect of Adding Spent Hen Meal in Pig Feeding

S.G. Bravo Jimenez, J.R. Orozco-Hernandez, J.J. Uribe-Gomez, V.O. Fuentes Hernandez,
A. Aguilar de la Torre and O.H. Navarro-Gonzalez
Departamento de Ciencias Biologicas, Centro Universitario de Los Altos, Universidad de Guadalajara,
P.O. Box 58. Km 7.5 Carretera Tepatitlan-Yahualica, Tepatitlan de Morelos, Jalisco, Mexico

Abstract: The search for alternative proteinaceous ingredients for monogastric animals is a constant task for the producer. The continuous renewal of hen population in the poultry industry, generates a protein source of aminoacids that can be used in pig feeding. The objective of the trial was to assess the effect of increasing levels of a poultry by-product meal in pig feeding, from weaning to market weight. Eighty newly weaned pigs were separated into 5 animal group to assess the addition of 0, 2.5, 5 and 7.5% (dry matter basis) of a Spent Hen by-product Meal (SHM) to a sorghum-soybean meal in pigs. The intake was daily measured and the weight gain was calculated using initial and final measurements. The initial weight was used as co-variable for the gain. Most of the production parameters were negatively affected with the addition of SHM ($p<0.05$). Increasing the SHM in the diet may affect negatively some of the production parameters in pigs.

Key words: Hen by-product, swine, production, pig feeding, SHM

INTRODUCTION

In the poultry industry, a continuous renewal is required to optimize facilities usage and to maintain product price in the market. This procedure dictates the disposal of older hens and daily mortality. Specialized enterprises utilizes these animals and produces a meal called Spent Hen Meal (SHM), which is a proteinaceous source of essential amino acids that can be used in animal feeding.

The SHM presents 58-62% of crude protein, 12-15% of fat and 18-23% of ash, which represents an alternative to fish meal to feed single stomach animals (Trindade *et al*., 2004). The ingredient has been included in poultry diets (Boiling and Firman, 1997; Douglas *et al*., 1997; Douglas and Parson, 1999; Fritts *et al*., 2002; Kersey and Waldroup, 1998; Lyons and Vandepopuliere, 1996; Trindade *et al*., 2004) with promising results, also (Keegan *et al*., 2004; Myer *et al*., 2004; Mustafa *et al*., 2000; Shelton *et al*., 2001; Zier *et al*., 2004; Zhang *et al*., 2003) have evaluated methods to process and conserve the fresh ingredient to feed pigs, but no difference was observed when compared with control diets, when fresh poultry viscera was included in the diet of fattening pigs, a slight decrease in daily weight gain was reported.

The latter studies show variable responses in pigs when poultry by-products are used. Nevertheless, the SHM, as source of protein and energy, produced from the egg producing enterprises has not been assessed in the terminal pigs.

MATERIALS AND METHODS

The present study was undertaken under commercial pig farm conditions. The farm was located in Tepatitlan de Morelos, Jalisco, Mexico. The temperature was between 18 and 20°C and the experiment was carried out during November and February 2006. Eighty Landrace x Hampshire x Duroc newly weaned piglets were used, animal were dewormed (intramuscular ivermectin; Merck Sharp Dome) and vaccinated against regional diseases. The SHM (Table 1) was included at; 0, 2.5, 5, or 7.5% (dry matter basis) in a ground sorghum-soybean meal based diet, which was adjusted to the stage of growth needs (National Research Council, 1998). The study included three stages (start, growth and fattening). For the first, 2.5×4 m, with plastic floor slats, cages (70 cm above the ground) were used to provide 0.4 m^2/piglet and each treatment had 4 repetitions. Each section had a manual feeder and automatic water supply. During the second and third stage, animals were lodged on cement floor. Productive parameters (intake, weight gain and feed to gain ratio) were assessed at the end of each stage. The stating weight of each stage was used as co-variable for gain. Parameters were statistically analyzed as a

Corresponding Author: S.G. Bravo Jimenez, Departamento de Ciencias Biologicas, Centro Universitario de Los Altos, Universidad de Guadalajara, P.O. Box 58. Km 7.5 Carretera Tepatitlan-Yahualica, Tepatitlan de Morelos, Jalisco, Mexico

Table 1: Spent hen meal composition

Meal composition	Mean	Minimum	Maximum
Humidity (%)	7.0	1	10
Total fat (%)	25.0	20	30
Crude protein (%)	55.0	50	60
Ash (%)	8.0	1	10
Calcium (%)	4.0	1	5
Phosphorus (%)	1.5	1	2
Peroxides (meq kg^{-1})	6.0	4	8
Pepsin digestibility (%)	75.0	70	90

Table 2: Production of the pig with the use of spent hen meal in the diet

	Percentage of addition			
Stages	0	2.5	5	7.5
Start				
Feed intake (kg day^{-1})	1.292a	1.376b	1.255ac	1.228c
Daily gain of weight (kg)	0.627ab	0.634b	0.586ac	0.575c
Feed to gain ratio	2.073a	2.174b	2.180b	2.234c
Growth				
Feed intake (kg day^{-1})	2.711a	2.282b	2.151b	1.719c
Daily gain of weight (kg)	1.069a	0.889b	0.889b	0.579c
Feed to gain ratio	2.535a	2.653a	2.417a	3.013b
Fattening				
Feed intake (kg day^{-1})	3.657a	3.224b	3.163b	2.897c
Daily gain of weight (kg)	0.858a	0.876b	0.868c	0.850a
Conversion	4.231a	3.719b	3.686b	3.446b

a-c: Different literal shows statistical difference ($p<0.05$) among treatments

randomized experiment using an alpha of 0.05 to declare differences among treatments and when they existed, the Duncan method was used to separate the means.

RESULTS AND DISCUSSION

The feed intake, during the initial stage with the 2.5% of SHM in the diet was low. However, this increase was not sustained and decreased food intake for up to 70 g day^{-1} ($p<0.05$; Table 2). The observation resulted in a low linear relationship between intake and the level of SHM addition ($r^2 = 0.029$). On the other hand, during the growth stage, the feed intake reduction was almost a kg per day with the 7.5% of HBM in the diet compared to the control treatment ($p<0.05$) and the decline was of 750 g during the fattening stage ($p<0.05$).

The general trend showed that the intake was reduced as far as the SHM was used to feed the animal regardless of the stage of production. The latter observation would be caused by the presence of some anti-nutritional factors in SHM. On the other hand, daily gain weight averaged 600 g during weaning and a trend was observed with a decrease correlated as SHM was increased in the diet ($p<0.05$) compared to the control treatment.

During growth the reduction was in average of 100 g with the 2.5 and 5% de SHM ($p<0.05$), nevertheless it reached 500 g, possibly reflecting the negative effect that the SHM had in the intake of pigs. In general, the effect on intake as well as in the daily gain produced a lower feed to gain ratio with 7.5% of SHM ($p<0.05$) in the diet, which increases the time the pig needs to reach the weight the market demands and affecting the income of the producer.

CONCLUSION

Increasing the HBM in the pig diet reduces the investment returns of the producer since affects negatively the production.

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