The Effect of Age, Sex and Breed on Carcass Yield and Cuts of broilers

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SUMMARY

Male and female of three commercial broiler breeds were slaughtered at the age of 6, 7, and 8 weeks. After storage cut in wings, breast, thighs and back. Breast meat was separated from bones.

Older and male birds had higher yields than younger and female birds. Significant differences in yield between strains were found. These differences are explained by differences in body weight. Breast and breast meat percentages increased with increasing age, whilst wing and back percentages decreased. Female birds showed higher breast percentages but lower thigh percentages. No differences in breast meat percentages could be found between sexes. The percentages of all body parts were influenced by breed, but back percentages only at the age of 8 weeks.

INTRODUCTION

Consumers in Sudan usually demand chicken of about one kilogram dressed weight. To meet this special demand, broilers are now slaughtered at the age of 5-6 weeks, even though older broilers are considered to have better carcass quality. As no adequate data are available in the literature or data of international big Poultry Firms on the effects of longer fattening period on modern broiler production. Hence the influence of age on yield and cuts of broiler could be evaluated in this experiment.

MATERIAL AND METHODS

600 male and female broiler chicks of three commercial broiler breeds were divided into 12 groups of 50 birds each. They were housed in deep litter compartments and reared under usual light and temperature conditions.

The feeds were approximately iso-nitrogenous and iso-energetic and formulated from locally available feedstuffs Table 1.

After 6, 7 and 8 weeks 4 birds of each sex and breed were slaughtered and cut into wings, thighs and back. Furthermore breast-meat was separated from bones. The weights were expressed as percentages of carcass weight.

The experiment was 3 factorial:

factor A, breed 1, 2, 3.
Factor B, sex 1,2 (male, female respectively).
Factor C, age 1, 2, 3.

According to the experimental design, 3-factor variance analyses for age, breed and sex with total data and 2 factor variance analyses for sex and breed within the age were calculated.
Differences between means were tested by t test.

RESULTS

Carcass yield is defined as the percentage of weight of slaughtered bird (before chilling without edible giblets) from the live weight immediately before killing.
As shown in table 1, carcass yield is significantly influenced by age, breed and sex.

Carcass yield improved with age from 67.1 to 69.3%. Breed 2 had a significantly lower yield than breed 1 and 3. The difference between sex 1 and 3 was smaller, but still significant. Males showed a significantly higher yield than females. Within all ages a significant effect of sex and breed was found (Table 2).

A significant difference between the yields of breed 1 and 3 existed only at the age of 8 weeks, whereas breed 2 showed a lower yield percentage than breed 1 and 3 at all ages. The yield of male birds was higher than the yield of female birds at all ages. After overnight hilling broilers were cut into wings breast thighs and backs.
Furthermore breast meat was separated from breast bones. The weights of the parts were expressed as percentages of carcass weight after overnight chilling.

Table 1. Results of 3 factorial variance analysis for yield % over 3 ages.

Source of variance F – value								
Age	Age ***		Breed ***			Sex ***		
	Live weight kg	Yield %	Breed	Live weight kg	Yield %	Sex	Live weight kg	Yield %
6 weeks	1.40	67.10 [c]	1	1.52	68.13[b]	1	1.43	68.45[a]
7 weeks	1.75	67.78 [b]	2	1.49	67.22[c]	2	1.	67.52[b]
8 wks	2.12	69.25 [a]	3	1.59	68.56[a]			

P = 0.001.

Table 2. F test of 2 factorial variance analysis of the yield response to sex and breed.

Source of variance F – value						
Breed	Age 6 wks ***		7 weeks ***		8 weeks ***	
	Live weight kg	Yield %	Live weight kg	Yield %	Live weight kg	Yield %
1	1.46	67.47[a]	1.52	68.13[a]	2.51	69.26[b]
2	1.62	66.19	1.49	66.91[b]	2.32	68.56[c]
3	1.73	67.74	1.61	68.21[a]	2.52	69.91[a]
Sex	**		***		***	
1	1.65	67.42[a]	1.62	68.14[a]	2.61	69.85[a]
2	1.41	66.73[b]	1.22	67.35[b]	2.78	68.72[b]

** *P = 0.01*
*** *P = 0.001.*

As could be seen in table 3, all parameters except thigh – percentages were influenced significantly by age. Back and wing percentages decreased with increasing age, whereas breast and breast meat percentages increased significantly. In the three factor-models all parameters were influenced significantly by breed. Breed 3 had the poorest thigh-percentages and showed higher breast and breast meat percentages than breed 1 and 2.

A significant effect of sex could be shown on back thigh and breast percentages. Although the female birds showed higher breast percentages, there was no difference in breast meat percentages. Within all 3 age groups wing, thigh, breast and breast meat percentages were influenced significantly by breed (table 4, 5, 6).

Breed 3 showed at each age the highest breast and breast meat percentages and the lowest thigh and wing percentages. In contrast to the significant effect on breast-percentages, breast meat percentages were not influenced by sex at any age.

DISCUSSION

Results indicate that carcass yield increases with body weight. Elder, as well as male broilers, e.g. heavier birds, showed higher yields than younger or female birds (table 1, 2).

Just as differences in yield between sexes and ages, differences between strains can be explained by differences in live body weights, as strain 2 had the poorest weight gains showed lower yields than strains 1 and 3 (table 1,2). In contrast to the yield, the cutting results cannot be explained by differences in body weight as shown in tables 3, 4, 5 and 6.

If there was a correlation between body weight and thigh and breast percentages, elder birds would have higher thigh percentages and male birds would have higher breast percentages. In these parameters an effect of age and sex must be assumed. An effect of breeds on wing, percentages can also be considered, as breed 3 and 1 were of similar body

weight but had different wing percentage and breed 1 and 2 showed no differences in wing percentages in spite of very different body weights (table 3, 4, 5, 6).

Table 3. Results of 3 factorial variance analysis for cutting data (weights of parts in percent of carcass weight).

	Source of variance								
		Age			breed			Sex	
		6 wks	7 wks	8 wks	1	2	3		
Back	F-value	***			***				
	X	18.52[a]	18.21	17.81[c]	18.14[b]	18.43[a]	18.00[c]	18.09[b]	18.28[a]
Wings	F-value	***			***				
	X	12.94[a]	12.49[b]	12.24[c]	12.66[a]	12.74[a]	12.30[b]	12.58	12.55
Thigh	F-value	n.s.							
	X	36.01	35.92	35.73	36.39[a]	35.97[b]	35.32[c]	36.46[a]	35.31[b]
Breast	F-value	***			***				
	X	32.28	32.98[b]	33.99	32.68[b]	32.45[b]	34.07[a]	32.66[b]	33.48[a]
Breast meat	F-value	***			***				
	X	19.66[c]	20.66[b]	21.97[a]	20.44[b]	19.95[c]	21.83[a]	20.76	20.73

*** *P = 001.*
** *P = 01.*
* *P = 05.*
n.s. *not significant.*

Table 4. Results of 2 factorial variance analysis for cutting data of Age 1.

		Source of variance				
		Breed			Sex	
		1	2	3		
Back	F-value	n.s.			n.s.	
	X	18.44	18.80	18.32	18.41	18.64
Wings	F-value	***			n.s.	
	X	12.93[a]	13.14[a]	12.76[b]	12.86	13.03
Thigh	F-value	***				
	X	36.65[a]	35.98[b]	35.40[b]	35.56[a]	35.46[b]
Breast	F-value	***				
	X	31.80[b]	31.71[b]	33.33[a]	31.97[b]	32.60[b]
Breast meat	F-value	***			n.s.	
	X	19.02	18.99[b]	20.96[a]	19.62	19.69

Table 5. Results of 2 factorial variance analysis for cutting data of Age 2.

		Source of variance				
		Breed			Sex	
		1	2	3		
Back	F-value	n.s.			n.s.	
	X	18.18	18.40	18.06	18.16	18.27
Wings	F-value	***			n.s.	
	X	12.53[a]	12.71[a]	12.24[b]	12.54	13.45
Thigh	F-value	***			***	
	X	36.35[a]	35.96[ab]	35.45[b]	36.35[a]	35.49[b]
Breast	F-value	***			***	
	X	32.61[b]	32.54[b]	33.80[a]	32.58[b]	33.37[a]
Breast meat	F-value	***			n.s.	
	X	20.57[a]	19.91[c]	21.52[a]	20.60	20.73

Table 6. Results of 2 factorial variance analysis for cutting data of Age 3.

		Source of variance				
		Breed			Sex	
		1	2	3		
Back	F-value	*			n.s.	
	X	17.77[ab]	18.06[a]	17.59[b]	17.70	17.92
Wings	F-value	***				
	X	12.50[a]	12.36[a]	11.89[b]	12.33[a]	12.16[b]
Thigh	F-value	***			***	
	X	36.16	35.97[a]	35.11[a]	36.47[a]	34.95[b]
Breast	F-value	***			***	
	X	33.68[b]	33.14[b]	35.10[a]	33.44[b]	34.57[a]
Breast meat	F-value	***			n.s.	
	X	21.79[b]	21.03[c]	23.05[a]	22.08	21.85

*** *P = 001.*
** *P = 01.*
* *P = 05.*
n.s. *not significant.*

Discrepancies between breast and breast meat percentages of male and female birds (female birds had higher breast percentages but not higher breast meat percentages) can be explained by higher bone percentages of the female breasts.

CONCLUSION

The fattening of modern broilers for longer periods would result in higher yield, higher breast and breast meat percentages and lower wing and back percentages.

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أثر العمر والجنس والسلالة في الكفاءة الإنتاجية
وتقطيع الدجاج اللاحم

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ملخص البحث:

ذكور وإناث ثلاث سلالات مختلفة من الدجاج اللاحم تمت تربيتها وذبحها في عمر 6 ، 7 ، 8 أسابيع وتم تقطيعها إلى صدور وأفخاذ وأجنحة وظهور .

أظهرت الدراسة أن الطيور الكبيره والذكور لديها كفاءة إنتاجية أعلي من الطيور الصغيرة والإناث .

كما أوجدت الدراسة بأن هناك فروقآ معنوية بين سلالات الطيور بسبب الفروقات في أوزان الأجسام .

الصدور ونسبة لحوم الصدور ترتفع بتقدم الجسم بينما الأجنحة والظهور تنخفض . الإناث أظهرت ارتفاع في نسبة الصدور وانخفاض في نسبة الأفخاذ .

الاختلافات في نسبة لحوم الصدور بين الذكور والإناث اختلافات كل أجزاء الأجسام تتأثر بالسلالة .