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Carcass and Parts Yield of Broilers Reared Under a Semi-Extensive System

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ABSTRACT

An experiment was carried out to evaluate carcass traits of male and female broilers of two genetic strains (Paraíso Pedrês and Pescoço Pelado), slaughtered at 65, 75, 85 and 95 days of age, and reared under a semi-extensive production system. The following parameters were evaluated: body weight at slaughter (BWs), carcass weight (CW), carcass yield (CY), parts yield, including breast, drumstick, thighs, back, neck, feet, wings, abdominal fat pad (AF), and giblets (gizzard, heart, liver). Paraíso Pedrês males presented higher BWs and CW. Paraíso Pedrês females had higher breast yield. Thighs and drumstick yields were higher in Pescoço Pelado males. Back yield was similar at 85 and 95 days of age, wing yield declined with age. AF yield was higher in Paraíso Pedrês and in females. GY was affected by sex and slaughter age. The results of this work lead to the conclusion that Paraíso Pedrês males reach higher live and carcass weights at 85 and 95 days of age, and that breast yield is higher in this strain. On the other hand, Pescoço Pelado males present higher drumstick and thighs yields. Therefore, the choice of genetic strain, sex and slaughter weight will determine carcasses with different parts yield.

INTRODUCTION

The market of broilers reared under intensive systems demands whole carcasses or parts. For broilers reared in alternative or free-range systems, the demand is still only whole carcasses. This market has been explored by large companies, which target clients are those consumers that are willing to pay higher prices for these products (Zanusso & Dionello, 2003). In some countries, such as Portugal and France, poultry companies strongly invest in these product lines by obtaining quality certificates. However, further studies are required to determine the performance and carcass yield to support production processes, and to provide profitability for the farmers, and customer satisfaction.

In the production chain, carcass and parts yields provide useful information to guide farmers as to strain, sex, and slaughter age options that would supply consumers' demands. Consumers prefer chickens with high yield of noble parts, such as breast, drumsticks, and thighs (Hellmeister Filho, 2002; Souza, 2004). In terms of carcass and parts yield of broiler strains used in semi-extensive systems, fast-growing birds usually present higher breast yield as compared to slow-growing birds, which present higher drumstick and thighs yield (Fanático *et al.*, 2005). Differences are also observed between sexes, with males having higher thighs yield, and females, higher breast yield (Takahashi *et al.*, 2006).

The objective of the present study was to evaluate the effect of the genetic strains Paraíso Pedrês (fast growth rate) and Pescoço Pelado (slow growth rate) and of sex on slaughter weight and carcass and parts characteristics at different slaughter ages (65, 75, 85, and 95 days).

MATERIALS AND METHODS

The experiment was carried out at Instituto Federal de Educação, Ciência e Tecnologia de Mato Grosso - São Vicente campus, Brazil. A total of 192 broilers were used during an experimental period of 95 days. A completely randomized experimental design, in a 2 x 2 x 4 factorial arrangement with two "free-range" broiler strains (Pescoço Pelado or Label Rouge - slow growth rate (SG), and Paraíso Pedrês - fast growth rate (FG)), two sexes (males and females), and four slaughter ages (65, 75, 85, and 95 days) was applied. There were three replicates per treatment, with a total of 48 experimental units. Each experimental unit consisted of four birds.

Birds were reared in two phases. During the starter phase (1 to 28 days), birds were housed in pens with *ad libitum* access to feed and water, and during the finisher phase (29 to 95 days), birds were kept in a poultry house and had access to a pasture area with an area of more than 3 m^2 per bird.

Table 1 shows the composition of the diets offered during the two different phases of the experimental period.

Birds were slaughtered by mechanical stunning, followed by bleeding (the carotid artery and the external jugular vein were cut) near the occipital bone and the atlas. After bleeding, birds were placed in a scalding tank with na average temperature of 60°C for a maximum period of 2 minutes, and then immediately de-feathered using an automatic turning de-feathering machine. Carcasses were eviscerated on stainless steel tables, and their giblets and abdominal fat were collected. Carcasses were individually packed in plastic bags, and chilled in a chilling room at 5° C for 24 hours. After this period, carcasses were weighed and cut up in commercial parts: breast, drumstick, thighs, feet, back, neck, and wings. Parts were weighed per experimental unit (four birds). Parts were then weighed, packed, and frozen at -18° C, and stored in a freezer (-18° C).

At each slaughter age, body weight at slaughter (BWs) was determined as the average weight of fasted birds in each experimental unit at the time of slaughter. Carcass weight (CW) considered whole slaughtered birds, with neck and feet, and no head, abdominal fat or giblets, and calculated as CW (carcass weight) = average weight of the experimental unit, where CW = (weight of four chilled broiler carcasses)/4. Carcass yield (CY) corresponded to the ratio between carcass weight after chilling (CW) and body weight at slaughter (BWs), and was calculated according to the following formula: CY (%) = CW/BWs*100. Parts yield (drumstick, thighs, breast, back, neck, wings, and feet) was calculated as the ratio between the average part weight representative of each experimental unit and carcass weight, according to the formula: Part yield (%) = PY/CW*100 (PY is the representative value of each part of each experimental unit). Giblets yield (GY) (heart, gizzard, and liver) was determined as the percentage of giblets weight (heart, gizzard e liver) relative to carcass weight, according to the formula: GY (%) = GW/CW*100 (GW is the sum of giblets weight representative of each experimental unit). Abdominal fat (AF) percentage considered abdominal fat weight (AFW) relative to body weight at slaughter (BWs), and was calculated according to the formula: Abdominal fat (%) = AFW/BWs*100.

Table 1 - Ingredient and calculated composition of the starter and finisher diets fed to the experimental birds.

Ingredients	Starter diet (%)	Finisher diet (%)
Corn	61.0	67.5
Soybean meal (45%)	34.0	27.5
Vitamins and minerals	5.0[1]	5.0[2]
Calculated values		
ME, (Kcal/kg)	2.860	2.934
CP (%)	20.71	18.31
Lysine (%)	1.10	0.93
Methionine + cystine (%)	0.66	0.60
Calcium (%)	1.19	1.17
Available phosphorus (%)	0.49	0.48

1 - Guaranteed levels per kg feed: calcium - 10.60g; phosphorus - 3.74g; sodium - 2.00g; selenium -0.34mg; nicotinic acid - 43.30mg; copper - 156.25mg; calcium pantothenate - 11.88mg; biotin - 0.20mg; manganese - 95.30mg; DL-methionine (minimum) - 2.13g; iodine - 1.63mg; coccidiostat - 137.50mg; antioxidant - 5.00mg; choline - 0.75g; growth promoter - 62.50mg; Vit. A - 8,750IU; Vit. B1 - 2.23mg; Vit. B2 - 12.00mg; Vit. B6 - 4.33mg; Vit. B12 - 12.50mcg; Vit. D3 - 375 AU.; Vit. E -31.25mg; Vit. K - 1.23mg; zinc - 114.05mg; fluoride (max.) - 37.35mg. 2 - Guaranteed levels per kg feed: calcium - 10.60g; phosphorus - 3.74g; sodium - 2.00g; selenium -0.34mg; nicotinic acid - 43.30mg; copper - 156.25mg; calcium pantothenate - 11.88mg; biotin - 0.20mg; manganese - 95.30mg; DL-methionine (minimum) - 1.69g; iodine - 1.63mg; coccidiostat - 137.50mg; antioxidant - 5.00mg; choline - 0.75g; growth promoter - 62.50mg; Vit. A - 8,750IU; Vit. B1 - 2.23mg; Vit. B2 - 12.00mg; Vit. B6 - 4.33mg; Vit. B12 - 12.50mcg; Vit. D3 - 375 AU; Vit. E -31.25mg; Vit. K - 1.23mg; zinc - 114.05mg; fluoride (max.) - 37.35mg.

The obtained data were analyzed using the software program SISVAR (Ferreira, 2000). Parameters presenting significant influence of the factors slaughter age, sex, and genetic strain and/or interaction of these factors in the analysis of variance were compared by the test of Tukey at 5% significance level.

RESULTS AND DISCUSSION

The results of the analysis of variance of carcass and parts yield are shown in Table 2.

There was a significant increase in BWs and CW as a function of slaughter age, with higher averages for the fast-growing line Paraíso Pedrês and males (Table 3). The interaction between line and slaughter age shows that the line Paraíso Pedrês reached higher weight as compared to Pescoço Pelado at all ages.

As to slaughter weight relative to slaughter age, the line Paraíso Pedrês weighed 2,226.0 at 75 days and the line Pescoço Pelado, 2,276.6 at 85 days, showing the faster growth rate of the line Paraíso Pedrês. These results are consistent with the findings of Hellmeister Filho (2002), who evaluated slaughter ages of 2,300.0 g live weight broilers, and observed that the line Paraíso Pedrês reached that weight at approximately 61 days of age, whereas in Pescoço Pelado birds, that weight was achieved only at 84 days of age. Santos *et al*. (2005) also verified an approximate age of 63 days to achieve 2.5 kg slaughter weight in Paraíso Pedrês birds, and of 77 days for Isa Label birds.

The effect of the interaction between sex and slaughter age on BWs showed that, at all slaughter ages, males presented higher averages as compared to females (Table 3). Souza (2004), comparing birds of age similar to the present study (85 days), despite finding lower weights than those reported here, observed significant increase in average live weight at slaughter as birds aged, and also that males were heavier than females.

Body weight at slaughter differences between genetic strains were also reported by Souza (2004), Takahashi *et al*. (2006), and Coelho *et al*. (2007), with higher averages for Paraíso Pedrês as compared to Pescoço Pelado. These results were reflected in carcass weights, in agreement with the studies of Souza (2004), Grashorn & Clostermann (2002), and Castellini *et al*. (2002), which showed that strains with higher growth potential are also heavier at slaughter.

Males presented significantly higher BWs and CW relative to females, confirming the behavior observed in free-range chicken lines reared under extensive

Table 2 - Analysis of variance of carcass and parts yield values as a function of genetic strain (L), sex (S), slaughter age (A) and their interactions.

Variable	L	S	A	L x S	L x A	S x A	LxSxA	CV(%)
BWs	***	***	***	n.s.	**	***	n.s.	5.21
CW	***	***	***	n.s.	n.s.	**	n.s.	6.20
CY	n.s.	*	n.s.	n.s.	n.s.	n.s.	*	3.84
	Parts yield							
Drumstick	***	***	n.s.	n.s.	n.s.	**	n.s.	2.26
Thighs	n.s.	**	***	n.s.	*	n.s.	*	3.51
Feet	***	***	***	n.s.	n.s.	n.s.	n.s.	4.91
Wing	*	n.s.	***	n.s.	n.s.	n.s.	n.s.	4.34
Breast	*	***	*	n.s.	n.s.	n.s.	n.s.	3.03
Back	n.s.	n.s.	***	n.s.	n.s.	n.s.	n.s.	3.83
Neck	***	n.s.	***	n.s.	*	n.s.	n.s.	4.96
Giblets	n.s.	**	***	n.s.	*	n.s.	*	6.41
Abd. Fat	***	***	***	n.s.	n.s.	*	*	19.61

*(p<0.05), **(p<0.01), ***(p<0.001), n.s. (p>0.05).

Table 3 - Average slaughter weight (BWs) and carcass weight (CW), in g, as a function of genetic strain, sex, and slaughter age.

Variable	Age	Line		Mean	Sex	
		P. Pelado	P. Pedrês		Male	Female
Body weight at slaughter						
	65	1,738.3dB	1,971.7dA	1,855.0d	1,998.3dA	1,711.7dB
	75	1,986.7cB	2,226.7cA	2,106.7c	2,251.7cA	1,961.7cB
	85	2,276.6bB	2,748.3bA	2,512.5b	2,806.7bA	2,218.3bB
	95	2,583.3aB	3,098.3aA	2,840.8a	3,218.3aA	2,463.3aB
Mean		2,146.3B	2,511.3A		2,568.8A	2,088.8B
Carcass weight						
	65	1,276.7	1,431.6	1,354.2d	1,490.0dA	1,218.3cB
	75	1,470.0	1,711.7	1,590.8c	1,735.0cA	1,446.7bB
	85	1,743.3	2,036.7	1,890.0b	2,115.0bA	1,665.0aB
	95	1,938.3	2,286.7	2,112.5a	2,396.7aA	1,828.3aB
Mean		1,607.1B	1,866.7A		1,934.1A	1,539.6B

Means followed by the different small letter in the same column and different capital letters in the same row are significantly different by the test of Tukey (p<0.05).

systems (Halle & Dänicke, 2001; Grashorn & Clostermann, 2002; Santos *et al*., 2005; Souza, 2004). Considering the effect of the interaction between sex and slaughter age on CW (Table 3), males presented significant differences at all ages, whereas in females, differences were found only until 85 days of age, and their weight stabilized thereafter. At all ages, males were always heavier than females, which is consistent with the findings of Souza (2004). However, average weights observed by that author for males (1,689.5 g) and females (1,365.7 g) are lower than those obtained in the present study. Grashorn & Clostermann (2002), working with six different genotypes, observed this same behavior, independently of genotype or slaughter age.

The effects of the interactions among slaughter age, genetic strain and sex on carcass yield (CY) results show that that there was no influence of line or slaughter age on male CY, whereas in females, there were differences between genetic strains on CY. Moreover, Paraíso Pedrês broilers females presented higher CY when slaughtered at 75 days and lower CY at 65 days as compared to the other line (Table 4), which maybe due to the higher growth rate of bones and muscles in Paraíso Pedrês females, which CY at 75 days was similar and higher than Pescoço Pelado males and females, respectively.

The effect of the interaction among sex, slaughter age and genetic strain on CY (Table 4) showed that Pescoço Pelado males presented the highest CY at 75 days, whereas in Paraíso Pedrês birds, CY was highest at 65 days.

Table 4 - Mean de rendimento de carcaça (%) por line, slaughter age e sex.

Line	Sex	Age (days)			
		65	75	85	95
P. Pelado	Male	73.59aAx	77.45aAx	77.09aAx	75.02aAx
	Female	73.26aAx	69.86aBy	75.65aAx	74.86aAx
P. Pedrês	Male	75.90aAx	76.55aAx	73.75aAx	73.94aAx
	Female	69.24bBx	77.09aAx	74.43abAx	73.51abAx

Means followed by the different letters (a-b) in the same row indicate age differences; and (A-B) in the same column indicate sex differences; and (x-y) indicate genetic strain differences within sex by the test of Tukey (p<0.05).

Takahashi *et al*. (2006) reported higher carcass yield for males slaughtered at 70 and 84 days, while in the studies of Santos *et al*. (2005), Hellmeister Filho (2002), and Dourado *et al*. (2009), there was no difference in carcass yield between males and females.

Higher live weight and carcass weight in males are related to their higher muscle development as influenced by the production of androgens (Gonzales & Sartori, 2002). Sartori *et al*. (1999) also observed that birds selected for high growth rates presented higher muscle mass, which fibers were longer and with higher area, as well as a higher proportion and hypertrophy of glycolytic fibers as compared to slow-growing broilers.

Breast yield results (Table 5) showed that Paraíso Pedrês birds had around 0.5% higher breast yield than Pescoço Pelado chickens. These results are consistent with the findings of Grashorn & Clostermann (2002), Quentin *et al*. (2003), and Lonergan *et al*. (2003), who verified higher breat yield in fast-growing broiler strains. These results are expected in broilers with faster development rates and genetically selected for muscle growth.

Females presented higher breast yield (1.91%), as compared to males, as also shown by Takahashi *et al*. (2006), Hellmeister Filho (2002), Grashorn & Clostermann (2002), Santos *et al*. (2005), and Souza (2004). According to Rondelli *et al*. (2003), this is due to sexual dimorphism of carcass conformation, with females presenting higher breast development, and lower drumstick proportion as compared to males.

Slaughter age influenced breast yield (Table 5), with the highest values obtained at 95 days of age, which was also reported by Castellini *et al*. (2002), when comparing broilers reared under conventional or organic systems.

Table 5 - Means values of parts yield (breast, drumstick, and wing) of broilers as a function of genetic strain, sex, and slaughter age.

Yield (%)		Line		Mean	Sex	
	Age	P.Pelado	P.Pedrês		Male	Female
Breast	65	25.42	26.12	25.77^{b}	24.82	26.72
	75	25.94	26.62	26.28^{ab}	25.27	27.30
	85	26.01	26.04	26.02^{ab}	25.21	26.84
	95	26.46	27.11	26.79^{a}	25.75	27.83
Mean		25.96^{B}	26.47^{A}		25.26^{B}	27.17^{A}
Drumstick	65	13.48	13.28	13.38	13.75^{bA}	13.01^{abB}
	75	13.91	13.52	13.71	14.10^{abA}	13.33^{aB}
	85	13.79	13.42	13.61	14.17^{abA}	13.04^{abB}
	95	13.64	13.27	13.45	14.23^{aA}	12.68^{bB}
Mean		13.71^{A}	13.37^{B}		14.06^{A}	13.01^{B}
Wing	65	12.12	11.91	12.01^{a}	11.86	12.17
	75	11.74	11.12	11.43^{b}	11.29	11.57
	85	11.29	10.91	11.10^{b}	11.00	11.20
	95	11.49	11.26	11.37^{b}	11.24	11.50
Mean		11.66^{A}	11.30^{B}		11.47	11.49

Means followed by the different small letter in the same column and different capital letters in the same row are significantly different by the test of Tukey (p<0.05).

The interaction between sex e slaughter age affected drumstick yield (Table 5), and the highest values were observed in males at all evaluated slaughter ages. Coelho *et al*. (2007), Grashorn &

Clostermann (2002), Hellmeister Filho (2002), Santos *et al*. (2005), Takahashi *et al*. (2006), and Dourado (2009) obtained similar results. According to Madeira *et al*. (2006), this is related to the higher physical activity of males, which would lead to higher muscle development of the drumsticks.

Slaughter age influenced drumstick yield of birds of both sexes (Table 5), with males presenting the highest values at 95 days, whereas females presented the highest drumstick yield at 75 days, which lowered at 95 days.

Pescoço Pelado birds had higher drumstick yield as compared to Paraíso Pedrês. These results are in agreement with the findings of Fanático *et al*. (2005), Quentin *et al*. (2003), Takahashi *et al*. (2006), who observed higher drumstick yield in slow-growing broilers strains. According to Madeira *et al*. (2006), the genetic selection for fast growth rate results in considerable differences in muscle mass due to changes in the number and size of the fiber muscles. Also, higher physical activity can also influence muscle development.

Wing yield results showed that higher values for Pescoço Pelado birds. In addition, wing yield decreased with slaughter age (Table 5). The difference between the studied genetic strains was also detected by Coelho *et al*. (2007), Hellmeister Filho (2002), and Takahashi *et al*. (2006). The effect of slaughter age on wing yield was also reported by Lewis *et al*. (1997), who observed reduction of wing yield when broilers slaughtered at 48 days of age were compared with those slaughtered at 83 days of age. This reduction may be related to the increase in yield of other parts, which present higher muscle or fat contents.

There was an effect of the interaction among genetic strain, sex, and slaughter age on thighs yield (Table 6). The results showed that there was no influence of slaughter age on thighs yield of Pescoço Pelado, however, genetic strain affected male thighs yield at the slaughter ages of 75 and 95 days, with Paraíso Pedrês male presenting the highest values at 85 days. The evaluation of the effect of slaughter age on females thighs yield showed that Paraíso Pedrês females presented the highest thighs yield at 85 days, whereas the same thighs yield was obtained in Pescoço Pelado females at 65, 85, and 95 days. Sex differences were observed in both genetic strains at 95 days, with different thighs yield also at 75 days for Pescoço Pelado birds and at 65 days for Paraíso Pedrês birds. Santos *et al*. (2005) reported higher thighs yield values in males.

Pescoço Pelado females presented higher thighs yield as compared to Paraíso Pedrês only at 65 days, and the highest values were obtained at 85 days (Table 6).

Table 6 - Mean thighs yield (%) as a function of genetic strain, slaughter age, and sex.

Line	Sex	Age (days)			
		65	75	85	95
P. Pelado	Male	16.21^{aAx}	16.04^{aAx}	16.59^{aAx}	17.15^{aAx}
	Female	16.13^{aAx}	14.85^{bBx}	16.50^{aAx}	15.90^{abBx}
P. Pedrês	Male	16.08^{bAx}	14.69^{cAy}	17.42^{aAx}	16.07^{bAy}
	Female	15.12^{bBy}	15.56^{bAx}	16.97^{aAx}	15.06^{bBx}
Mean	15.88bc	15.29^{c}	16.87^{a}	16.05^{b}	

Means followed by the different letters (a-b) in the same row indicate age differences; and (A-B) in the same column indicate sex differences; and (x-y) indicate genetic strain differences within sex by the test of Tukey (P<0.05).

Back yield results were influenced only by slaughter age (Table 7). Considering the effect of each slaughter age on genetic strain, Paraíso Pedrês birds showed higher back yield at 65, 85, and 95 days. In both genetic strains, the highest values were obtained at 95 days.

Table 7 - Mean values of carcass parts as a function of genetic strain, sex, and slaughter age.

Yield (%)		Line		Mean	Sex	
	Age	P.Pelado	P.Pedrês		Male	Female
Back	65	19.54	18.81	19.17^{b}	19.32	19.03
	75	20.20	20.49	20.35^{a}	20.20	20.50
	85	18.53	18.22	18.38^{b}	18.12	18.63
	95	18.62	19.42	19.02^{b}	18.45	19.59
Mean		19.22	19.23		19.02	19.43
Neck	65	7.55^{bB}	8.84^{abA}	8.19^{b}	8.19	8.19
	75	7.46^{bB}	7.69^{cB}	7.58^{c}	7.58	7.58
	85	7.81^{abB}	8.53^{bA}	8.17^{b}	8.17	8.17
	95	8.22^{aB}	9.27^{aA}	8.75^{a}	8.63	8.86
Mean		7.76^{B}	8.58^{A}		8.14	8.20
Feet	65	5.70	5.40	5.55^{a}	5.89	5.20
	75	5.31	4.99	5.15^{b}	5.48	4.81
	85	5.21	4.90	5.06^{b}	5.39	4.73
	95	4.82	4.61	4.71^{c}	5.12	4.30
Mean		5.26^{A}	4.97^{B}		5.47^{A}	4.76^{B}

Means followed by the different small letter in the same column and different capital letters in the same row are significantly different by the test of Tukey (P<0.05).

Feet yield values were higher in Pescoço Pelado birds and males (Table 7). Slaughter age affected feet yield, with the lowest values obtained at 95 days. This results confirm the findings of Hellmeister Filho (2002), Souza (2004), and Santos *et al*. (2005). This demonstrates that bones related to movement and body support develop earlier than the other bones, and therefore their yield is reduced as carcass weight increases.

Pescoço Pelado males presented the lowest abdominal fat yields at 65 and 95 days, whereas females, at 75 days. Abdominal fat yield of Pescoço Pelado males and Paraíso Pedrês females were not affected by slaughter age, but Paraíso Pedrês males presented lower values at 75 days, as well as Pescoço Pelado females. In general, the lowest abdominal fat percentage was obtained in birds slaughtered at 75 days of age (Table 8).

Table 8 - Mean abdominal fat yield (%) as a function of genetic strain, slaughter age, and sex.

Line	Sex	Age (days)			
		65	75	85	95
P. Pelado	Male	1.71aAy	1.34aAx	1.85aBx	1.50aBy
	Female	2.18bAx	1.12cAy	2.76abAx	3.27aAx
P. Pedrês	Male	2.59aAx	1.50bBx	1.97abBx	2.61aBx
	Female	2.75aAx	2.51aAx	3.03aAx	3.40aAx
Mean		2.31a	1.62b	2.40a	2.70a

Means followed by the different letters (a-b) in the same row indicate age differences; and (A-B) in the same column indicate sex differences; and (x-y) indicate genetic strain differences within sex by the test of Tukey ($p<0.05$).

In general, the higher abdominal fat yield values ($p<0.05$) were obtained in Paraíso Pedrês birds (2.55%) relative to Pescoço Pelado (1.97%). These results are consistent with the findings of Berri *et al*. (2001), Grashorn & Clostermann (2002), Hellmeister Filho (2002), and Souza (2004), who reported higher abdominal fat deposition in fast-growing broilers, as these birds achieve muscle growth peak and physiological maturity earlier than slow-growing birds. Therefore, an increasing portion of the dietary energy is converted in adipose tissue as birds age (Lawrence & Fowler, 1997).

The effect of interaction among sex, slaughter age, and genetic strain on abdominal fat (Table 8), showed higher values for Pescoço Pelado females after 85 days and after 75 days in Paraíso Pedrês females. In general, females (2.63%) presented higher abdominal fat yield as compared to males (1.88%) ($p<0.05$). These results are consistent with those reported by Grashorn & Clostermann (2002), Hellmeister Filho (2002), Santos *et al*. (2005), and Souza (2004). This may be attributed to the growth rate differences between sexes: as females reach maturity earlier, they deposit more fat in the carcass (Lawrie, 2005).

Giblets yield was influenced by the interaction among the studied factors (Table 9). Males of both genetic strains did not present different GY among slaughter ages; however, the lowest values were obtained at 95 days. Pescoço Pelado females showed the highest GY at 75 days, while Paraíso Pedrês females presented lower values at 75 and 95 days.

Table 9 - Mean giblet yield (%) as a function of genetic strain, slaughter age, and sex.

Line	Sex	Age (days)			
		65	75	85	95
P. Pelado	Male	5.79abAx	6.03aBx	5.38abAx	5.18bAx
	Female	6.07bAx	6.92aAx	5.77bcAx	5.24cAx
P. Pedrês	Male	5.80aBx	6.05aAx	5.71aAx	4.86bAx
	Female	6.57aAx	5.74bAy	5.88abAx	5.30bAx
Mean		6.06ab	6.19a	5.96b	5.15c

Means followed by the different letters (a-b) in the same row indicate age differences; and (A-B) in the same column indicate sex differences; and (x-y) indicate genetic strain differences within sex by the test of Tukey ($p<0.05$).

This trend of GY reduction as a function of age was reported by Souza (2004) in 70-, 85-, and 110-d-old broilers, with differences between sex and between Paraíso Pedrês and Pescoço Pelado genetic strain.

The effect of the interaction among sex, slaughter age, and genetic strain on GY (Table 9) revealed higher values in females: Pescoço Pelado birds at 75 days and, and Paraíso Pedrês at 65 days; however, there were no differences at the other slaughter ages.

The general results of birds slaughtered at 85 and 95 days of age show that neck and abdominal fat yields increased with age, and that females presented more abdominal fat than males. Back yield was not influenced by slaughter age, sex, or genetic strain. Feet and wing yield were reduced, with females presenting 0.70%, lower feet yield as compared to males.

In general, there was an increase in parts with higher muscle mass relative to those with higher bone content as a function of slaughter age. According to Hellmeister Filho (2002), those yields tend to increase as birds become heavier.

CONCLUSIONS

Paraíso Pedrês birds showed higher live weight at slaughter, higher carcass weight, and higher breast, neck, and abdominal fat yields as compared to Pescoço Pelado.

Independently of genetic strain (slow- or fast-growing broilers), it was found that both sexes present similar behavior at different slaughter ages, suggesting that the decision factor may be slaughter weight in order to prevent product losses.

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