ORIGINAL ARTICLE

Growth performance and carcass characteristics of Arsi-Bale goats supplemented with graded levels of dry Pigeon pea (*Cajanus cajan*) foliage

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ABSTRACT

This study was conducted to evaluate feed intake, digestibility, weight gain and carcass characteristics of Arsi-Bale goats fed on effective microorganisms (EM) treated maize stover and supplemented with graded levels of pigeon pea foliage. Twenty four yearling male Arsi Bale goats with mean initial body weight of 15.5 ± 0.06 were assigned in completely randomized block design to the following treatment EM treated maize stoves *ad libitum* + 100 g 200 g, 300 g and 400 g pigeon pea foliage as fed basis. The feeding and digestibility experiment lasted for 80 and 7 days, respectively. The dry matter (DM) and organic matter (OM) intake of treated maize stover decreased, while the total DM, OM and crude protein (CP) intake increased ($P<0.05$), with increasing level of pigeon pea foliage supplementation. The DM digestibility with 300 g and 400 g supplement levels was higher ($P<0.05$) than with 100 g while 200 g had an intermediate value. The OM digestibility with 400 g supplement level was higher ($p<0.05$) than those goats fed 100 g, 200 g and 300 g foliage. The CP digestibility increased ($p<0.05$) with increasing levels of pigeon pea foliage. Digestible CP intake also increased ($p<0.05$) as CP intake of goats increased. The average daily gain of goats with 300 g and 400 g supplement levels was greater ($p<0.05$) than those supplemented with 100 g and 200 g foliage. Goats supplemented with 300 g foliage had the highest ($p<0.05$) slaughter weight, empty body weight, rib-eye muscle area and total usable product. In conclusion, supplementation of 300 g of pigeon pea foliage to growing Arsi Bale goats showed a better performance, which could be used as dry season feed supplement for small holder farmers.

Keywords: carcass, digestibility, intake, maize stover, pigeon pea

INTRODUCTION

In mixed crop-livestock production systems, crop-residues are the major source of feed starting from harvesting of food crops to the wet periods during the time at which feed from grazing areas is inadequate or almost unavailable (Alemayehu *et al*., 2017). However, cereal crop residues cannot sustain effective animal production or even maintenance when fed alone because of low nutrient content, low digestibility and limited intake by animals (Tolera, 2007).

The feeding value of crop residues could be improved by physical, chemical and biological treatment methods (Sarnklong *et al*., 2010). Environmentally friendly (Alluri *et al*., 2007) biological treatments can be employed for improving the feeding value of low quality fibrous crop residues (Mahesh and Mohini, 2013). Research result on biological treatment of maize stover with effective microorganisms (EM) was scarce, except reported by Syomiti (2009) who observed the beneficial effects on nutrient utilization when EM was used as an additive to improve feed value of maize stover.

Moreover, Tolera (2007) reported that supplementation with forage legumes can enhance the utilization of poor quality roughage in smallholder mixed farming systems. Solomon (2009) also indicated that feed intake and digestibility of low quality feed could be improved through supplementation with high quality legume fodder or concentrate feed. Goats are mainly dependent on browses during the dry season (Berhane *et al*., 2006).

In Ethiopia, different studies evaluated the effect of pigeon pea leaves on the performance of small ruminant (Ajebu *et al*., 2013; Belete *et al*., 2013; Netsanet and Yonatan, 2015; Solomon *et al*., 2016, Hungenaw and Birhan, 2016; Desta *et al*., 2018). Except Solomon *et al*. (2016) who supplemented pigeon pea leaves to sheep fed tef straw, in all other studies grass was used as basal feed. However, grass hay was not sufficiently available during the dry season in areas where maize are staple crop. Thus, goats were entirely depend on dried maize stover Therefore, this study evaluated the supplementary value of pigeon pea foliage on feed intake, digestibility, weight gain and carcass characteristics of Arsi- Bale goats fed activated effective microorganisms (EM2) treated maize stover.

MATERIALS AND METHODS

Description of the study area

The experiment was conducted at Hawassa University, College of Agriculture located between 7°4′N and 38°31′E longitude with altitude of 1650 m.a.s.l. The average annual rainfall ranges from 800mm to 1100mm. The mean minimum and maximum temperatures in the study area are 13.5°C and 27.6°C, respectively (NMA, 2012).

Experimental feed preparation

Effective microorganisms (EM2) treatment of maize stover

Dried maize stover was purchased from local farmers. It was collected during early dry season (October) after maize grain was harvested and stored under shade. Maize stover was chopped to a size of approximately 7-10cm with a machete knife for ease of feeding and to increase the surface area for better microbial penetration. One kg of molasses was dissolved in 16 liters of chlorine free water. One litter of activated effective microorganisms (EM2) was mixed with molasses solution (Yonatan *et al*., 2014) making the ratio 1:1:16 (Woljeejii Agricultural Industry PLC, Ethiopia) then stirred to thoroughly mix the solution. The mixed solution was sprayed using garden watering-can on to 30 kg chopped maize stover spread on hard plastic sheet (black vinyl). The maize stover was repeatedly rubbed with hand for proper penetration of the solution and kept in tightly closed polyethylene bag to be fermented anaerobically for 48 h. The bags were kept inside a house to protect from direct sunlight. Throughout the feeding trial period, the treated maize stover was prepared at interval of two days.

Pigeon pea foliage preparation

Fresh pigeon pea (*Cajanus cajan*) foliage contained leaf, twig and thin stem were purchased after seed harvest from small holder farmers of Humbo district Welaita Zone which is located at low altitudes <1500 m.a.s.l. (WZFED, 2005). The fresh foliage was dried by spreading on a plastic sheet under shade and turning at regular intervals for uniform and proper drying.

Experimental animals and management

Twenty four yearling male Arsi-Bale goats with mean initial body weight of 15.5 ± 0.06 kg were purchased from Loka Abaya market, 50km south of the experimental site. Age of the animals was determined by their dentition and information obtained from owners. The goats were treated against internal parasites with broad spectrum albendazol (250mg) and injected with oxy-tetracycline (2ml) as prophylaxis. They were kept in individual pens for 21 days for quarantine and adaptation to the environment followed by 14 days of adaptation to the experimental feed. The growth experiment lasted for 80 days. Goats were weighed every 14 days after overnight fasting of feed. At the beginning and end of experiment goats were weighed for two consecutive days and an average taken as initial and final weight measurement, respectively. Water was offered free access throughout the experimental time. Treated maize stover was offered to experimental goats before pigeon pea foliage. Pigeon pea foliage was offered twice a day at 10 AM and 4 PM. Samples were taken from each feed type once a week, thoroughly mixed and sub sampled at the end of the experiment for chemical composition analysis.

Experimental design and treatment

The experimental goats were blocked into six blocks based on their initial body weight and randomly assigned to the four treatments in a completely randomized block design. The EM2 treated maize stover was offered *ad libitum* (≈50% refusal). The treatments were: T_1 =EM2 treated maize stover *ad libitum*+ 100 g pigeon pea foliage, T_2 = EM2 treated maize stover *ad libitum*+ 200 g pigeon pea foliage, T_3 = EM2 treated maize stover *ad libitum*+ 300 g pigeon pea foliage, T_4 = EM2 treated maize stover *ad libitum* + 400 g pigeon pea foliage on as fed basis.

The amounts of feed offered and refused were recorded daily. Feed refusals were collected in the morning before daily offer. Samples of refusals were taken for each goat and kept in a separate plastic bag throughout the trial period. At the end of the experiment, samples of refusals were pooled per treatment, thoroughly mixed and sub sampled for chemical analysis. Daily feed intake was measured as a difference between feed offered and feed refused.

Digestibility trial

After 80 days of growth experiment, all goats from each treatment were fitted with individual fecal collection bag for the digestibility trial. Goats were accustomed to fecal collection bags for 3 days before the start of fecal collection. The digestibility trial lasted for seven days and during this period feed offered, refused and fecal outputs were recorded. Total feces of individual goat was recorded, 10% of the daily fecal output was sampled and stored in a freezer at -20°C until analysis. During feces collection period, sample of feces were dried daily at 105°C overnight to determine the dry matter (DM) content of the feces. At the end of the experiment, samples of feces were removed from the freezer, kept at room temperature, bulked for each goat and sub sampled. Thereafter, samples of feces to be used for chemical analysis were dried at 60°C for 48h. Samples of feed offered, refused and dried feces were milled using Thomas Wiley laboratory mill through 1-mm sieve and kept in plastic bags until analysis.

Carcass characteristics

At the end of digestibility trial, four goats from each treatment were randomly selected, weighed and slaughtered after overnight fasting for measurements of carcass parameters. Goats were slaughtered manually using knife after recording live weight and their blood collected in a container and weighed. Weight of offal such as skin, head with tongue, internal organs such as heart, kidneys, lungs with trachea, liver with gall bladder and spleen, reproductive organs (testis, penis), four stomach parts, small and large intestine were recorded. Empty body weight (EBW) was determined by subtracting the gut content from the slaughter weight (SW). Hot carcass weight (HCW) was determined after the removal of head, skin intestinal tract and intestinal organs. Dressing percentage (DP) was computed as hot carcass weight on slaughter weight basis and also on empty body weight basis (Solomon and Simret, 2008). The carcass was partitioned into hind and four quarters between 12 and 13 ribs of the carcass. The rib-eye muscle area (REMA) of each animal was determined after traced on tracing paper, the cross sectional area of the 12th and 13th ribs after cutting perpendicular to the back bone. Each area was measured and then averaged to give a rib-eye muscle area using a portable area meter, Model LI-3000A.

Chemical analysis

The dry matter (DM), ash and nitrogen (N) content of the feeds, refusals and feces samples were determined according to the standard procedures of AOAC (2005). Ash was determined by combusting the sample at 550°C for 3 hours. Nitrogen (N) was determined by the micro-kjeldahl method and crude protein (CP) was calculated as N X 6.25. Neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL) were determined according to Van Soest and Robertson (1985) using ANKOM® 220 fiber analyzer and ANKOM F57 Filter bags (ANKOM Technology Corp., Macedon, NY, USA) without the use of alpha amylase.

Statistical analysis

Data on experimental feed chemical composition, feed intake, digestibility, weight gain and carcass traits were analyzed using General Liner Model (GLM) procedure of Statistical Package for Social Sciences (SPSS) version 20 (SPSS, 2016). Mean comparisons were determined by using least significance difference (LSD) at 5% significance level. The model for data analysis was:

$$Y_{ij}= \mu+T_i+Bi+e_{ij}$$

Where: Y_{ij}= is response variable (intake, digestibility, weight gain and carcass characteristics), μ = the overall mean, T_i = treatment effect, B_i= block effect and e_{ij}= random error.

RESULTS AND DISCUSSION

Chemical composition of treated maize stover and pigeon pea foliage are shown in Table 1. The NDF, ADF and ash contents of treated maize stover were higher than the value obtained in pigeon pea foliage. The use of EM treatment on maize stover in this study did not improve the CP (3.78%) content of maize stover. This might be due to short time for microbial reaction since EM treatment took place 48 hours before feeding. On the other hand, Getu *et al.* (2016) reported that oat straw CP content was improved from 1.92 to 2.20%, barley straw from 2.74 to 3.13%, and wheat straw from 1.65 to 2.07%, when treated with EM for 20 days.

Table 1. Chemical composition of experimental feeds

Component	Untreated maize stover	EM treated maize stover	Pigeon pea foliage
Dry matter (%)	92.6	90.3	93.8
Organic matter (% DM)	91.5	89.7	91.2
Crude protein (% DM)	3.75[b]	3.78[b]	17.0[a]
Neutral detergent fiber (% DM)	75.1[a]	74.7[a]	57.3[b]
Acid detergent fiber (% DM)	43.5	43.4	39.5
Acid detergent lignin (% DM)	6.25[b]	6.22[b]	22.1[a]

EM= Effective microorganisms, DM= dry matter. Means with different superscripts in a row are significantly different (P<0.05).

Daniel *et al.* (2017) also reported improvement in CP content of sorghum stover from 2.93 to 5.33 % after 21 days of ensiling with EM. The CP value of treated maize stover in the current study is lower than untreated maize stover (5.83%) reported by Hirut *et al*. (2011). The variation might be attributed from difference of maize variety used or the N level in soil.

Pigeon pea foliage had higher CP and ADL content than treated maize stover. Lower CP content was observed in the current study compared with the value reported by Ajebu *et al.* (2013) and Belete *et al.* (2016) but comparable with the values (18.7% and 17.0%) reported by Netsanet and Yonatan (2015) and Solomon *et al.* (2016) respectively.

Dry matter and nutrient intake

Dry matter and nutrient intake of experimental feeds are presented in Table 2. The DM, OM, and NDF intake from treated maize stover was the lowest (P<0.05) in 300 g pigeon pea foliage supplement level and highest (P<0.05) in 100 g The decrease in treated maize stover intake with increasing levels of pigeon pea foliage is consistent with the result of previous studies (Tolera and Sundstøl, 2000a; Hirut *et al.*, 2011) that reported reduction in maize stover DM intake with increasing levels and intake of the supplement. In the current research, maize stover DM intake reduced due to increasing CP intake from pigeon pea foliage supplement and also increasing DM intake of the foliage.

The CP intake from maize stover was lower (P<0.05) in 300 g than the other supplement levels. Hence, at the lowest level of pigeon pea foliage supplement (100g, T1) goats consumed the highest (355 g/day or 79%) amount of treated maize stover which is consistent with Hunegnaw and Berhan (2016) who indicated that animals given low level of supplementation consume more basal diet to meet their nutrient requirement.

Table 2. Dry matter and nutrient intake (g/day) of goats fed EM treated maize stover *ad libitum* supplemented with graded levels of pigeon pea foliage (g/head/day)

Variables	Levels of pigeon pea foliage supplement			
	100 g	200 g	300 g	400 g
Dry matter intake				
Treated maize stover	355 ± 3.4[a]	310 ± 3.7[b]	260 ± 3.7[d]	297 ± 3.8[c]
Pigeon pea foliage	93.5 ± 0.2[d]	184 ± 0.4[c]	274 ± 0.7[b]	359 ± 1.3[a]
Organic matter	387 ± 3.2[d]	425 ± 3.6[c]	465 ± 4.5[b]	573 ± 3.7[a]
Crude protein	27.3 ± 0.2[d]	41.3 ± 0.2[c]	55 ± 0.27[b]	72.8 ± 0.2[a]
Neutral detergent fiber	306 ± 2.7[d]	318 ± 3.0[c]	340 ± 3.0[b]	411 ± 3.1[a]
Acid detergent fiber	167 ± 1.8[d]	184 ± 1.9[c]	212 ± 1.8[b]	257 ± 1.8[a]

Means with different superscripts in a row are significantly different (P<0.05).

The DM, OM and CP intake and the total DM, OM, CP, NDF and ADF intake from pigeon pea foliage, increased (P<0.05) with increasing level of pigeon pea foliage supplementation. With an increase in supplementation level of pigeon pea foliage the microorganisms in the rumen received sufficient N for their growth and proper rumen function which resulted better degradation of the fiber and improvement in intake. The current result is in agreement with previous studies (Belete *et al.*, 2013; Netsanet and Yonatan, 2015) who reported increased total DM intake with increased levels of pigeon pea foliage supplementation. Hunegnaw and Berhan (2016) also reported improvement in total DM and CP intake in sheep supplemented with pigeon pea, cowpea and lablab compared with the non-supplemented group but depressed the grass hay intake, which is similar with the current result.

Argheore and Perera, (2004) reported that *Erythrina variegata*, *Gliricidia sepium* or *Leucaena leucocephala* supplementation improved intake of maize stover in the diets of mature goats. Tolera and Sundstøl (2000a) revealed that intake due to forage legume supplementation to poor quality roughages are inconsistent attributed to the quality of the forage supplements and the quality of the basal roughages. The same authors explained that the effect of forage legume supplements on basal roughage intake is a function of their solubility, rate of degradation and rate of passage from the rumen.

Apparent digestibility of dry matter and nutrients

Apparent digestibility of DM and nutrients are shown in Table 3. The dry matter digestibility for 300 g and 400 g supplement levels were higher ($p<0.05$) than 100 g, while 200 g had an intermediate value. The OM digestibility was greater ($p<0.05$) in 400 g than in the other treatments. The low level of pigeon pea foliage supplement was not optimum for growth of microbes as it could not provide sufficient amount of digestible protein (5.46 g/day) resulting in the lowest DM, OM, CP, NDF and ADF digestibility values (Tolera and Sundstøl 2000b). Kearl (1982) recorded that the minimum requirement of digestible nutrient for tropical growing goats with 15-20 kg body weight was 23 g/day.

Table 3. Apparent digestibility of dry matter and nutrients (%) in goats fed EM treated maize stover supplemented with graded levels of pigeon pea foliage (g/head/day)

Variables	Levels of pigeon pea foliage supplement				
	100 g	200 g	300 g	400 g	SEM
Dry matter	56.6^{b}	61.5^{ab}	64.9^{a}	72.6^{a}	2.1
Organic matter	54.2^{b}	53.2^{b}	59.5^{b}	64.0^{a}	2.8
Crude protein	20.6^{d}	33.4^{c}	51.2^{b}	63.3^{a}	3.7
Neutral detergent fiber	56.0^{c}	60.5^{b}	62.6^{b}	71.4^{a}	2.2
Acid detergent fiber	46.1^{b}	54.5^{b}	56.7^{a}	65.6^{a}	2.5

Means with different superscripts in a row are significantly different ($P<0.05$). SEM = standard error of the means.

The CP digestibility significantly increased ($p<0.05$) with increasing levels of pigeon pea foliage supplementation. The low CP digestibility with 100 g supplement level could be due to high ADL and ADF content of the experimental feeds and high intake of these chemical components in the treatment group. The NDF digestibility was highest in 400 g and lowest with 100 g supplement level ($P<0.05$) with intermediate values in 200 g and 300 g levels The digestibility of ADF with 100 g and 200 g level of supplementation was lower ($p<0.05$) than those goats fed 300 g and 400 g foliage

Raize et al. (2014) indicated that digestibility is negatively influenced by ADF in goats, sheep, cattle and buffalo species. Besides, Heuzé *et al.* (2016) revealed that pigeon pea is protein-rich forage, but its high fiber content (particularly ADF and lignin) decreases digestibility and limits its potential use. Digestibility of CP in goats steadily increased due to an increase in pigeon pea foliage supplementation level thus resulted in an increase of digestible protein within the range values of 5.46 - 45.9 g/head/day.

Increasing levels of supplementation of pigeon pea foliage resulted in increased crude protein intake, thus the DM, OM, NDF and ADF digestibility was improved at higher levels. This finding is consistent with Tolera and Sundstøl (2000b), who reported that increment in microbial N supply cause an increase in digestibility. Aregheore and Perera (2004) also found increased DM, OM, CP and NDF digestibility in goats fed maize stover supplemented with forage legumes. Contrary to the current finding, Ajebu *et al.* (2013) observed that CP digestibility decreased with increasing levels of pigeon pea leaves supplementation.

Digestible nutrient intake and body weight change

The digestible nutrient intake and body weight change in goats fed EM treated maize stover supplemented with different levels of pigeon pea foliage is shown in Table 4. The digestible OM intake was higher ($p<0.05$) in 400 g than in 300 g foliage level, which in turn had greater digestible OM intake values than 100 g and 200 g supplement levels. Digestible CP intake increased ($p<0.05$) with increasing level of pigeon pea foliage supplementation. Solomon *et al*. (2004) reported that higher digestible CP intake was positively correlated with daily live weight gain in sheep supplemented with dried leaves from *Lablab purpureus* or graded levels of *Leucaena pallida* and *Sesbania sesban.* In general, in this research the average daily gain for all treatment groups was very low. According to Jung and Deetz (1993) high fiber and lignin limit protein digestibility and reduce nutrient availability to the tissue of goats.

The total body weight gain and the average daily gain were greater ($p<0.05$) in goats fed 300 g and 400 g than those fed 100 g and 200 g. The low average daily weight gain of goats in 100 g and 200 g supplement levels of this study could be due to the low intake of digestible OM (209 and 225 g/head/day, respectively). The values were near maintenance requirement (220 g/head/day) of tropical goats with 15-20 kg body weight (Kearl, 1982).

Table 4. Digestible nutrient intake and body weight change of goats fed treated maize stover and supplemented with different levels of pigeon pea foliage (g/head/day)

Digestible nutrients intake (g/head/day)	Levels of pigeon pea foliage supplement				
	100 g	200 g	300 g	400 g	SEM
Digestible organic matter	209[d]	225[c]	279[b]	367[a]	35.6
Digestible crude protein	5.46[d]	13.6[c]	28[b]	45.9[a]	9.81
Body weight change					
Initial (kg)	15.6	15.5	15.5	15.4	0.06
Final (kg)	16.0[c]	16.3[b]	17[a]	16.7[b]	0.22
Total gain (kg)	0.52[b]	0.75[b]	1.46[a]	1.33[a]	0.19
Mean daily gain (g)	6.45[b]	9.37[b]	18.3[a]	16.6[a]	2.34

Means with different superscripts in a row are significantly different ($P<0.05$). SEM = standard error of means

In the current experiment, the mean daily gain in all treatments were lower than reported by Belete *et al.* (2013) who supplemented pigeon pea foliage to grazing Arsi Bale kids. Desta *et al.* (2018) reported slightly higher body weight gain of 24.2 and 27.1 g/day for goats (fed 300 and 450 g) pigeon pea leaves supplement, respectively.

In general, the growth response of goats to supplementary feeding is affected by the quality of feed, age, sex and breed (Dereje *et al*., 2015). Previous studies (Legesse *et al*., 2006; Mesfin, 2007) also showed that Arsi Bale goats appear to be less responsive to intensive feeding as compared to grazing condition.

Carcass characteristics

Goats supplemented with 300 g had the highest ($p<0.05$) slaughter weight (SW), empty body weight (EBW), rib eye muscle area (REMA) and total usable product (TUP) of goats supplemented with 300 g were higher ($p<0.05$) than goats supplemented with 100 g, 200 g and 400 g levels of supplement (Table 5). The highest slaughter weight, empty body weight and rib-eye area of goats in 300 g could be due to increased CP intake than goats' supplemented with 100 g, 200 g and 400 g foliage. Similar to the slaughter body weight, goats with 300 g supplement level had relatively higher rib-eye area than those supplemented with 100 g, 200 g and 400 g. The rib-eye area in the current finding in all treatments was lower than the value reported by Aberra *et al.* (2016). The same author suggested that the rib-eye and body weights are positively correlated traits

Table 5. Carcass parameters of goats fed EM treated maize stover supplemented with different levels of pigeon pea foliage (g/head/day)

Parameters	Levels of pigeon pea foliage supplement			
	100 g	200 g	300 g	400 g
Slaughter weight (kg)	15.4 ± 0.34[c]	15.4± 0.34[c]	16.8 ± 0.34[a]	16.3 ± 0.34[b]
Empty body weight (kg)	10.1 ± 0.32[b]	10.6 ± 0.32[b]	11.7± 0.32[a]	10.5 ± 0.32[a]
Hot carcass weight (kg)	6.16 ± 0.58	6.32 ± 0.58	7.64 ± 0.58	6.40 ± 0.58
Rib eye area (cm^2)	2.42 ± 0.15[b]	2.53 ± 0.15[b]	3.31 ± 0.15[a]	2.75 ± 0.15[b]
DP (% of SBW)	39.5 ± 0.05	41.0 ± 0.05	42.4 ± 0.05	39.8 ± 0.05
DP (% of EBW)	60.4 ± 0.02	65.3 ± 0.02	65.4 ± 0.02	61.3 ± 0.02
Total usable product (kg)	9.73 ± 0.62[b]	10.2 ± 0.62[b]	11.5 ± 0.62[a]	9.99 ± 0.62[a]

Means with different superscripts in a row are significantly different ($P<0.05$). DP= dressing percentage, SBW= Slaughter body weight, EBW= Empty body weight

Hot carcass weight (HCW), dressing percentage on slaughter body weight (DP on SBW) base and dressing percentage on empty body weight (DP on EBW) base were similar ($p>0.05$) among treatments. The dressing percentage was not affected by the level of supplementation. The finding is in agreement with Berhan and Asnakew (2015). However, Aberra *et al.* (2016) reported higher slaughter weight, empty body weight, rib-eye area and dressing percentage in the supplemented Arsi Bale goats.

Dereje *et al*. (2015) indicated that DP (on slaughter body weight basis) of indigenous goats in Ethiopia was estimated to be between 42 and 45%. In the current experiment goats supplemented with 100 g, 200 g and 400 g were below average of indigenous Ethiopian goats. The associative effects of high fiber content from treated maize stover in combination with high NDF and lignin content in pigeon pea foliage resulted in high gut fill with 100 g and 200 g supplement levels. In general, dressing percentage is an important trait for carcass evaluation and influenced by age, breed, sex, plane of nutrition and management system (Aberra *et al*., 2016).

CONCLUSION

The result of this study indicated that higher level of pigeon pea foliage supplement improved intake and digestibility of feed in experimental goats. Goats supplemented with 300 g foliage had better body weight gain and carcass measurement than others. However, the average daily weight gain and carcass weight in all treatments were low, due to low digestibility of DM and nutrients that caused by high content of ADF in the experimental feeds and lignin content in the foliage. Based on these results pigeon pea foliage at 100 g (93.8 g on DM basis) maintained body weight of goats during the dry season when there is scarcity of green forage and grass hay where animals entirely depend on maize stover.

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