BRJ BASIC RESEARCH JOURNALS

Basic Research Journal of Agricultural Science and Review ISSN 2315-6880 Vol. 6(6) pp. 49-56 September 2018
Available online http//www.basicresearchjournals.org
Copyright ©2018 Basic Research Journal

Full Length Research Paper

Evaluation of different dietary rations for growth performance and carcass characteristics of two years old Kereyu bulls for export/local market weight

Tesfaye A.T.[1], Girma D.[1], Mieso G.[1], Ashebir W.[1], Amen G.[1], Frehowit M.[1] and Tesfaye A. A.[2]

[1]Adami Tulu Agricultural Research Center P.O.Box 35 Ziway, Oromia
[2]Oromia Agricultural Research Institute

*Corresponding author email: talemu1962@yahoo.com

Acceptance 1 October, 2018

ABSTRACT

Growth performance and carcass characteristics evaluation of two years old Kereyu bulls fed on three dietary feed rations was conducted at Adami Tulu Agricultural Research Center during the year of 2014. The objectives of the study were to evaluate the growth performance and carcass characteristics and to identify the most economical feeding rations for export/local market weight gain. Eight experimental bulls were assigned to each of the three dietary treatment groups (T1=Rhodes grass hay ad-lib, molasses 20%, wheat bran 35% and linseed cake 45%, T2= Rhodes grass hay ad-lib, maize grain 20%, wheat bran 45% and Noug cake 35%, T3= G Rhodes grass hay ad-lib, wheat bran 65% and cotton seed cake 35%) in a Randomized complete block design. All the experimental bulls were supplemented with their respective feed rations at 2.5% of their body weight per day during the whole experimental periods. Finally, after 18 hours fasting, 3 bulls from each treatment group were randomly selected and slaughtered for carcass analysis. Data on feed intake, live body weight change, feeds conversion efficiency and carcass parameters were analyzed using general linear model (GLM) of Statistical Analysis System (SAS) version 9.2. Results of the fattening trial revealed that there is no significant difference in daily weight gain, total weight gain, final body weight, feeds conversion ratios and carcass characteristic of bulls fed on treatments 1, 2 and 3 at 168 fattening days ($P>0.05$). But there was significant difference in feed conversion efficiency and dry mater intake of bulls fed on T1 and T3 ($P< 0.05$). Even though all the three feeding rations are economically profitable, feeding of bulls with T1 is more profitable as compare to T 2 and T3. Therefore beef cattle fatteners can use T1 for fattening of two years old Kerayu bulls for export/local market weight gain and for better economic return.

Keywords: Carcass, Concentrate, Export, Kereyu bulls and market weight

INTRODUCTION

Livestock industry is an important and integral part of agricultural sector in Ethiopia. Livestock farming is vital for the supply of meat and milk and serves as a source of additional income both for smallholder farmers and livestock owners (Ehui *et al*., 2002). Ethiopian livestock are fed with diverse feed resources which are very low in quality and quantity. The major feed resources are the crop residues and grass hay which contains poorly digestible nutrients. To ensure better body weight gain of the animals under such situation, it is advisable that additional sources of energy and nitrogen feedstuff should be included in the diet of beef cattle to improve

their growth performance and carcass quality. In Ethiopia the effect of many feed ingredients has been tested on body weight change and carcass characteristics of old and culled oxen for domestic consumptions. However, the effect of different feeding rations on different breeds and ages of bulls for export market weight gain is not addressed well. Evaluation of different feeding options on different breeds and different ages of bulls to attain the desired export market weight and carcass quality contributes significant amount of foreign currency to what the country earns from exporting of live animals and meat. The recent study conducted on different ages of Borana bulls fed on different dietary rations for export market weight gain at Adami Tulu agricultural research center revealed that various feed had played a vital role on growth response and carcass quality of bulls (Mieso *et al*., 201; Girma *et al*., 2015). The result indicated that Borana breed have far better potential to attain export market weight at an earlier age than the other breeds so far done in the country Mieso *et al.* (2013); Girma *et al.* (2015). But the effect of different dietary rations on early ages of Kereyu bulls targeted for export/local market weight gain is not studied yet. Hence this feeding trial was designed to evaluate the growth performance, carcass characteristics and to identify the most economical feeding option of Kereyu bulls for export/local market weight gain.

MATERIALS AND METHODS

Description of the study area

The feeding trial was conducted at Adami Tulu Agricultural Research Center which is located at a distance of 167 kms from the capital city of Ethiopia (Addis Ababa). Its altitude is 1650 meter above sea level in mid rift valley. It lies at latitude of 709'N and 3807'E longitude. The agro-ecological Zone of the area is semi-arid and sub humid. It has a bimodal unevenly distributed rainfall and its mean annual rainfall is 760.9 mm. The mean minimum and maximum temperatures are 12.7^0C and 29.2^0C respectively. The average annual relative humidity is 60%. The soil type is fine, sandy loam with sand: silt: clay in the proportion of 34, 38 and 18% respectively. The average PH is 7.88. The dominant vegetation in the center includes acacia woodland, Pennisetium and Cenchrius grass species (ATARC, 1998).

Description of experimental animals

A total of 24 two-years old Kereyu bulls with an initial mean body weight of 149± 6.49kg were purchased from local market of Fentale district and transported to Adami Tulu agricultural research center. The Kereyu breed is predominantly found in Fentale district which is located at a distance of 200km east of the capital city of Ethiopia (Addis Ababa). The breed is typically known by their long horn, aggressive behavior and black and white body color. This breed is commonly kept by Kereyu people/communities. Age dentition and body conformation were used as main criteria to purchase bulls of similar ages and the same body condition from the market. The purchased bulls were kept under quarantine in separate barn at Adami Tulu agricultural research center for about 14 days and they were treated both for external and internal parasites.

Experimental design

The initial body weights of the experimental bulls were used for blocking of the animals into three groups/blocks. Randomized Complete block design was used to assign one of the dietary rations for experimental bulls. Overall a total of 8 Kereyu bulls were randomly assigned to one of the three feeds ration.

Feeds and feeding management

The three feeding rations were formulated from different feeds ingredients to be used for fattening of the experimental bulls. The dietary rations used for this feeding trial were composed of molasses, maize grain, wheat grain, noug seed cake, cotton seed cake and salt. The three different feeds rations formulated from the above listed feeds ingredients were formulated in the way that they contain the same amount of energy and protein contents (table 1 below). Totally the feeding trail lasted for 168 feeding days to attain the required export/local market weight gain. The dietary treatments used for feeding of experimental bulls during these periods were:
1 = ad-libitum Rhodes grass hay +20% molasses+ 40% wheat bran+ 40% Noug seed cake
T2 = ad-litum Rhodes grass hay +20% maize grain+45% wheat bran+35% Noug seed cake
T3= ad-litum Rhodes grass hay + 65% wheat bran+ 35% cotton seed cakes.

Feeding of experimental bulls

The experimental bulls were kept in feedlot and they were fed on their respective dietary ration until they attained the desired export/local market weight gain. The bulls were supplemented with the dietary ration at 2.5% of their body weight and feeding of the bulls were undertaken on individual basis. Supplementations of bulls at 2.5% of their body weight were gradually changed within two weeks intervals based on the body weight change of the bulls. In addition to supplementary ration,

Table 1. Ingredients and Composition of the formulated experimental ration

Ingredients	Treatment	DM%	CP%	TDN%
Molasses	T1	20	1.16	14.4
Wheat bran	T1	40	5.52	26.80
Noug seed cake	T1	40	11.9	26.4
Total		100	18.58	67.6
Maize grain	T2	20	2	17
Wheat bran	T2	45	5.85	30.15
Noug cake	T2	35	10.41	23.1
Total		100	18.26	70.25
Wheat bran	T3	65	8.45	43.55
Cotton seed cake	T3	35	9.8	26.25
Total		100	18.25	69.8

the experimental bulls were also fed on ad-libtum Rhodes grass hay as a basal diet throughout the feeding trial. Water was provided for the bulls at free choice/ access. The feeding trial lasted for 168 days including the 14 days of adaption period.

Data collection

Data on daily feed offered and refusal from each treatment group of experimental bulls were collected and weighed every day before the daily feed allowance was provided for the bulls. Data on body weight change of experimental bulls were collected every two weeks (fortnightly) starting from the commencement of the feeding trial to the end of the fattening period.

Partial budget analysis

All costs incurred for feeding of experimental bulls with the three dietary rations were recorded to analyze the profitability of fattening two years old Kereyu bulls for export/local market weight gain. Total variable costs incurred include cost of purchasing the animals, transportation cost, feed cost during the feeding period, labor and veterinary costs. The gross output/revenues of experimental bulls were estimated at the end of the fattening period by the help of three people who have enough knowledge and experience on pricing of fattened bulls. The fixed costs incurred for feeding of these experimental bulls is not included in this cost-benefit analysis. Hence, this partial budget analysis only indicates gross margin of fattened bulls using three dietary rations for 168 feeding day. Gross margin and Total Gross margin per bull was calculated as:

GM = TVC- GO,

TGM = GM multiplied by total number of bulls assigned to one ration/treatment.

Where, GM= gross margin per animal,

TVC= total variable costs incurred for fattening of bulls,

GO= gross out per bull and Total gross margin.

Statistical analysis

Data on feed intake, live body weight change, feeds conversion efficiency and carcass parameters (for each slaughtered bulls) were analyzed using general linear model (GLM) of Statistical Analysis System (SAS). The estimated least squares means were separated by the Duncan's Multiple Range Test at $P< 0.05$. Data on body weight gain of experimental bull were computed by finding the difference of the two weighing periods (initial and final body weight) and regress it over the number of days elapsed.

RESULT AND DISCUSSION

The growth performance /body weight change of two years aged Kereyu bulls fed on three feeds rations for 168 days feeding period is indicated in table 2. There was no significant difference ($P > 0.05$) in final body weight, daily weight gain and total weight gain among experimental bulls fed on T1, T2 and T3. This result is similar with the previous finding trial conducted (Girma *et al.*, 2015). In the study, no-significant difference in final body weight, daily weight gain and total weight gain of 2 years old Borana bulls fed on the same type of feeds were reported. Even if there were no significant variation on body weight change of Kereru bulls fed on three feeds ration, experimental bulls fed on T1 had gained higher final body weight, daily weight gain and total weight gain than bulls fed on ration T2 and T3 (table 2).

The mean feeds conversion efficiency of experimental bulls fed on T1, T2 and T3 were 8.1, 8.5, and 6.1 respectively. There is a significant difference ($P<0.000$) in DMI of bulls fed on T1 and T3 but there is no significant difference ($P> 0.05$) in DMI of bulls fed on T1 and T2. But there is a significant difference in FCE (feed conversion efficiency) of bulls fed on T2 and T3. Experimental bulls fed on T2 had higher feed conversion ratio than bulls fed on T1 and T3 (table 2). There is a significant difference in DMI of experimental bulls fed on T1 and T3, T2 and T3 ($P<0.05$) but there is no significant difference ($P>0.05$) in

Table 2. Effect of different feeding options on body weight change and feeds conversion ratio of the bulls at 168 feeding days

Variables (kg)	T1	T2	T3	Grand mean
IBW	149±6.49[a]	149±6.36[a]	149±5.43[a]	149±6.36
FBW	285.6±11.1[a]	264.8±7.8[a]	274.1±17.0[a]	274.8±7.2
LBWC	136.6±7.3[a]	130.8±17.0[a]	124.38±11.9[a]	130.5±7.1
ADG	0.810±0.07[a]	0.779±0.05[a]	0.740±0.10[a]	0.777±0.04
DMI	6.4±0.20[a]	6.1±0.18[a]	4.2±0.26[b]	5.6±0.24
FCR	8.1±.0.48[a]	8.5±0.81[a]	6.1±0.76[b]	7.6±0.45

IBW=intial body weight, FBW= final body weight, DWG = daily weight gain, LBWC = Live body weight change, DMI= dry matter intak and FCR = feed conversion ratio

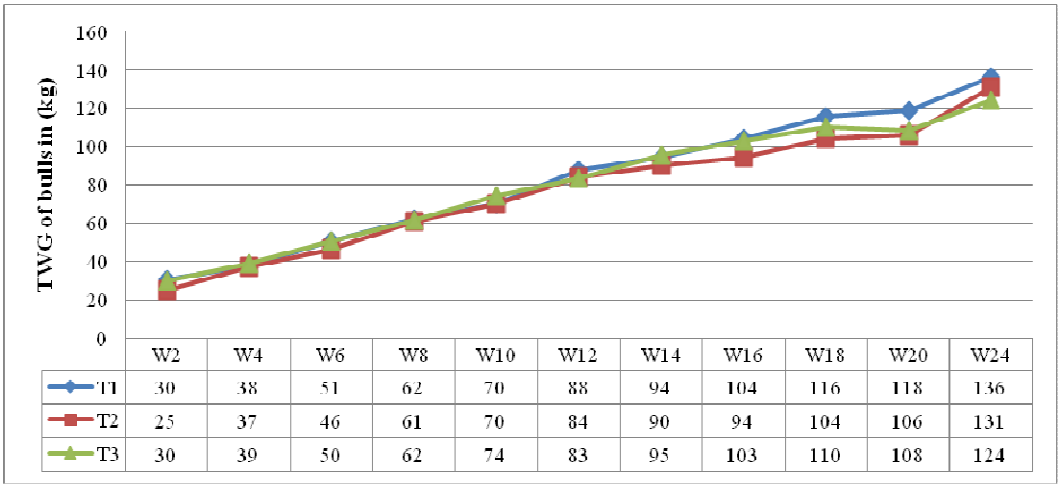


Figure 1. Trend of total weight gain of two years old kereyu bulls over the fattening period

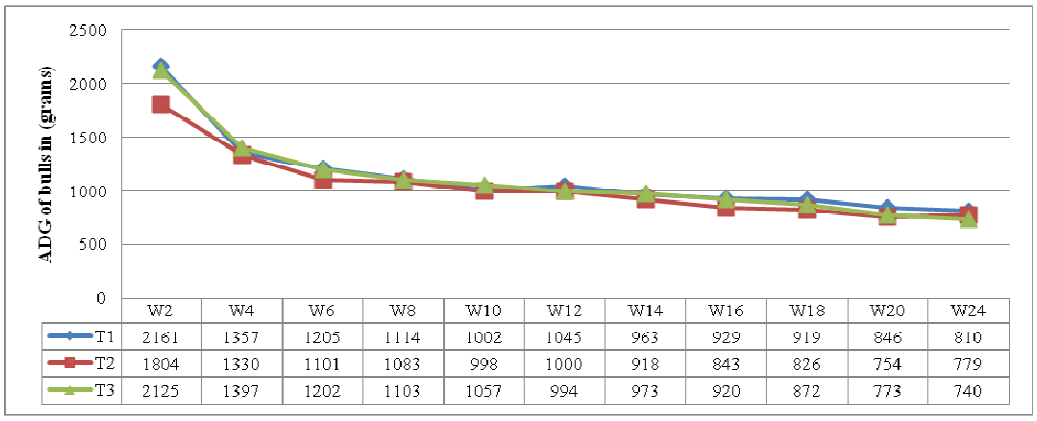
DMI between T1 andT2.

The total body weight gain and avergae daily weight gain of bulls fed on T1 in the present study was highere than 69.1and 0.47kg reported for Zebu oxen grazing natural pasture and supplemented with higher level of wheat bran (Tefaye *et al*., 2002). The present ADGs for bulls fed on T1, T2 and T3 were also higher than 0.614kg/day reported for drought oxen fed on teff straw and suplemented with wheat bran, wheat middlings and cotton seed cake (Osuji and capper, 1992). It was also comparable with 0.740kg/day reported for matured Zebu bulls fed teff straw and supplemented with poultry litter and Noug seed cake (Preston and Leng, 1986). In general, the difference in weight gain might be attributed to the difference in quantity and quality of the supplements, type of basal diet and age and the physiological and genetic potential of the animals.

As the number of feeding days increase from 14 to 168 days, the feed conversion efficiency of the experimental bulls also increase. This is because of the increase in dry matter intake of the bulls. However, when the daily weight gains of the bulls were decrease. The total body weight gain of experimental bulls over 168 days of fattening period is indicated in figure 1. In all dietary treatments the live body weight changes of experimental bulls were steadily increase as the amount of dry matter intake (DMI) of experimental bulls increase. An average of the total body weight gain of the experimental bulls increase within the range of 28kg to 130kg starting from the beginning to the end of the feeding trial.

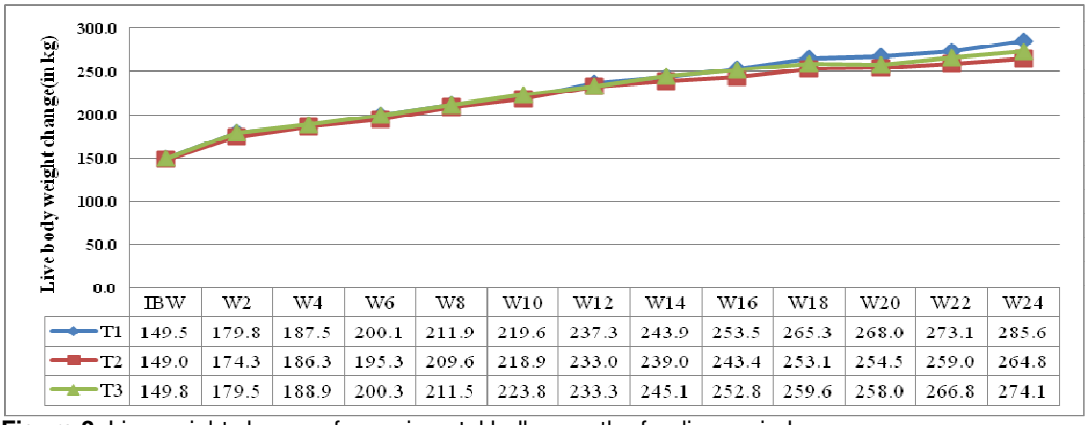
The daily weight gains of the experimental bulls fed for the 168 days are indicated in figure 2 below. The change in daily body weight gain of experimental bulls also increase/decrease in similar fasion to the live weight change of the bulls. As a result of compensatory growth, the average daily weight gains of experimental bulls were higher at the initial stage of the feeding period. But later on as the experimental bulls finished their compensatory growth, their average daily weight gains decrease steadily. This finding is similar with the previous findings of Mieso *et al*., (2013); Girma *et al*., (2015).

The dry matter intake (DMI), daily weight gain (DWG) and feeds conversion efficiency (FCE) of experimental bulls are indicated in table 3 figure 3. The feed conversion ratio/efficiency indicates the amount of feed needed to produce 1kg gain in live weight. The dry matter intake and daily weight gain of experimental bulls fed on three dietary rations were steadily increased throughout the feeding period. The feed conversion ratio of the experimental bulls fed on the three treatment groups steadily increased starting from day one to the end of feeding period (168 days).



	W2	W4	W6	W8	W10	W12	W14	W16	W18	W20	W24
T1	2161	1357	1205	1114	1002	1045	963	929	919	846	810
T2	1804	1330	1101	1083	998	1000	918	843	826	754	779
T3	2125	1397	1202	1103	1057	994	973	920	872	773	740

Figure 2. Trend of daily weight gain of two years old kereyu bulls over the fattening period



	IBW	W2	W4	W6	W8	W10	W12	W14	W16	W18	W20	W22	W24
T1	149.5	179.8	187.5	200.1	211.9	219.6	237.3	243.9	253.5	265.3	268.0	273.1	285.6
T2	149.0	174.3	186.3	195.3	209.6	218.9	233.0	239.0	243.4	253.1	254.5	259.0	264.8
T3	149.8	179.5	188.9	200.3	211.5	223.8	233.3	245.1	252.8	259.6	258.0	266.8	274.1

Figure 3. Live weight change of experimental bulls over the feeding period.

Table 3. Dry matter intake, daily weight gain and feeds conversion efficiency of Kereyu bulls

Feeding days	Treatment 1			Treatment 2			Treatment 3		
	DMI (gm)	DWG (gm)	FCE	DMI (gm)	DWG (gm)	FCE	DMI (gm)	DWG (gm)	FCE
0-14	4200	2161	2	4000	1804	2	4300	2125	2
14-28	4400	1357	3	4300	1330	3	4400	1397	3
28-42	4700	1205	4	4600	1101	4	4300	1202	4
42-56	4900	1114	4	4900	1083	5	4400	1103	4
56-70	5300	1002	5	5200	998	5	4700	1057	4
70-84	5400	1045	5	5400	1000	5	4700	994	5
84-98	5800	963	6	5800	918	6	4500	973	5
98-112	6100	929	7	5700	843	7	4900	920	5
112-126	6300	919	7	6100	826	7	4900	872	6
126-140	6400	846	8	6100	754	8	4700	773	6
140-168	6400	810	8	6100	779	8	4300	740	6

DMI= Dry Matter Intake, DWG=Daily Weight Gain, FCE=Feeds Conversion Efficiency and gm=gram

Effect of dietary rations on carcass parameters of experimental bulls

The effects of dietary rations on dressing percentage and lean to fat ratio of bulls fed on the three treatment groups were indicated in table 4. In this experiment there was no significant difference ($p>0.05$) in dressing percentage, lean to fat ratio, fat to bone ratio and bone to lean ratio among the three dietary treatments. However, experimental bulls fed on dietary ration T2 had higher dressing percentage and lean to fat ratio than bulls fed on treatment one and two. The current dressing percentage

Table 4. Effect of different feeding options on dressing percentage, lean to fat, lean to bone and fat to bone ratios of the bulls

Parameters	T1	T2	T3	Mean
Dressing percentage	54.4	57.4	57.1	56.3
Lean meat to cold carcass weight ratio	2.43	2.53	2.42	2.46
Fat to cold carcass weight ratio	0.79	0.69	0.74	0.74
Bone to cold carcass weight ratio	0.72	0.72	0.76	0.73
Lean to fat ratio	3.08	3.67	3.25	3.3
Bone to lean ratio	0.3	0.28	0.31	0.3
Fat to bone ratio	1.09	0.96	0.98	1.01

Table 5. Effect of different feeding options on non-edible organs of the bulls

Non-edible organs (in kg)	T1	T2	T3	Overall mean
Tail	0.8	0.6	0.8	0.7
Skin	22.7	21.7	23.9	22.8
Feet	5.1	4.5	5	4.8
Lung	2.5	2.5	2.8	2.6
Spleen	0.8	0.8	1	0.8
Pancreas	0.2	0.2	0.2	0.2
Bladder	0.1	0.1	0.1	0.1
Pensi	0.4	0.5	0.5	0.5
Full gut	31.8	28.5	34.2	31.5
Small intestine	9.6	10.9	13.1	11.2
Large intestine	6.4	5.3	5.6	5.8

Table 6. Effect of different feeding options on carcass and edible organs of the bulls

Carcass parameters(in kg)	T1	T2	T3	Overall mean
Hot carcass weight	155.4±6.4	152±8.2	156.5±8.8	154.6±4.2
Right side hot carcass weight	77.5±2.6	76.1±4.2	77.3±3.9	76.9±1.9
Left side hot carcass weight	77.8±3.9	75.8±4.0	78.8±5.3	77.54±2.4
Right cold carcass weight	76.3±3.3	74.4±3.9	74.3±4.4	75.0±2.0
Tongue	0.85±0.07	0.74±0.16	0.73±0.07	0.77±0.06
Heart	0.95±0.5	0.96±0.06	0.96±0.10	0.96±0.04
Heart fat	0.75±0.05	0.80±0.06	0.65±0.12	0.73±0.48
Kidney	0.55±0.05	0.54±0.02	0.65±0.03	0.56±0.23
Kidney fat	3.2±0.45	3.7±0.0.45	4.2±0.57	3.7±0.27
Liver	5.95±0.36	3.9±0.35	4.1±0.27	3.98±0.17
Pelvic fat	1.56±0.37	1.4±0.07	1.2±0.09	1.4±0.13
Hump	2.96±0.53	3.7±0.26	3.6±0.59	3.4±0.27
Omental fat	2.6±0.4	3.0±0.35	3.3±0.30	3.0±0.20
Head	13.5	11.9	13.4	12.9
Empty gut	7.4	6.7	6.8	6.9

of Kereyu bulls (57%) obtained by feeding with T2 (adi-libitum Rhodes grass hay, 20% maize grain, 45% wheat bran and 35% Noug cake) is similar with the report of Girma *et al.* (2015) who reported the dressing percentage of 59% for 2 years old Borana bulls fed on grazing + 20% molasses + 40% wheat bran and 40% Noug seed cake. Mekasha *et al*. (2011) also reported similar dressing percentage (56%) for Ogaden bulls grazing on native tropical pasture supplemented with different levels of agro industrial by-products. The dressing percentage found in this feeding trial is higher compare to the dressing percentage of 52.5% reported for Sudan Baggara Zebu bulls maintained under *ad libitum* feeding management (Fadol and Babiker, 2010; Talib and Ahmed, 2008). The lean to fat ratio found in this trail is also comparable with the report of Girma *et al*. (2015) who reported the lean to fat ratio of 2.6 for 2 years old Borana bull. The higher lean to fat ratio obtained in this feeding trial than the previous result of Borana bulls indicates that Kereyu bulls had accumulated less fat than Borana bulls.

The effects of different feeding options on non-edible organs and different parts of slaughtered bulls are indicated in table 5. There were no statistically significant

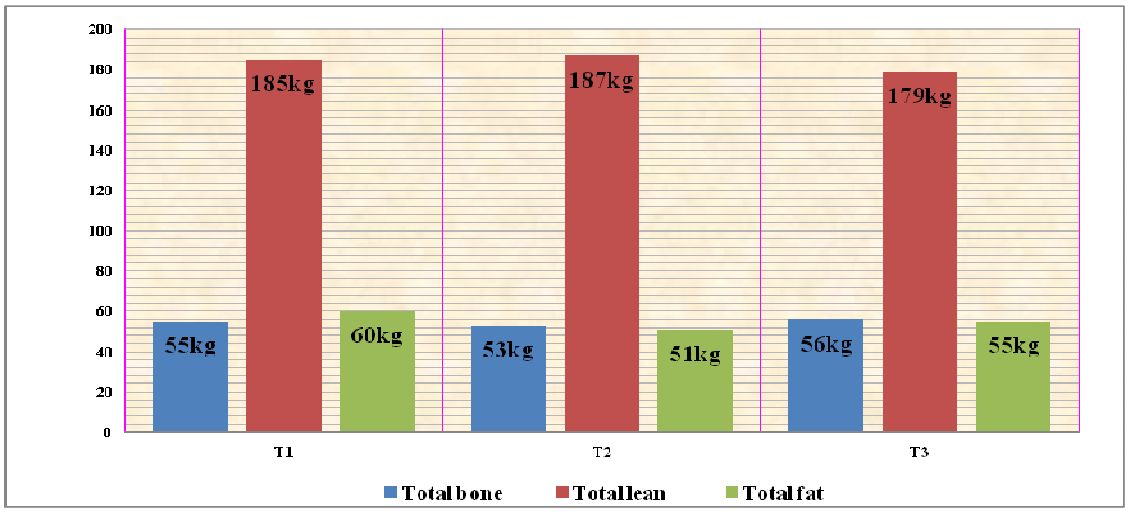


Figure 4. Effect of feeding rations on lean meat, fat percentage and bones of the bulls

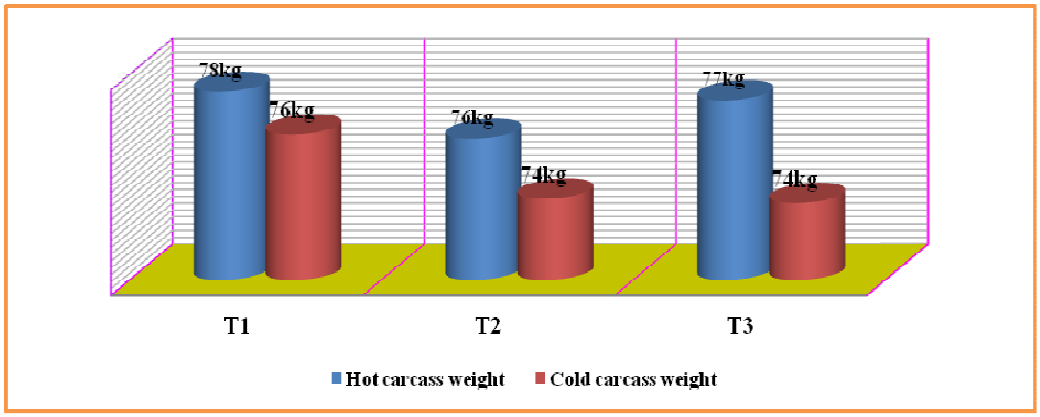


Figure 5. Effect of feeding rations on hot and cold carcass weight of the Kereyu bulls

difference in non-edible organs of experimental bulls fed on T1, T2 and T3. Even if the difference among the treatment groups were not statistically significant, experimental bulls fed on T3 had higher skin and small intestine than bulls fed on T2 and T1.

The effect of different dietary rations on carcass parameters of experimental bulls fed on T1, T2 and T3 were depicted in table 6above. There was no significant difference in hot carcass weight, cold carcass weight, heart, kidney, hump and empty gut of experimental bulls fed on T1, T2 and T3.

The effect of feed rations on lean meat, fat content and bone of the slaughtered bulls were indicated in figure 4. There were no statistically significant difference in lean meat and fat accumulation of experimental bulls fed on ration 1, ration 2 and ration 3. Hence, in this trial lean meat proportion was not significantly affected by dietary rations. But experimental bulls fed on T2 had developed higher lean meat than bulls fed on T1 and T3. While bulls fed on T1 had accumulated higher fat proportion than bulls fed on T2 and T3. Experimental bulls developed higher lean meat and lower proportion of fat and bones. On the other hand experimental bulls' accumulated higher fat percentage (T2) and developed lower lean meat as compare to other experimental bulls fed on other rations (T1 and T3).

Effect of different feeding options on hot and cold carcass weight of experimental bulls was depicted in figure 5. There were no significant difference in hot carcass weight and cold carcass weight of experimental bulls fed on T1, T2 and T3. However, bulls fed on dietary ration 1 had higher hot carcass and cold carcass weight than experimental bulls fed on dietary rations 2 and 3. The effect of dietary rations on hot and cold carcass weight of the bulls found in this trial is lower than the report of Mekasha *et al*., (2011) for Ogaden bulls grazing on native tropical pasture plus different levels of agro industrial by-products. This difference might be due to the breed difference and type of feeds used for fattening of the bulls.

Table 7. Partial budget analysis of Kereyu bulls fed on different feeds rations for 168 feeding days

List of items	T1	T2	T3
Feeds costs per bull	5933	6605	6479.96
Purchasing price and transportation coats per bull	2400	2400	2400
Labor cost per bull	294	294	294
Vet cost per bull	35	35	35
Total variable costs per animals	8662	9334	9208.96
Total gross output per bull	14000	14000	14050
Gross margin per bull	5338	4666.3	4841
Total gross margin (8 bulls)	42704	37330.25	38728.3

Economic return on fattening of 2 years old Kereyu Bulls

The result of partial budget analysis of fattening of 2 years old Kereyu bulls fed on three different feeds ration for about 168 days for export market weight gain of 275kg is indicated in table 7. Its result showed that experimental bulls fed with T1 had higher gross margin per 8 bulls (42704.00) than bulls fed on T2 (37330.25) and T3 (38728.30). Feeding of bulls with T2 (37330.25) is less profitable as compare to T1 and T3. This is because of the high cost of maize grain used in T2 during that season/year. Hence, fattening of 2 years old Kereyu bulls for 168 days by using three different feeding rations for export market weight gain of 275kg is profitable for all the three feeding rations in general.

CONCLUSION AND RECOMMENDATIONS

There were no significant difference (P>0.05) in ADG, TWG, FBW, FCE and carcass parameters evaluation of two year old Kereyu bulls fed on T1, T2 and T3 for 168 feeding days. This may be because of the similarity in ages and breed of the bulls which had brought the same effect on body weight gains and carcass characteristics of the bulls. Moreover the same percent of total CP and TDN had been provided for experimental bulls which might have produced the same effect on body weight change and carcass characteristics of experimental bulls. The dressing percentage of experimental bulls fed on T3 was higher than those fed on T2 and T1. But in case of final body weight gain, hot carcass weight, clod carcass weight, bulls fed on T1 had higher values than those fed on T3 and T2. Lean meat to fat ratio of experimental bulls fed on T2 was the highest followed by those fed on T3. Experimental bulls fed on T1 had least lean to fat ratio. This might be because of the energy in dietary ration T2 and T3 had relatively lower digestible energy than ration 1. This plays a great role in accumulation of fat in muscles. Feeding of two years aged Kereyu for export/local market weight gain of about 300kg took very long time and may not be profitable. Because of this, feeding of the bulls was stopped on average at 275kg live weight. Feeding of two years old Kereyu bulls with T2 and T3 for 168 days is less profitable as compare to feeding of the bulls with T1. Hence, feeding on T1 is very feasible both economically and biologically as compare to feeding on T2 and T3. Therefore beef cattle fatteners can use T1 for fattening of two years old Kereyu bulls for export/local market weight gain.

REFERENCE

ATARC (Adami Tulu Agricultural Research Center) (1998). Thirty years of research experience. Oromiya Agricultural Research Coordination service. Bulletin no 1. 42p.

Ehui S,Samuel B, Timothy W, Siet M (2002). Food Security in Sub-Saharan Africa to 2020. Socioeconomics and Policy Research Working Paper 49. Nairobi, Kenya: International Livestock Research Institute (ILRI), Nairobi, Kenya, 52pp.

Fadol SR, Babiker SA (2010). Effect of feedlot regimen on performance and carcass characteristics of Sudan Baggara Zebu cattle. Livestock Research for Rural Development. 22(2). Retrieved November 24, 2015, from http://www.lrrd.org/lrrd22/2/fado22027.htm.

Girma D, Mieso G, Tesfaye A, Arse G, Frehowit M, Ashebir W and Aman G (2015). Effect of different feeds option on growth response and carcass characteristic of 2 years aged Borana bulls for export market weight gain at Adami Tulu agricultural research center. Basic Res. J. Agric, Sci. Rev. ISSN 2315-6880 Vol. 4(5) pp. 139-145

Mieso G, Girma D, Tesfaye Alemu T, Frihiwot M, Tesfaye AA (2013). Evaluation of different feeding options on yearling Borana bulls to attain export market weight at Adami Tulu Agricultural Research center. Ame. J. Cell and Animal Biology. 1(1): 01-09.

Osuji PO, Capper B (1992). Effect of age on fattening and body condition of draught oxen fed tef straw (Eragrostis tef) based diets. Trop Anim Health Prod, 24: 103-108.

Preston TR, Leng RA (1986). Matching livestock production systems to available resources. ILCA, Addis Ababa, Ethiopia.

Talib NH, Ahmed FA (2008). Performance and carcass characteristics of intact zebu bulls fed different levels of deep stacked poultry litter. J. Animal Vet. Adv., 7(11): 1467-1473

Tesfaye WM, Osuji PO, Asfaw Y, Alemu Y (2002). Effect of wheat bran supplementation on feed intake, body weight change and retained energy in the carcass of Ethiopian highland zebu (bos indicus) oxen fed teff straw (eragrostis tef) as basal diet. ESAP (Ethiopian Society of Animal Production). Livestock in Food security-Roles and contributions. Proceedings of the 9th annual conference of the Ethiopian Society of Animal Production (ESAP), Addis Ababa, Ethiopia, p. 433.

Yoseph M, Mengistu U, Mohammed YK, Merga B (2011). Effect of strategic supplementation with different proportion of agro-industrial by-products and grass hay on body weight change and carcass characteristics of tropical Ogaden bulls (*Bos indicus*) grazing native pasture. Afri. J. Agric. Res. 6(4), 825-833.