

Production of Meat from Egyptian Buffaloes

II. The Effect of Using Different Sources of Roughages on Carcass Traits

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CARCASS characteristics of buffalo meat were studied using animals previously described in part 1 of this study by Afifi *et al.*(1976). Three animals from the group fed on rice straw, wheat straw and bean straw, were slaughtered. The average slaughter weight was 450, 414 and 405 kg for the first, second and third groups, respectively. The average slaughter age of the animals of the three groups was nearly similar and was about 20 months.

The results obtained are summarized in the following :

1. The average dressing percentage, based on fasting weight was 56.89, 55.93 and 52.97 % for rice straw, wheat straw and bean straw groups, respectively. The corresponding figures calculated on empty live weights basis were 65.31, 64.17 and 61.85%.

2. The average boneless meat percentages in the carcass were 80.93, 81.02 and 79.51 for the rice straw, wheat straw and bean straw groups, while the percentage of the muscle/bone ratios in the carcass of the respective groups were 4.24, 4.27, and 3.88.

3. Chemical analysis of the longissimus dorsi samples on fresh weight basis was variable according to the type of feeding. Average percentages of moisture, protein, fat and ash for the three groups ranged from 71.98 to 75.06, 20.57 to 22.15, 3.39 to 3.99 and 0.91 to 1.08 % respectively.

The country is a heavy importer of meat to feed its expanding population and the meat importation are increasing, year after year.

The government was very much concerned with solving the problem, and it was thought if it is not possible to knock off this big amount of meat imports, it should be at least substantially minimized.

As mentioned before in Part 1 of this study, it is clear that most of the farmers get rid of their buffalo male calves at the earliest possible age.

If these calves could be raised until they reach higher weights (400kg), the supply of local meat will accordingly be raised.

Yet, the information available about meat characteristics of the male buffaloes when they reached the optimum live weight, is limited, particularly when they are subjected to different systems of feeding.

This study, therefore, aimed at comparing the effect of feeding rice, wheat and bean straws on dressing percentage and chemical analysis of buffalo meat.

Material and Methods

Animals used in this study were the same previously described by Afifi *et al.* (1976). Three animals of each group were slaughtered at an average weights of 450, 414 and 405 kg respectively. The weight of head, legs, hide, four compartments of the stomach full and empty and intestine full, and empty were recorder. The hot carcasses were weighed without the offals (liver, heart and kindeys). The weights of heart, bladder, and lungs were also recorded.

The carcasses were split carefully into two sides and the sides were chilled 5° for 24 hr. The chilled side was then divided into fore and hind quarters each quarter was weighed.

Chemical analysis of meat

Samples of the longissimus dorsi muscle were analysis for moisture, ether extract, protein and ash contents. According to the A.O.A.C. (1965) moisture content was carried out at 100-102°, the protein was determined using micro-kjeldahl, while soxhled method was applied for ether extract determination. Ashing was carried out in muffle at 525°.

Results and Discussion

Dressing percentage

The results in Table 1 show a dressing percentage of 56.89, 55.93 and 52.97 for the first, second and third group, respectively.

This means that the rice straw group had the highest dressing percentage, the bean straw had the lowest and the wheat straw was inbetween, although such difference between groups was not significant ($P < 0.05$).

According to Nakadal (1968) the dressing percentage was highly correlated with live weight at slaughtering, the relatively lowere dressing percentage of the third group could be attributed to the above finding.

Abdel-Rahman (1966) reported lower dressing percentage which ranged from 40.91 to 47.17% and 53.60 to 56.22% for buffaloes slaughtered at 18 and

24 months of age respectively. The values of these study were also higher than that reported by Hill (1967), who found that the dressing percentage was 50.6% for buffaloes slaughtered at 3-6 years old. young and Van den Heever (1969) stated that killing out percentage ranged from 40 to 44 for African buffaloes.

On the other hand, these results are matching with those reported by El-Naggar *et al.* (1972) and Ragab *et al.* (1966) who stated that the dressing percentage were 57.57 and 52.74 for male buffalo calves at 18 and 24 months of age respectively. El-Hakim *et al.* (1971) reported that the dressing percentage of male buffalo calves slaughtered at about 400 kg were 52.66, 54.66 and 59.76% for animals raised on 100% 50% and 20% roughages, respectively. Meanwhile El-Ashry *et al.* (1972) found that dressing percentage for buffaloes slaughtered at 325 kg were 47.4, 57.5 and 54.7 for animals fed all roughage, 50 and 80% concentrate ration respectively. Also, Afifi *et al.* (1974) found that the values were 57.30 and 54.17% for male buffaloes slaughtered at 18 and 24 months old.

Our results are in accordance with those reported by Minieri *et al.* (1972) in Italy, where found that the dressing percentage of Italian buffalo was 57.83, and 56.77 for animals slaughtered at 427.1 and 44.5 kg live body weight respectively.

In spite of fasting the animals for 16 hr before slaughtering, the weight of the content of digestive tract was 12.88, 12.83 and 14.35% of the live weight of the animals of the first, second and third groups, respectively. Therefore, the dressing percentage is markedly influenced by the volume and weight of the content of the digestive tract at slaughtering. Consequently, the dressing percentages calculated on empty live weight basis were 65.31, 64.17 and 61.85% for the animals fed on rice straw, wheat straw and bean straw, respectively as shown in Table 1. Ragab *et al.* (1966) found that the dressing percentage on empty live weight basis were 63.56 and 60.68 for male buffaloes slaughtered at 18 and 24 months old respectively. While, values reported by Afifi *et al.* (1974) were 64.02, 62.05% for male buffaloes slaughtered at the same ages, respectively. Charles and Johnson (1972) stated that the average dressing percentage (on empty live weight basis) of buffalo bulls at ages ranged from 14 to 48 months was 55.2%.

Bone less meat

The percentage of meat of the chilled carcass showed a negligible variation among the different groups as it was 80.93%, 81.02% and 79.51% for the rice straw, wheat straw groups respectively. The difference was statistically insignificant. The corresponding percentages for bone in the carcasses were 19.07, 18.98% and 20.49% for the first, second and third group respectively (Table 2).

TABLE 1. Carcass traits.

Item	Groups		
	I. Rice straw	II. Wheat straw	III. Bean straw
Fasting live weight kg	450	413	404
Empty live weight kg	392	360	346
Carcass weight	256	231	214
Av. Dr. % based on fasting wt	56.89	55.93	52.97
Av. Dr. % based on empty live weight	65.31	64.17	61.83
Digestive sys. full.	83	82	83
Digestive sys. empty.	25	29	25
Dig. sys. full % to live weight . . .	18.44	19.85	20.54
Dig. sys. empty % to live weight . .	5.56	7.02	6.19

TABLE 2. Percentage of lean and bone weight to the chilled carcass weight.

Groups	weight of chilled carcass (kg)	Lean		bone		Meat :* bone ratio
		weight (kg)	%	weight (kg)	%	
1. Rice straw . . .	236.0	191.0	80.93	45.0	19.07	4.24
2. Wheat straw . .	216.0	175.0	81.02	41.0	18.98	4.27
3. Bean straw . . .	205.0	163.0	79.51	42.0	20.49	3.88

* The muscle bone ratio including the fat.

The percentages of boneless meat in the present study were in accordance with those reported by Ragab (*et al* 1966) who found that 66.75% lean, 13.89% fat and 18.45% bone for the carcass of male buffalo slaughtered at 18 months, while at 24 months old, they were 66.52% lean, 15.04% fat and 17.28% bone.

El-Hakim *et al.* (1971) found that the average boneless meat percentage for male buffalo calves of about 325 kg live weight were 73.8, 81.7 and 82.8% for groups fed 100, 50 and 20% roughage rations respectively. The corresponding percentage at about 400 kg for the same feeding treatments were 78.6, 80.4% and 81.4%. El-Ashry *et al.* (1972) reported that the percentages of boneless meat in buffalo fed 50 and 80% concentrate rations were 78.5 and 79.5% respectively. These results were also in accordance with those found by Afifi *et al.* (1974) who reported 69.37% lean, 12.17% fat and 18.46% bone for the carcass of male buffalo slaughtered at 18 months old, while at 24 months old, the corresponding values were 73.46%, 8.96% and 17.58%.

The values of boneless meat percentage which were obtained in this study were some what higher than those reported by El-Naggar *et al.* (1972) being 75.6% and 77.6% for early and late weaned male buffalo calves slaughtered at 416.0 and 402 kg live body weight respectively. Charles and Johnson, (1972) reported an average percentage of 63.6% lean, 16.6% fat and 17.3% bone for Australian buffalo bulls slaughtered at 14-48 months.

Muscle bone ratio

Table 2 indicates that muscle / bone ratio were 4.24, 4.27 and 3.88 for animals fed on rice straw, wheat straw and bean straw respectively. The differences between groups is obviously very small. These rates were in accordance with those reported by Afifi *et al.* (1974) being 3.76 and 4.17 for male buffalo calves slaughtered at 18 and 24 months of age.

The meat / bone ratio resulted in this work were higher than value reported by Hill (1967), being 3.1:1 in Barazilin buffaloes slaughtered at 3-6 years old. These differences could be attributed to many factors among which were the plane of nutrition, age, slaughter weight and degree of fattening.

Chemical composition of buffalo meat

Data presented in Table 3, show values of moisture, dry matter, protein, fat and ash contents of longissimus dorsi muscle of buffalo fed on rations included rice straw, wheat straw and bean straw as a part of roughage.

It can be seen that the moisture content was relatively higher 75.06% in group 1 (rice straw), while the third group samples (bean straw) showed the lowest content 71.98% and the second group was intermediate 73.09%.

Protein contents were 20.57, 21.07 and 22.15% for rice straw, bean straw and wheat straw group respectively. On the other hand, the fat contents (on fresh weight basis) were 3.39, 3.56 and 3.99% for the first second and third groups respectively.

TABLE 3. The chemical composition of buffalo meat (%).

Groups	Moisture	Dry matter percentage	Protein	Fat	Ash
I. Rice straw .	75.06	24.94	20.57	3.39	0.91
II. Wheat straw	73.09	26.91	22.15	3.56	0.98
III. Bean straw .	71.98	28.02	21.07	3.99	1.108

Ash contents for the rice straw, wheat straw, and bean straw were 0.91, 0.98 and 1.08% respectively. It could be indicated that the ash and protein contents were higher in the groups 2 and 3 compared to the first group.

Moisture, protein, ether extract and ash percentages for meat tissues, in the current study ranged from 71.98 to 75.06, 20.57 to 22.15, 3.39 to 3.99 and 0.91 to 1.08% respectively, for the different groups. Similar results were reported by Ragab *et al.* (1966), where moisture, protein, ether extract and ash percentages were 77.06 and 76.13, 19.00 and 20.71, 1.30 and 2.57 and 1.10 and 0.81% respectively, for male buffalo calves slaughtered at 18 and 24 months of age respectively.

From Table 3 it could be concluded that as the fat content increased, the moisture content decreased, similar relationship was reported by Kondratenya (1971). On the other hand as the fat content increased, the dry matter also increased.

According to the above mentioned discussion it is obvious that buffalo can be used efficiently in meat production as well as cattle

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انتاج اللحم من الجاموس

II - تأثير استخدام مواد العلف الخشنة على صفات الذبيحة

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معهد بحوث الانتاج الحيواني ، كلية الزراعة ، جامعة عين شمس .

تم دراسة صفات الذبيحة للعجول الجاموسى وذلك باستخدام الحيوانات السابق استخدامها فى الجزء الأول من هذه الدراسة Afifi وآخرون (١٩٧٦) . ذبحت ثلاثة حيوانات من كل مجموعة قش الأرز ، تبن القمح ، تبن الفول وكان متوسط وزن الحيوانات عند الذبح هو ٤١٤ر٤٥٠ ، ٤٠٥ كيلوجرام للمجموعة الأولى والثانية والثالثة على الترتيب . بينما كان متوسط أعمار المجاميع الثلاث حوالى ٢٠ شهر تقريبا .

وتتلخص أهم نتائج هذه الدراسة فيما يلى :

١ - كانت النسبة المئوية للموتى للتصافى (على أساس وزن الحيوان الصائم) ٥٦ر٨٩ ، ٥٥ر٩٣ ، ٥٢ر٩٧ لمجموعات قش الأرز ، تبن القمح ، تبن الفول على التوالي بينما كانت القيم المقابلة والمحسوبة على أساس وزن الحيوان الفارغ هي ٦٥ر٣١ ، ٦٤ر٧ ، ٦١ر٨٥ % .

٢ - تبين أن النسبة المئوية للتشاقى كانت ٨٠ر٩٣ ، ٨١ر٠٢ ، ٧٩ر٥١ لمجموعات قش الأرز ، تبن القمح ، تبن الفول بينما كانت نسب اللحم الى العظم فى ذبائح المجاميع الثلاث هي ٤ر٢٤ ، ٤ر٢٧ و ٣ر٨٨ على التوالي .

٣ - أوضح التحليل الكيمائى للمعضلة الطولية الظهرية

Longissimus dorsi

(على أساس الوزن الرطب) أن المكونات الكيمائية تتغير تبعا لنوع

التغذية .

فلقد وجد أن النسبة المئوية للرطوبة والبروتين والمستخلص الأثيرى والرماد كانت تتراوح ما بين ٧١ر٩٨ الى ٧٥ر٠٦ ، ٢٠ر٥٧ الى ٢٢ر١٥ ، ٣ر٣٩ الى ٣ر٩٩ ، ٠ر٩١ الى ١ر٠٨ % على التوالي .