

EFFECTS OF DIFFERENT POULTRY VISCERA BY-PRODUCTS (RENDERING, ACIDULATION AND FERMENTATION) ON FEED CONSUMPTION, DAILY GAIN AND FEED:GAIN RATIO OF BROILERS DURING A 4-6 WEEK FEEDING PERIOD.

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2029 FAFFY ROAD, COLUMBUS ,OH 43210 USA**INTRODUCTION**

Poultry viscera is unstable and easily deteriorates producing an odor. It is often an industry problem and is a possible source of environment contamination. To decrease the odor and deterioration, several methods such as rendering, acidulation, fermentation and extrusion can be applied to treat (Russell et al., 1992; Urlings et al., 1993 and 1994; Mcnaughton et al., 1976, Divakaran, 1987) this by-product. Ensminger et al., (1990) indicated that animal by-products may be utilized as protein feed because it contains an excellent balance of amino acids and is a good source of minerals and vitamins. The purpose of this study was to evaluate the actual nutrient value and acceptability of three different poultry viscera products (rendering, acidulation and fermentation) as a feed material in broiler chicken diets.

MATERIALS AND METHODS

A total of 144, 3 week-old, commercial broilers (72 males, and 72 females) were divided into 4 treatments (control, rendered, acidulation and fermentation) x 2 sex (male and female) x 3 replications. These birds were raised from the 4th week to the 6th week with control diet-meat and bone meal(3%), rendered diet-poultry viscera meal(3%), acidulation diet-acidulated poultry viscera (9.69%) and fermentation diet-fermented poultry viscera (8.89%). Weekly feed consumption, daily gain and feed:gain ratio were determined at the 4th, 5th and 6th week.

RESULTS AND DISCUSSION

During the 4th week, the rendered treatment had the highest weekly feed consumption (773.23g/week/perbird) and the fermentation treatment had the lowest value (722.16 g/week /perbird) of all treatments. The feed consumption of the rendered diet was significantly higher ($p < 0.05$) than that of the fermentation diet but there were no difference when compared with the control and acidulation diets. The fermentation diets had a fermented sour odor after the fermented poultry viscera was mixed into the diet and this odor may have caused the palatability of the fermentation diet to slightly decrease when this diet was fed to broilers. These results agreed with Briscoe (1981) and Urlings et al., (1993) who reported that the feed intake of animals decreased when fed fermented products due to the low pH and odor of the fermented poultry by-products. The daily gain of all treatments were not significantly different (Table 2). The control diet had the best feed:gain ratio (2.09) and the fermentation diet had the worst feed:gain ratio (2.38) (Table 3).

At the 5th week, the weekly feed consumption (Table 1) of the rendered diet (1154.38 g/week) and the acidulation diet (1148.86 g/week) were significantly higher ($p < 0.05$) than that of the fermentation diet (1032.61 g/week). The reason for less weekly feed consumption of the fermentation diet was the same as in the 4th week. The daily gain of all treatments were not significantly different (Table 2). In the feed:gain ratio, there were no differences among treatments (Table 3).

At the 6th week, the weekly feed consumption of all treatments were not significantly different (Table 1). After 2 weeks, the broilers may have become used to the fermented sour odor and the weekly feed consumption increased and this may be used as a reason to explain why the weekly feed consumption of broilers fed the fermentation diet were not significantly different when compared to that of broilers fed the control, the rendered and the acidulation diets at the 6 week. The broilers on the acidulation diet had the highest daily gain (75.07g/perday) among all treatments and it was significantly higher than that of the control diet (69.84 g/perday, Table 2). The feed:gain ratio of all treatments were not significantly different (Table 3).

The weekly feed consumption, daily gain and feed:gain ratio of all treatments were not significantly different during the total (4-6 week) feeding period (Table 1, 2, and 3).

CONCLUSION

The weekly feed consumption of broilers fed the fermentation diet was significantly less than that of broilers fed the rendered diet at the 4th and 5th week but was not significantly different at the 6th week. The daily gain of broilers were not affected by the addition of different viscera products during the feeding period. The feed:gain ratio of broilers fed the fermentation diet was the worst at the 4th week but was not significantly different when compared with that of broilers fed the control, rendered and acidulation diets. For the total (4-6 week) feeding period there was no difference due to treatment in weekly feed consumption, daily gain or feed:gain ratio.

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Table 1 Means and standard error of the weekly feed consumption of broilers as influenced by the different poultry viscera products during 4-6 week feeding period.

Week	Experimental diets			
	Control (SE)	Rendered (SE)	Acidulation (SE)	Fermentation (SE)
4	754.99 ^{AB} (41.09)	773.28 ^A (29.64)	770.41 ^{AB} (44.88)	722.16 ^B (34.98)
5	1114.08 ^{AB} (60.68)	1154.38 ^A (69.89)	1148.86 ^A (60.61)	1032.61 ^B (25.51)
6	1187.53 ^A (62.30)	1187.67 ^A (83.87)	1235.53 ^A (65.61)	1212.73 ^A (51.12)
4-6	3058.00 ^A (133.00)	3115.30 ^A (155.17)	3154.80 ^A (150.51)	3001.00 ^A (93.99)

A, B : The means of the weekly feed consumption of broilers with different superscript letters in the same row (week) are significantly different (p<0.05).

Table 2 Means and standard error of the daily gain of broilers as influenced by the different poultry viscera products during 4-6 week feeding period

Week	Experimental diets			
	Control (SE)	Rendered (SE)	Acidulation (SE)	Fermentation (SE)
4	51.27 (1.11)	49.92 (1.03)	48.98 (1.61)	48.90 (1.79)
5	76.39 (1.72)	75.55 (1.84)	73.30 (2.23)	73.58 (2.12)
6	69.84 (2.13)	71.16 (1.84)	75.07 (2.18)	72.10 (2.04)
4-6	65.82 (1.38)	65.67 (1.38)	65.82 (1.62)	64.65 (1.54)

There were no significant differences among treatments.

Table 3 Means and standard error of the feed:gain ratio of broilers as influenced by the different poultry viscera products during 4-6 week feeding period

Week	Experimental diets			
	Control (SE)	Rendered (SE)	Acidulation (SE)	Fermentation (SE)
4	2.09 ^A (0.05)	2.20 ^{AB} (0.04)	2.26 ^{AB} (0.11)	2.38 ^B (0.11)
5	2.23 ^A (0.04)	2.25 ^A (0.07)	2.25 ^A (0.06)	2.26 ^A (0.05)
6	2.47 ^A (0.05)	2.48 ^A (0.13)	2.40 ^A (0.04)	2.42 ^A (0.05)
4-6	2.26 ^A (0.05)	2.31 ^A (0.04)	2.30 ^A (0.04)	2.32 ^A (0.05)

A, B : The means of the feed:gain ratio of broilers with different superscript letters in the same row (week) are significantly different (p<0.05).