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Identification and Chemical Composition of Major Camel Feed Resources in Degahbur District of Jarar Zone, Somali Regional State, Ethiopia

Guled Hassen[1]*, Kawnin Abdimahad[1], Berhan Tamir[2], Abdihakin Ma'alin[1], Tadele Amentie[1]

[1]Department of Animal and Range Sciences, College of Dryland Agriculture, Jigjiga University, Jigjiga, Ethiopia
[2]Department of Animal Production, College of Veterinary Medicine and Agriculture, Addis Ababa University, Addis Ababa, Ethiopia
Email: *guuyo1442@gmail.com

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Abstract

This study was conducted to identify major available camel feed resources and determine their chemical composition in Degahbur district. A total of 120 respondents were selected using purposive sampling technique. Data from the selected actors were collected using a semi-structured questionnaire survey, focus group discussion and field observations. The study revealed that the majority (82.5%) of the respondents in the study area were male headed households. Browsing trees and shrubs were the major available livestock feed resources both in dry (51.6%) and wet (68%) season, and followed by herbaceous species (26.6 and 23.7% for dry and wet season, respectively). The study identified about 20 herbaceous, 24 trees, 11 shrubs, 7 bush and 17 grass species which are used as camel feed in the study area. Chemical composition analyses of the sampled feeds indicated that there was a significant difference in crude protein (CP), neutral detergent fiber (NDF) and acid detergent fiber (ADF) between species in different seasons. The NDF contents in the current study were above the critical value of 60% which was reported to result in decreased voluntary feed intake, feed conversion efficiency and longer rumination time. In general, the findings indicated that the use of improved forages and agro-industrial by-products as camel was minimal; thus, camels were fed on available feed resources which are poor in nutritional quality without any supplementation. Therefore, the study suggests the need for improving camel feeding practices in the study area to enhance camel productivity.

Keywords

Camel, Feed, Browse Species, Grass Species, Herbaceous

1. Introduction

Camel (*Camelus dromedaries*), being the most climate resilient livestock, play a significant role in the livelihood of pastoral and agro-pastoral communities in Ethiopia [1]. The current world camel population number is estimated to be 35 million heads [2], most of which are in Somalia, Niger, Kenya, Chad, Ethiopia, Mali, Mauritania and Pakistan. Five bordering Countries: Somalia, Ethiopia, Kenya, Sudan, and Djibouti hold 84% of African and more than half of the world's camel population [3].

Camels are very important domestic animals that have uniquely adapted to arid and semiarid zones in Asia and Africa [4]. In Ethiopia, 8.1 million heads of dromedary camels are reared in arid and semi-arid regions [5] and the majority of these camels are found in eastern part of the country.

Camels contribute to household food security through meat and milk [6] [7] [8], are used as pack animals for transport, hides and wool are products that emanate from camels [3] [9] [10] [11]. Camel milk has a great economic role on pastoralists' livelihoods as well as those engaged in marketing of camel milk and its products in Ethiopia. Camels are the major livelihood alternative in the arid and semi-arid areas since other animals' species are less adapted to the harsh and dry climate [12] [13].

Although camel plays a significant role in supporting livelihood of pastoral and agro-pastoral communities in Ethiopia including the study area, its production and productivity are affected by a number of factors [14]. Among which, feed shortage (both in quality and quantity) is the most important one, as camel in arid and semi-arid areas of Ethiopia feed mainly on natural pasture (like browser of a broad spectrum of fodder plants, including trees, shrubs, and sometimes hard-thorny, bitter and halophytic (salty) plants that grow naturally in the desert and other semi-arid areas) which poor in their nutritional quality [15]. Even, these poor quality natural pastures are low in their quantity, and become more acute in the dry season [16]. This forces camel and their keepers to trek long distances in search of feed. These expose camels and their herders to different risk factors like livestock disease, clan conflict and others; and decrease the productivity of camels [17] [18]. To overcome this problem, undertaking exhaustive studies and providing documented information on camel feed resources is critically important. This is because, such information may be important for governmental, non-governmental and other developmental organizations to undertake relevant development interventions, which improve feeding system of camel, and thus, increase its productivity in lowland areas including the study area. However, currently, there is no well documented information available on camel feed resources in the study area where the majority of camel and its product produced is supplied to both domestic and cross-border markets. Therefore, the objective of the study was to identify major available camel feed resources and determine their chemical composition in Degahbur district of Somali regional state, Ethiopia.

2. Materials and Methods

2.1. Description of the Study Area

The study was conducted in Degahbur district of Jarar zone, Somali regional state, Ethiopia. The district is located at 8˚13' North of longitude and 43˚34' East latitude at the distance of about 160 km south of Jigjiga town. The altitude of the district is 1044 meters above sea level. It has mean annual minimum and maximum temperatures of 11 and 33˚C, respectively. The mean annual rainfall and humidity of the area ranges from 300 to 400 mm and 31% to 36%, respectively. The rainfall pattern is erratic and has uneven distribution. The farming system in the district is primarily pastoralists, who mainly keep livestock, particularly cattle (672,956), sheep (2,726,526), goat (3,981,852), and camels (1,087,831) heads; and to some extent crop (like sorghum and maize) production is also practiced in the district [5]. According to Central Statistical Agency [19], the total human population of the district is estimated at 150,000 of whom 85,000 are men and 65,000 are women.

2.2. Sampling of Camel Herders

Degahbur district was stratified into pastoral and agro-pastoral production systems. Each production system was further stratified into rural kebeles (RKs) (RK, the lowest administration unit in Ethiopia). Thus, a total of four RKs (2 from pastoral and 2 from agro-pastoral systems) with high camel production potential were purposively selected for the study. Then the lists of camel producer households in each selected RK were collected from their respective administrations. Eventually, thirty camel producer households from each RK were selected randomly. Thus, the total number of camel producer households selected to study camel production practices in the district was 120 (2 production systems * 2 RKs * 30 households). The sampling technique was multistage stratified sampling.

2.3. Sampling of Camel Feeds

First five commonly used grazing lands were identified from each selected RK, and then feed for laboratory analysis were identified two times during the wet and dry seasons according to the preference rank given by the respondents. Natural pasture from each grazing land was harvested randomly from 10 quadrates (with size of 1×1 m^2) at stubble height (5 cm) to resemble natural grazing by using sickle by selecting the grasses, herbaceous, browse trees and shrubs in the area which was identified by the respondents during survey part accordingly their preference by livestock Moreover, browse leaves and twigs (with less than 5 mm stem diameter) were hand plucked.

2.4. Data Collection Procedure

After stratification and identification of camel producer household, focused group discussions were held with key informants (such as producers having good ex-

perience on the subject under study, community leaders and experts) in each production system to generate information on camel production practices in the study area. The resulting information were then used for the development of a survey questionnaire which were pre-tested before administration, and this was be followed by questionnaire survey. Moreover, field observations were made to collect some data which properly not described during the questionnaire survey.

For the evaluation of the nutritive value of major available natural feed resources, a total of 12 feed samples (3 from each RK) were collected. The samples were kept under shade until collection for the day will be completed. After then, samples were sun dried until the field work will be completed, and all sub-samples harvested from the same grazing lands were thoroughly mixed to make one composite sample of one kilo gram, leveled and stored in the sample bags. The samples were dried by air to prevent spoilage before being placed in the laboratory oven. For a feed obtained from grass and browse plant their specimens were collected, pressed, labeled, dried and then were transported to Haramaya University central laboratory for the analysis. Moreover, identification of different grass and browse species were undertaken following the guide provided in the Flora of Ethiopia [20] [21] and the Flora of Tropical East Africa [22].

2.5. Chemical Composition Analysis of Feeds

Feed samples were air dried in a well-ventilated room and transported to the nearby laboratory and further dried in an oven at 105˚C for 24 hours. Then the samples were separately ground in a grinding mill to pass through 1 mm sieve and were equilibrated to room temperature for 24 hours. The samples were then put in plastic bags and sealed for further nutrient analysis. Analysis of feed samples was undertaken at Haramaya University Central Laboratory. The dry matter (DM), crude protein (CP) and ash contents were determined according to the standard methods of AOAC [23]. CP was estimated as N × 6.25. Neutral detergent fibre (NDF), acid detergent fibre (ADF) and acid detergent lignin (ADL) were analyzed according to the procedure of Van Soest *et al.* [24].

The data collected using a questionnaire survey and field observations were analyzed using SPSS (version 20). Descriptive statistics were used to quantitatively express the responses of the study participants with respect to their demographic characteristics and natural feed resource management practices. Chi-square test was employed to examine the difference among the categorical variables. Differences were considered to be significant at the level $P < 0.05$. Moreover, data on chemical composition of natural feed resources were analyzed using the General Linear Model (GLM) procedure of SAS (Version 9.1). Mean comparison was made using Tukey's adjustment. The following model was used for the analysis of chemical composition of feeds:

$$Y_{ij} = \mu + S_i + e_{ij}$$

where, Y_{ij} = observations;

μ = overall mean;
S_i = effect of i^{th} the season;
e_{ij} = random error.

3. Results and Discussion

3.1. Characteristics of the Respondents

Table 1 shows sex, age and educational level of the respondents in the study area. Majority of the respondents were males (81.7%) while the rest (18.3%) were females. Majority of the respondents in the study area belonged to the age group of 30 - 60 years; indicating that the strongest and active age groups were carrying out camel herding activities in the study area.

The study also indicated that the overall observed level of illiteracy was 79.1%, the proportion of respondents who were capable of reading and writing only was 15.9%, whereas 5% of the respondents were educated completing their primary education. The higher percentage of illiteracy is similar to the findings of Wendimu [25] who reported a higher proportion of illiteracy for Godey and Adadle districts of Somali region. Similarly, Ma'alin *et al.* [26] reported higher illiteracy in Godey, Adadle, Dhanan and Ber'ano districts of Shabele zone, Somali regional state. The role of education is obvious in affecting household income, adopting technologies, demography, health, and as a whole the socio-economic status of the family as well [27]. This demonstrates the need of providing training and extension services to the local community.

3.2. Major Feed Resources Utilized by Camels

The major available feed resources for camels in the study area are given in Table 2.

Table 1. Table Sex, age and educational level of the respondents in the study area.

Variables	Pastoral		Agro-pastoral		Overall	
	N	%	N	%	N	%
Sex						
Male	52	86.7	46	76.7	98	81.7
Female	8	13.3	14	23.3	22	18.3
Age (years)						
<30	17	28.3	22	36.7	39	32.5
31 - 60	37	61.7	34	56.7	71	59.2
>60	6	10	4	6.7	10	8.3
Educational level						
Illiterate	53	88.3	42	70	95	79.1
Read and write	7	11.7	12	20	19	15.9
Primary school	0	0	6	10	6	5

N = number of respondents.

Table 2. Major avaialable feed resources for camels in the study area

Feed resource	Pastoral		Agro-pastoral		Overall	
	N	%	N	%	N	%
Wet season						
Herbaceous species	20	33.3	25	41.7	45	37.5
Browsing trees and shrubs	32	53.3	22	36.7	54	45
Grass species	8	13.3	13	21.6	21	17.5
Dry season						
Herbaceous species	16	26.7	12	20	28	23.4
Browsing trees and shrubs	44	73.3	33	55	77	64.1
Sorghum Stover	-		5	8.3	5	4.2
Maize Stover	-		10	16.7	10	8.3

In the wet season, camels preferred to browse trees and shrubs (45%), followed by herbaceous species (37.5%), and grass forage (17.5%). In the dry season, however, browsing trees and shrubs (64.1%), herbaceous species (23.4%), maize Stover (8.3%), and sorghum Stover (8.3%) were the most common feed sources for camels (4.2%). The study revealed that browsing trees and shrubs and herbaceous species were the common feed resources for camels in the study area. This is in line with the report of Mirkena *et al.* [28] who reported that the major feed resources for camels are browsing trees or bushes, but grasses may be consumed when shrubs or trees are not available.

Feed problem is one of the major factors that hinder camel production. In the study area, browsing plants like trees and shrub species were the major feed resources utilized as camel feed. In the study area, browsing plants like trees and shrub species were the major feed resources utilized as camel feed. In the district, most of the land was covered with woody vegetation. Trees and shrubs were important sources of camel feed thought out the year and browsing was the main form of camel feed utilization. During wet season, browsing trees and shrubs were the major feed resource followed by herbaceous species. This is in agreement with the findings of other studies [29] [30] that indicated browse forage to be the main feed resource for livestock in Ethiopia. Although the availability of crop residues was low, straws of maize and sorghum were fed mainly to agro-pastoralists during the dry season, which is in line with the study of Abate *et al.* [31], who reported that Stover from maize and sorghum was used mainly during the dry season in south eastern parts of the country.

3.3. Major Herbaceous Species Utilized by Camels

According to focus group discussions and key informants interview, twenty herbaceous plants were used as a camel feed were identified in the study area as shown in **Table 3**. The most widely utilized herbaceous species were *Blepharis*

Table 3. Available herbacecous species utilized by camels in the study area.

Local name (Somali)	Scientific name	Family name
Yamaarug	*Blepharis ciliaris*	Acanthaceae
Wancad	*Abutilon fruticosum*	Acanthaceae
Jid	*Actiniopteris radiata*	Adiantaceae
Sarin	*Cadaba ruspolii*	Capparidaceae
Rugumbay	*Cadaba longifolia*	Capparidaceae
Qodah-tol	*Maytenus somalensis*	Celstraceae
Ga-gabood	*Vernonia mogadoxensis*	Compositae
Maadathe	*Dicoma Somalensis*	Compositae
Fari-hood	*Sclerostephane adenophora*	Compositae
Hiil	*Vernonia cinerascens*	Compositae
Madooya	Cadaba longifolia	Convolvulacaeae
Saar	*Coccinia grandis*	Cucurbitaceae
Qarari	*Citrullus lanatus*	Cucurbitaceae
Buuhiso	*Croton gillettii*	Euphorbiaceae
Dhikri	*Acalypha fruticosa*	Euphorbiaceae
Kab-gal	*Hibiscus meyeri*	Malvaceae
Baar	*Hyphaene benadirensis*	Palmae
Haqa-qaro	*Tephrosia villosa*	Papilionaceae
Jilab	*Indigofera uspolii*	Papilionaceae
Labi-yar	*Sesbania somalensis*	Papilionaceae

ciliaris, *Indigofera ruspolii*, *Vernonia mogadoxensis*, *Abutilon fruticosum* and *Hyphaene benadirensis.*

3.4. Major Bush Species Utilized by Camels

Table 4 shows a list of bush species that have been identified as locally important camel feeds, along with their scientific and common names. About seven indigenous bush species were identified as being used as feed sources by camels. According to the group discussions, camel browsed more trees and shrubs during the wet season compared to bush species. However, during the dry season, the herbaceous components are less abundant and often become more fibrous. As the dry season progresses, however, less palatable species like bushes were browsed by camel during the critical dry season. The pastoralist elders also indicated that the less palatable species and/or some dried or wilted plants, which are assumed to be poisonous, are eaten by camels during the critical feed shortage time in dry season.

3.5. Major Tree Species Utilized by Camels

Table 5 shows a list of tree species that have been identified as locally available

Table 4. Available bush species utilized by camels in the study area.

Local name (Somali)	Scientific name	Family name
Jaleelo-geel	*Cassia somalensis*	Caesalpinaceae
Balan-baal	*Abutilon anglosomaliae*	Malvaceae
Gamo-dheere	*Entada leptostachya*	Mimosaceae
Kariiri	*Solanum somalensis*	Solanaceae
Dhalaan-duuh	*Euphorbia longetuberculosa*	Euphorbiaceae
Adda-adeey	*Sida ovata*	Malvaceae
Geed-hamar	*Cucumis halabrada*	Cucurbitaceae

Table 5. Available tree species utilized by camels in the study area.

Local name (Somali)	Scientific name	Family name
Gaheydh	*Blepharispermum Fruticosum*	*Composite*
Bilcil	*Acacia Mellifera*	*Mimosoceae*
Adaad	*Acacia Senegal*	*Mimosaceae*
Dhamaajo	*Commiphora Incise*	*Burseaceae*
Adey	*Salvadora Persica*	*Salvadoraceae*
Hagar	*Commiphora Agar*	*Burseraceae*
Feedho-qandhol	*Hildebrandtia Linearifolia*	*Convolvulaceae*
Galool	*Acacia Bussei*	*Mimosacaea*
Garbi	*Acacia Albida Del*	*Mimosaceae*
Garas	*Dobera Glabra Poir*	*Salvadoraceae*
Jeerin	*Acacia Edgeworthii*	*Mimosaceae*
Gob	*Ziziphus Mauritiana*	*Rhaminaceae*
Madheedh	*Cordia Sinensis*	*Boragginaceae*
Hadi	*Commiphora Erlangeriana*	*Burseraceae*
Qudhac	*Acacia Tortilis*	*Mimosaceae*
Maanyo	*Sonneratia Alba*	*Lythraceae*
Mey-gaag	*Boscia Minimifolia*	*Capparidaceae*
Maraa	*Acacia Nilotica*	*Mimosaceae*
Sarman	*Acacia Hoodia*	*Mimosacea*
Qansax	*Acacia Reficiens*	*Mimosaceae*
Gumar	*Acacia nubica*	*Mimosaceae*
Xagar madow	*Commiphora allophylla*	*Burseraceae*
Cadaad-geri	*Acacia ogadensis*	*Mimosaceae*
Sogsog	*Acacia Etbiaca*	*Mimosacea*

along with their scientific and common names. A total of twenty-four indigenous tree species have been identified as camel feed sources.

3.6. Major Grass Species Utilized by Camels

Table 6 shows a list of grass species that have been identified as locally important, along with their scientific and common names. A total of seventeen indigenous grass species have been identified as camel feed sources.

3.7. Major Shrub Species Utilized by Camels

Table 7 shows a list of shrub species that have been identified as locally important, along with their scientific and common names. A total of twelve indigenous shrub species have been identified as camel feed sources. The study indicated that, camel browsed more shrubs during the wet season compared to herbaceous and grass species. However, during the dry season, the herbaceous components are less abundant and often become more fibrous.

3.8. Nutritional Values of Camel Feeds

The nutritive value of plants consumed by foraging animals is one of the criteria used to select and prioritize them. During both seasons, nutritional fractions (dry matter, crude protein, neutral detergent fiber, acid detergent fiber, acid

Table 6. Available grass species utilized by camels in the study area.

Local name (Somali)	Scientific name	Family name
Daba adde	*Aerva Spp*	Amarahthaceae
Biile	*Jatropha dichtar*	Euphorbiaceae
Weylo-qab	*ChiorissSomalensis*	Gramineae
Badhoole	*Afrotrichloris hyaloptera*	Gramineae
Birqin(bire)	*Aristida sieberiana*	Gramineae
Dareemo	*Chrysopogon aucheri*	Gramineae
Dhurbay	*Bothriochloa insculpta*	Gramineae
Dihi	*Paspalum vaginatum*	Gramineae
Dooyo	*Coelachyrum stoloniferum*	Gramineae
Duur	*Schizachyrium kelleri*	Gramineae
Eir-dhuq	*Cenchrus ciliaris*	Gramineae
Gargood	*Panicum Sp*	Gramineae
Harfo	*Digitaria ternate*	Gramineae
Maadh	*Aristida papposa*	Gramineae
Maajeen	*Aristida magiurtina*	Gramineae
Ramaas/Dhikil	*Sporobolus spicatus*	Gramineae
Timo gabdhoodle	*Letothrium senegalense*	Gramineae

detergent lignin, and ash) have an impact on herbivorous animals' acceptance of forage plants. The chemical composition of *Sporobolus spicatus*, *Indigofera ruspolii*, *Acacia mellifera*, *Grewia tenex*, *Dobera glabra* and *Acacia bussei*, of range pasture species were collected for analysis in both wet and dry seasons and are given in Table 8. There was significant difference in crude protein (CP),

Table 7. Available shrub species utilized by camels in the study area.

Local name (Somali)	Scientific name	Family name
Dhafaruur	*Grewia tenax*	Tiliaceae
Hanjo-mukh	*Sarcostemma adongense*	Asclepiadaceae
Dhebi	*Grewia bicolour*	Tiliaceae
Hob-hob	*Grewia penicillata*	Tiliaceae
Dhirindhir	*Euphorbia cuneata*	Euphorbiaceae
Madheedh	*Cordia gharaf*	Boraginaceae
Gomosh	*Grewia villosa*	Tiliaceae
Salalma	Sesamothamnus busseanus	Pedaliaceae
Tiire	*Clerodendrum Sp.*	Verbenaceae
Higlo	*Cadaba heterotricha*	Capparidaceae
Qalaan-qal	*Boscia coriacea*	Capparidaceae

Table 8. Mean chemical composition of preferred forage species in wet and dry seasosn.

Feed stuff	Feed type	Season	Chemical composition (% DM)					
			DM%	CP	NDF	ADF	ADL	Ash
Sporobolus spicatus	Grasses	Wet	90.3	10.7^{a}	65.2^{b}	45.4	10.5	14.9
		Dry	92.4	3.9^{b}	75.5^{a}	51.2	7.6	11.5
Tephrosia villosa	Herbaceous	Wet	89.2	14.6^{a}	55.8^{b}	40.4^{b}	15.2	6.8
		Dry	90.5	9.4^{b}	63.3^{a}	52.5^{a}	8.8	4.2
Acacia mellifera	Browse trees	Wet	90.9	12.4^{a}	56.8^{b}	41.7^{b}	9.4	8.4
		Dry	92.2	6.8^{b}	68.7^{a}	46.4^{a}	13.8	5.7
Grewia tenex	Shrubs	Wet	88.5	14.3^{a}	53.3^{b}	36.8^{b}	22.6	11.2
		Dry	91.1	5.5^{b}	62.3^{a}	53.7^{a}	17.9	8.3
Dobera glabra	Shrubs	Wet	93.2	13.7^{a}	40.5^{b}	20.8^{b}	13.2	14.3
		Dry	95.3	9^{b}	64.8^{a}	35.4^{a}	9.9	9.1
Acacia gussei	Browse trees	Wet	92.4	12.1^{a}	45.4^{b}	33.3^{b}	9.8	9.9
		Dry	90.6	7.7^{b}	57.7^{a}	45.7^{a}	11.6	8.6

Means followed by different superscripts within a column are significantly different at $P < 0.05$, DM= dry matter; CP = crude protein; ADF = acid detergent fiber; ADL = acid detergent lignin, NDF = neutral detergent fiber.

neutral detergent fiber (NDF) and acid detergent fiber (ADF) between seasons however there was no significant difference in dry matter, acid detergent lignin and ash in both seasons.

In the wet season, the average DM content of selected feeds ranged from 88.5% to 93.2%, while during the dry season, it ranged from 90.5% to 95.3%. The DM content of identified feeds in this study area agreed with the report of Muhyadin [32] in Kebribeyah district. In the wet season, there was no significant difference in CP content among the species, whereas in the dry season, a significant drop was observed, particularly in *Sporobolus spicatus* and *Grewia tenex*. During the dry season, the high CP content of forage species may be an advantage for feeding livestock as the nutritional value of rangeland grasses declines. This finding is in line with the report of Muhyadin [32], who stated that, some herbaceous and browsers in Kebribayah district are suitable as protein supplements to low-quality pasture and fibrous crop residues because of their high CP content. However, the CP values in this study were higher than the critical value of 7.5 percent for optimal rumen function [33].

In general, as forages mature in the dry season, their ash content decreases. This was in agreement with Ahamefule *et al.* [34] and Derero and Kitaw [35], who found that different plants increased or decreased ash content in all pasture lands. This could be due to differences in soil and other habitat features, which need to be investigated further. Moreover, Sisay [36] observed that ash contents of rangeland pasture in Metema district were influenced by seasonal changes.

The reported NDF contents of the current study lie above the critical value of 60% which was reported to result in decreased voluntary feed intake, feed conversion efficiency and longer rumination time [34]. The mean NDF content found in this study is similar to that found in Metema by Sisay [36], but higher than that found in Kebribeyah by Muhyadin [32]. If the roughage contains more than 65% NDF, it is considered poor quality feed, according to Singh and Oosting [37]. Furthermore, while Norton [38] claimed that NDF content of 67% - 78% was sufficient to limit DM intake and digestibility, Linn *et al.* [39] found that Neutral detergent fiber is the most important determinant of overall forage quality and digestibility, and has a direct impact on animal performance.

In this study, the mean ADF content of rangeland pasture ranged from 20.8 in the wet season to 53.7 in the dry season. Natural pasture ADF content was low during the rainy season and high during the dry season, which is in agreement with the finding of Sisay [36]. According to McDoland *et al.* [40], forage species with high ADF content may have lower digestibility because feed digestibility and ADF content are negatively correlated.

4. Conclusion and Recommendations

This study identified about 20 herbaceous plants, 11 shrub species, 7 bush species, 24 tree species and 17 grass species used as a camel feed in the study area. The study also revealed that browsing trees and shrubs were the main feed re-

sources utilized by camels. The chemical composition analysis of feeds indicated that there was a significant difference in crude protein, neutral detergent fiber and acid detergent fiber among selected forage species in different seasons, indicating the importance of improving the feeding system of camels in the study area. Therefore, the study suggests educating, awareness creation and training camel herders about basic management and conservation techniques of feed resources. Furthermore, further studies are needed to evaluate the nutritive value of the other feed resources which are utilized by camels.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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