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Carcass and meat biochemical traits of local Sudanese rabbits

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Abstract

The present study was conducted to document the carcass traits and meat biochemical properties of Sudanese local rabbits. A total of 17 rabbits (males and females) of 3 age categories (3, 4 and 12 months) were examined for live weight, empty carcass weight, dressing percentage, neck and shoulder, ribs, loin and rump cuts. The meat biochemical traits were protein, moisture and ash contents. The current values of these parameters were found to vary considerably from those reported previously. This research work may provide baseline information for future study on local Sudanese rabbits.

Keywords: Sudan, Rabbits, Carcass, Meat, Biochemical Characteristics

Introduction

According to FAO (1993) report, in most developing countries the daily intake of animal protein is far from the recommended amount (3.24 g versus 27 g/ day). Rabbits are monogastric herbivores that do not compete with man for food. They are also characterized by high fecundity, low cost of investment, short generation interval as well as the ability to digest forages (Taiwo et al., 2004). Rabbit's meat has higher protein, lower calories and fat content in comparison with meat from other livestock (USDA, 1973). Janieri (1987) reported that rabbit meat has the lowest cholesterol value of 169 mg/100 g (on dry matter basis) compared to beef (200 mg), chicken (220 mg), and pork (223 mg). The objective of this study was to report the carcass traits and the biochemical properties of rabbits' meat.

Materials and Methods

The experiment was conducted in the Rabbit Unit of the Faculty of Animal Production, Gezira University, Sudan. Seventeen local Sudanese rabbits (males and females) of 12 (mature) 4 and 3 months were collected from different parts in Central Sudan. The animals were kept in an open sided house made of brick walls, wire mesh, supported with metal poles and corrugated iron sheet roof. The house was divided internally into small breeding pens with dimensions of 105×79×60 cm. Animals were firstly accommodated in these pens in couples (one sire and one dam) and then each dam with its kids was transferred to a separate cage (1×1m), provided with clay pots as nests where they stayed until weaning at six weeks. The animals were provided with a formulated ration (Table 1) *ad libitum* in addition to green fodder (*Medicago sativa*). Fresh water was also available in plastic containers throughout the day. Feed was offered daily in early morning, in plastic containers after removing the remaining spoiled feed. Feeding and drinking containers were cleaned daily with soap and water. Rabbit's house was cleaned every day.

Rabbits intended to be used for carcass study were deprived from food 12 hours prior to slaughtering. Animals were slaughtered according to Muslim practice after taking the slaughter weight. Duplicate meat samples each of five grams from 14 rabbits belonging to the three age groups were taken from thigh and lumber region of the carcass of each rabbit. The samples were then sent to the laboratory for proximate analysis to determine their protein, moisture and ash contents.

Only descriptive statistics was used to represent the examined data as means ± standard errors of each age category.

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Results and Discussion

The live body weight of rabbits (Table 2) in this study were lower than the results reported by Iraqi (2008) for Gabali rabbits, Enab (2001) for New Zealand White, Youssef et al. (2009) for Black Baladi, Szendro et al. (1998) for Danish White and Pannon White. However, the present values of body weight were higher than that reported by Anous (1999) for local rabbit in Burundi and the range reported by Elamin et al. (2011) for local rabbits of Sudan. Dressing percentage in this study is similar to the results reported by Ouyed and Brun (2008), Lukefahr et al. (1982). The current values were higher than the results obtained by Anous (1999), Holmes et al. (1984), and lower than the results reported by Bawa et al. (2008), Ozimba and Lukefahr (1991), Gasim-Boubaker et al. (2007) for cross bred rabbits and Dal Basco et al. (2002) for Fryer rabbits. Such differences might be due to differences of breed, age, feeding system and environmental conditions (Gasim-Boubaker et al., 2007).

Table 1: Composition of diet

Ingredient	Percentage
Sorghum	10
Groundnut cake	11
Wheat bran	40
Groundnut hulls	24
Alfalfa hay	15
Total	100
CP (% of Kg DM)	16.1%
Metabolizable Energy (K cal ME/kg DM)	2552.4

The non carcass traits in the present report (table 3) were lower than the results observed by Al-Dobaib (2010) for V Line and Saudi breeds (head, skin and viscera weights), Mehrez and Mousa (2011) for New Zealand White (liver, kidney and head weights), Ghosh and Mandal (2008) for Soviet Chinchilla and Grey Giant (gut full, lung and trachea and feet and tail weights) and Amata and Bratte (2008) for Dutch rabbits, (heart, liver, lung and spleen weights).

The total protein of rabbit meat (Table 4) in this trial was in accordance with that reported by Ghosh and Mandal, (2008), Adam (2003), Pla (1998) and Holmes et al. (1984), but higher than the protein content of New Zealand White rabbits (El-Gendi, 1999), African Boer goat (Webb et al., 2005). Moreover values of total protein content in the current rabbits' meat were lower than the results reported by Simonova et al. (2010) for Hy-plus rabbit breed and Dal Basco et al. (2002) for Fryer rabbits.

Table 2: Mean ± SE of some rabbit carcass characteristics at different ages

Trait	Age group	No.	Mean±SE
Body weight (gm)	Mature	5	1628.80±75.08
	4 month	8	1031.38±58.76
	3 month	4	1049.25±48.53
Empty carcass weight (gm)	Mature	5	878.40 ±37.66
	4 month	8	574.25 ±31.23
	3 month	4	535.75±37.86
Dressing Percentage (%)	Mature	5	54.49±1.93
	4 month	8	56.70±1.54
	3 month	4	49.58±2.21
Neck and Shoulder (gm)	Mature	5	83.20 ±3.96
	4 month	8	58.50 ±3.02
	3 month	4	52.50 ±2.75
Ribs (gm)	Mature	5	71.80 ±4.10
	4 month	8	37.38 ±2.18
	3 month	4	38.25 ±3.09
Lion (gm)	Mature	5	101.60 ±6.24
	4 month	8	67.38 ±5.34
	3 month	4	60.00 ±7.38
Rump (gm)	Mature	5	179.60 ±7.78
	4 month	8	119.75 ±5.48
	3 month	4	116.00 ±6.92

Table 3: Mean ± SE of some non carcass component organs of rabbits at various ages

Trait (gm)	Age group	No.	Mean±SE
Head	Mature	5	167.43±6.78
	4month	8	114.53 ±5.41
	3 month	4	113.19 ±7.78
Heart	Mature	5	7.85 ±0.53
	4month	8	3.31 ±0.42
	3 month	4	5.13 ±0.60
Lung	Mature	5	11.29±2.00
	4month	8	7.87±1.60
	3 month	4	11.02±2.30
Liver	Mature	5	47.97±3.08
	4month	8	40.96±2.46
	3 month	4	34.83±3.53
Kidney	Mature	5	25.05±2.34
	4month	8	13.56±1.87
	3 month	4	16.14±2.69
Gutful	Mature	5	271.66±13.63
	4month	8	204.20±10.88
	3 month	4	211.84±15.63
Tail	Mature	5	4.53±0.64
	4month	8	4.04±0.51
	3 month	4	2.17±0.73
Feet	Mature	5	29.33±1.07
	4month	8	25.66±0.854
	3 month	4	24.43±1.23
Skin	Mature	5	184.64±13.98
	4month	8	99.67±11.16
	3 month	4	91.41±16.03

Table 4: Meat biochemical traits (mean ± SE) for the examined rabbits

Trait (%)	Age group	No.	Mean±SE
Protein	Mature	4	20.59 ±0.51
	4 month	6	21.01±0.42
	3 month	4	19.70±0.53
Moisture	Mature	4	72.91±0.49
	4 month	6	72.61±41
	3 month	4	73.96±51
Ash	Mature	4	0.93±0.07
	4 month	6	1.02±0.06
	3 month	4	0.98±0.07
Fat	Mature	4	1.38±0.03
	4 month	6	1.66±0.15
	3 month	4	1.27±0.19

The average percentage of moisture content of rabbit meat in this study (Table 4) is in accordance with Adam (2003) and Pla (1998), higher than the result reported by Ghosh and Mandal (2008), Marongiu et al. (2006), Polak et al. (2006) and Bovera et al. (2004). However, it is lower than the result reported by Simonova et al. (2010), Dal Basco et al. (2002), Hernandez et al. (2004), El-Gendi (1999) and Holmes et al. (1984), higher than the moisture content found by Lee et al. (2008) in lambs and Webb et al. (2005) in goats. Younger rabbits contained less fat in their meat; this is in agreement with Hernandez et al. (2004).

The ash content of rabbit meat in the current study was in line with the findings of Adam (2003), El-Gendi (1999), Simonova et al. (2010) and Dal Basco et al. (2002) but it was lower than the values reported by Marongiu et al. (2006), Hernandez et al. (2004), Bovera et al. (2004), and Lee et al. (2008).

The fat content in this study is in agreement with Dal Basco et al. (2002) and Simonova et al. 2010, but lower than the results reported by Ghosh and Mandal, (2008), Marongiu et al. (2006), Adam (2003), El-Gendi (1999), Pla (1998), Holmes et al. (1984) and Lee et al. (2008).

In conclusion, this report may provide useful information on further studies on local Sudanese rabbits.

References

Adam, S.E.I.Y. 2003. Feed efficiency and carcass evaluation of local rabbits. M.Sc thesis, Sudan University of Science and Technology.

Al-Dobaib, S.N. 2010. Effect of diets on growth, digestibility, carcass and meat quality characteristics of four rabbit breeds. *Saudi journal of Biological Science*, 17:83-93

Amata, I.A. and Batte, L. 2008. The effect of partial replacement of soybean meal with gliricidia leaf meal on the performance and organ weights of weaner rabbits in the tropics. *Asian journal of Animal and Veterinary advances*, 3: 169-173

Anous, M.R. 1999. Growth performance, slaughter and carcass compositional traits in rabbits of a local strain and New Zealand White raised in Burundi. *World Rabbit Science*, 7(3): 139-143.

Bawa, G.S., Ajide, S.O., Adeyinka, I.A., Ajala, M.K. 2008. Effects of varying levels of groundnut haulms and cowpea shells on performance of weaner rabbits. *Asian Journal of Animal and Veterinary advances*, 3(27):54-61.

Bovera, F., Di Meo Barone, C., Gazaneo, M.P., Taranto, S. and Nizza, A. 2004. A survey on carcass and meat characteristics of Ischia rabbits raised in pits. The 8th World Rabbit Congress, Puebla, Mexico. Pp:1366-1371.

Dal Basco, A., Castellini, C. and Mugnai, C. 2002. Rearing rabbits on wire net floor or on straw litter: behavior, growth and meat quality traits. *Livestock Production Science*, 75:149-156.

Elamin, K.M., Elkhairey, M.A., Ahmed, H.B., Musa, A.M. and Bakhiet, A.O. 2011. Effect of Different Feeds on Performance and Some Blood Constituents of Local Rabbits. *Research Journal of Veterinary Sciences*, 4: 37-42.

El-Gendy, K.M. 1999. Nutritional studies on some green forages in Egypt. 7- Utilization of sweet Lupin (*Lupinus albus*) as green forage for feeding rabbits. *Egyptian Journal of Rabbit Science*, 9(2): 257-269.

Enab, A.A. 2001. Genetic evaluation of multi-trait selection indices for overall economic improvement in rabbit breeding programs. *Egyptian Poultry Science*, 21 (1):221-236.

FAO. 1993. Production Year Book of Food and Agricultural Organization of the United Nations. Rome, Italy. 1:17.

Gasim-Boubaker, A., Abdouli, H., Elhichi, M., Faiza, K. and Tayachi, L. 2007. Feeding rapeseed meal to rabbits: digestibility, performance and carcass characteristics. *Asian Journal of Animal and Veterinary Advances*, 2(1):38-41.

Ghosh, N. and Mandal, L. 2008. Carcass and meat quality traits of rabbits (*Oryctolagus cuniculus*) under warm-humid condition of West Bengal, India. *Livestock Research for rural development*, 20(9).

Hernandez, P., Aliaga, S., Pla, M. and Blasco, A. 2004. The effect of selection for growth rate and slaughter age on carcass composition and meat quality traits in rabbits. *Journal of Animal Science*, (82): 3138-3143.

Holmes, Z.A., Wei, S.F., Harris, D.J. and Cheeke, P.R. 1984. Proximate composition and sensory characteristics of meat from rabbits fed three levels of alfalfa meal. *Journal of Animal Science*, 58(1): 62-67.

Iraqi, M.M. 2008. Estimation of genetic parameters for post-weaning growth traits of Gabali rabbits in Egypt. *Livestock Research for Rural development*, 20(5).

Janieri, A. 1987. Nutritional quality of rabbit meat. *Italian R. V. agriculture*, 24:275.

Lee, J.H., Kouakou, B. and Kannan, G. 2008. Chemical composition and quality characteristics of Chevon from goats fed three different post-weaning diets. *Small Ruminant Research*, 75:177-184.

Lukefahr, S., Hohenboken,W.D., Cheeke, P.R., Patton, N.M. and Kennick, W.H. 1982. Carcass and meat characteristics of Flemish Giant and New Zealand White and terminal-cross rabbits. *Journal of Animal Science*, 54: 1169-1174.

Mehrez, A.Z. and Mousa, M.R.M. 2011. Growth performance of rabbits fed olive pulp in North Sinai. *Asian Journal of Animal Science*, 5(5): 317-327.

Marongiu, M.L., Pinna W., Floris B. and Nizza, A. 2006. Rabbit meat production as affected by delayed-weaning technique, Proceedings of the 2nd seminar of the scientific professional network of the Mediterranean livestock farming, Zaragoza. Spain: 279-285.

Ouyed, A. and J. Brun, M. 2008. Comparison of growth performance and carcass quality of crossbred rabbit from four sire lines in Quebec. 9th World Rabbit Congress, Verona, Italy.

Ozimba, C.E. and Lukefahr, D. 1991. Evaluation of purebred and crossbred rabbits for carcass merit. *Journal of Animal Science*, 69:2371-2378.

Pla, M. 2008. A comparison of the carcasses traits and meat quality of conventionally and organically produced rabbits. *Livestock Science*, 115:1-12

Polak, T. Gasperlin, L., Rajar, A. and Zlender, B. 2006. Influence of genotypes lines, age at slaughter and sexes on chemical composition of rabbit meat. *Food Technology and Biotechnology*, 44(1)65-73.

Simonova, P., ChrastinovaL, M., Mojto, J., Laukova, A., Szaboova, R. and Rafay, J. 2010. Quality of rabbit meat and phyto-additives. *Czech Journal of Food Science*, 28(3): 161-167.

Szendro, Z., Kenessey, Jensen, A.J.F., Csapo, J., Romvar, R.I. and Milisits, G. 1998. Effect of genotype, age, body weight and Sex on the body composition of growing rabbits. *World Rabbit Science*, 6 (3): 277- 284.

Taiwo, A.A., Adejuyigbe, A.D., Adebowale, E.A., Oshotan, J.S. and David, O.O. 2004. Effect of *Tridax orocumbens*, *Panicum maximum* and pawpaw leaves (*Carica papaya*) supplemented with concentrate on the performance and nutrient digestibility of weaned rabbits. Proceeding twenty ninth Annual Conference. Nigerian Society For Animal Production (NSAP). March 20-25. USMANO Danfodio University Sokoto, Nigeria.

USDA. 1973. The ABCs of Domestic farm raised rabbit meat. Cicular No. 549, Washington, D.C. 44-49.

Webb, E.C., Casey, N.H. and Simela, L. 2005. Goat meat quality. *Small Ruminant Research*, (60): 153-166.

Youssef, Y.M.K., Farid, A., Gad-Alla, S.A. and Abo-warda, M.A. 2009. Genetic evaluation for post weaning body weight traits in three genetic groups of rabbits under Egyptian conditions. 5th International Poultry conference, 10-13 March, Taba –Egypt.