

# EFFECTS OF DIFFERENT POULTRY VISCERA BY-PRODUCTS (RENDERING, ACIDULATION AND FERMENTATION) ON CARCASS CHARACTERISTICS OF BROILER AND SUBJECTIVE AND OBJECTIVE EVALUATION OF BROILER BREAST MUSCLE

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## INTRODUCTION

Animal by-products are used as a feedstuff in animal diets because they contain an excellent balance of amino acids and a good source of minerals and vitamins (Ensminger et al., 1990). Tibbetts et al., (1987) indicated that carcasses dressing percentage, length, average backfat and percent ham, loin, shoulder and lean cuts of pigs were not affected by poultry by-product silage. Urlings et al., (1993) stated that the pigs fed an experimental diet with fermented poultry by-products had a significantly higher carcass weight, a lower meat percentage and an increased backfat thickness. The same results were found in cattle carcass characteristics when the experimental diet contained 30% poultry viscera silage was fed to growing and finishing cattle (Briscoe, 1981). Van Lunen et al., (1990) reported that the flavor, tenderness or juiciness of pork roasts were not affected by including acidulated poultry offal in the diet at level of up to 15%. The purpose of this study was to investigate the carcass characteristics and the subjective and objective evaluation of breast muscle of broilers fed diets with three different poultry viscera products (rendering, acidulation and fermentation).

## MATERIALS AND METHODS

A total 144 broilers (72 males, 72 females) were raised with 4 different diets (control-3% meat and bone meal, rendered-3% poultry viscera meal, acidulation-9.69% acidulated poultry viscera and fermentation-8.89 % fermented poultry viscera) from 4 week to 6 weeks. When the feeding experiment was completed at the 6th week broilers were sent to a poultry slaughterhouse to obtain poultry carcasses and breast muscle. The carcass characteristics of broiler were estimated by wholesale cut techniques and the subjective and objective evaluation of breast muscle were performed by sensory panel test and instron Warner-Bratzler shear test.

## RESULTS AND DISCUSSION

The wholesale cut parts (head, neck and back, breast, leg, wing and feet) of broiler carcasses were not significantly different among all treatments (Table 1). The carcass weight, dressing percentage and viscera percentage of broilers fed the control, the rendered, the acidulation and the fermentation diets were also not significantly different.

The juiciness, tenderness, texture score of broiler breast muscles were not significantly different among all treatments. The flavor score of broiler breast muscle of the control diet had the highest value (6.25) of all treatments and was significantly higher ( $p < 0.05$ ) than that (5.89) of the fermentation diet but was not significantly different when compared with broilers fed the rendered diet (6.07) and the acidulation diet (6.07). Although the flavor score of breast muscle of broilers fed the fermentation diet was lower than that of broilers fed the control diet it was still acceptable by the panelist. The overall acceptability score of breast muscle of broilers fed the control diet also had the highest score (6.29) of all treatments and was significantly higher than that of broilers fed the rendered and fermentation diets (Table 2) but they all were acceptable by the panelists in this study. There was no difference in instron Warner-Bratzler shear test when the breast muscle of broiler fed the control diet was compared with those of broilers fed the rendered, the acidulation and fermentation diets.

## CONCLUSION

The carcass characteristics (wholesale cut parts percentage, dressing percentage, carcass weight and viscera percentage) were not affected by the broilers fed the experimental diets with the rendered, acidulated and fermented poultry viscera. The juiciness, tenderness and texture of broiler breast muscle were also not affected by the addition of different poultry viscera products. The flavor of breast muscles of the broilers fed the control diet were significantly better than that of broilers fed the fermentation diets and the overall acceptability of breast muscle of broilers fed the control diet were also higher than that of the broilers fed the rendered diet but the breast from all diets were acceptable by the panelists in this research.

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**Table 1 Means and standard error of the wholesale cut parts percentage, carcass weight, dressing percentage and viscera percentage of broiler as influenced by different poultry viscera products**

Items	Experimental diets			
	Control (SE)	Rendered (SE)	Acidulation (SE)	Fermentation (SE)
Carcass weight, g	1591.34 (35.02)	1576.86 (24.65)	1603.32 (36.14)	1580.72 (38.20)
Dressing, %	76.91 (0.30)	76.56 (0.20)	76.82 (0.33)	76.51 (0.27)
Viscera, %	14.78 (0.19)	15.11 (0.21)	15.00 (0.21)	15.09 (0.20)
Neck, head and back, %	27.64 (0.15)	27.44 (0.19)	17.62 (0.25)	27.22 (0.21)
Breast, %	26.20 (0.23)	26.47 (0.31)	26.03 (0.30)	26.48 (0.28)
Leg, %	29.96 (0.19)	29.73 (0.21)	30.04 (0.18)	30.22 (0.19)
Wing, %	10.87 (0.07)	10.83 (0.11)	10.74 (0.11)	10.86 (0.08)
Feet, %	5.87 (0.11)	5.87 (0.13)	5.78 (0.10)	5.71 (0.08)

There were no significant differences among all treatments in this table. Wholesale cut parts consist of neck, head and back, breast, leg, wing and feet. The percent of wholesale cut parts based on carcass weight.

Dressing percentage= carcass weight / live body weight x 100.

Viscera percentage= viscera weight / live body weight x 100.

Viscera contain liver, heart, gizzard, lung, proventriculus, trachea and intestine tract.

**Table 2 Means and standard error of the sensory panel score of broiler breast muscles as influenced by different poultry viscera products.**

Items	Experimental diets			
	Control (SE)	Rendered (SE)	Acidulation (SE)	Fermentation (SE)
Flavor	6.25 <sup>A</sup> (0.09)	6.07 <sup>AB</sup> (0.09)	6.07 <sup>AB</sup> (0.08)	5.89 <sup>B</sup> (0.10)
Juiciness	5.79 <sup>A</sup> (0.12)	5.61 <sup>A</sup> (0.10)	5.60 <sup>A</sup> (0.10)	5.51 <sup>A</sup> (0.13)
Tenderness	6.07 <sup>A</sup> (0.11)	5.87 <sup>A</sup> (0.07)	5.90 <sup>A</sup> (0.11)	5.98 <sup>A</sup> (0.11)
Texture	5.92 <sup>A</sup> (0.12)	5.83 <sup>A</sup> (0.08)	5.94 <sup>A</sup> (0.10)	5.86 <sup>A</sup> (0.13)
Overall Acceptability	6.29 <sup>A</sup> (0.10)	5.97 <sup>B</sup> (0.07)	6.07 <sup>AB</sup> (0.09)	6.02 <sup>B</sup> (0.12)

A 9 point scale of the sensory panel score was used in this test. Flavor: 1=extremely bland, 9= extremely chicken flavor. Juiciness: 1= very dry, 9= very juicy. Tenderness: 1= very tough, 9= very tender. Texture: 1= very coarse, 9= very fine. Overall acceptability: 1= very low overall acceptability, 9= very high overall acceptability.

A, B: The means of the sensory panel score with different superscript letters in the same row were significantly different (p<0.05).