



FACULTY OF AGRICULTURE

Minia J. of Agric. Res. & Develop.
Vol. (29) No. 2 pp 259- 266, 2009

PRELIMINARY STUDY ON CHEMICAL COMPOSITION AND DIGESTIBILITY OF SOME VEGETATION SELECTED BY CAMELS GRAZING IN GREEN MOUNTAIN REGION IN LIBYA

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Received 1 March 2009

Accepted 2 May 2009

ABSTRACT

This study was conducted to assess some nutritional characteristics of vegetations selected by camelus dromedaries in an unusual area for this animal. Direct observation and collection of samples of vegetations selected by camels and feces were applied. Acid indigestible ash was used as internal marker for estimation the apparent digestibility. Plants grazed by camels in this pasture were in majority *Echinopes spp.*, in addition to *Sorghum halepense*, *Avena fatua*, *Olea europaea var. sylvestris* and *Pistacia lentis*. The average dry mater of vegetations was 50.77%. Chemical composition of vegetation consumed by camels (as % of DM) was 92.94, 45.47, 32.83, 6.45, 8.16 and 7.06 for OM, NDF, ADF, CP, EE and ash respectively. The vegetation characterized by low protein content. Apparent digestibility of DM, OM, NDF, ADF, CP and EE were 71.40%, 72.97%, 68.10%, 55.17%, 60.40% and 79.99%, respectively. Despite of low protein content of pasture, the results of this study support the possibility of exploiting the grazing areas of Green Mountain by camel in times of forage shortage in their

normal habitat, providing the respecting of environment is fulfilled. Additional digestibility trial by total collection method is needed to confirm the present study.

INTRODUCTION

Camels in Libya belong to single-hump camel (*camelus dromedaries*) which is widespread in the Arab countries and North Africa. There are about 47000 head of camels in Libya (FAO 2006). Camel's meat is particularly popular in western part of Libya. Camels are considered a dual-purpose animals as they produce meat and milk. Serti camels produce about 2200 kg of milk annually head, while western region camels and Al-Mahari camels produce one third of this amount (FAO 2003). Camel is capable of utilizing the dry matter of poor quality feeds such as straws or halophytic vegetations.

Digestibility coefficients of wheat straw dry matter in stall-fed camels ranged from 44.81% (Cianci et al. 2004) to 55% (Abdouli and Kraiem 1990). Ben Arfa et al. (2004) reported that dry matter digestibility was 39.9 % of halophytic vegetations for camels grazing in southern Tunisian rangelands. Libyan camel breeders normally keep their flocks in the arid and semi-arid areas. However, in spring season, when there is a forage shortage in the mentioned regions, some farmers bring their flocks to green mountain areas to benefit of the availability of thorny plants, shrubs and some forest trees. Some species of this vegetation are not common in the desert areas where camels are normally raised. So this study was conducted to investigate the digestibility of these vegetations by grazing camels.

MATERIAL AND METHODS

Animals

This study was conducted in May 2007 on healthy flock counted about 40-50 heads of camels grazed mountainous area near the city of Al-Baida (32° 45'N and 21° 44'E). were used. The animals were grazed on open range every day and water is readily available at fixed points..

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Forage species selection, collection and analysis

Observation of animals was made in the morning. Some of animals were followed and forages species selected by them were selected. Representative samples of grazed plants, shrubs or trees were collected. Plants grazed by camels in this pasture were in majority *Echinopes spp.*, in addition to *Sorghum halepense*, *Avena fatua*, *Olea europaea var. sylvestris* and *Pistacia lentis*. Samples of feces were also collected from these animals. Samples (plants and feces) were placed in plastic bags and transferred to laboratory for the determination of dry matter (DM), crude protein (CP), ether extract (EE), according to AOAC (1990). Contents of neutral detergent fiber (NDF) and acid detergent fiber (ADF) were determined using the method of Van Soest et al. (1991). Acid insoluble ash (AIA) in feeds and feces was determined according to Van Keulen and Young, (1977) to predict the digestibility of conventional nutrients..

RESULTS AND DISCUSSION

Chemical composition of vegetations

Data of chemical composition of the vegetations and the feces are shown in Table 1.

The vegetation selected by camels in this study was characterized by low protein content (6.45%) and relatively higher content of ADF (32.83%) and ash (7.6%). Protein content in the vegetations selected by camels in southern Darfur state in Sudan ranged from 6.79% in dry season to 4.90% in green season (Amin et al. 2007).

Crude protein concentrations were below the quantity considered as the minimum necessary for good ruminal functioning, but the dromedaries in their natural habitat are quite often subject to poor quality diets (Cianci et al. 2004). Ether extract was relatively higher in selected vegetation and this may be attributed to the presence of trees like *Olea europaea var. Sylvestris*.

Table 1: Chemical composition of forage and feces of camels grazed vegetation.

Items	Forage	Feces
DM *	50.77	42.61
OM	92.94	87.87
NDF	45.47	50.84
ADF	32.83	51.51
CP	6.45	8.94
EE	8.16	6
Ash	7.06	12.13

* DM % of as fed, all other components are % of DM.

Digestibility of vegetation

Digestibility coefficients of vegetations selected by camels are presented in Table 2. Acid insoluble ash was used as internal marker to calculate the coefficients of digestibility. For the determination of apparent digestibility coefficients, the total collection method is considered as a standard method. This method could be replaced by the more easy internal markers method using acid insoluble ash. The values obtained by the two methods are comparable, except for the digestion coefficients obtained for crude protein, which are more variable (Bergero et al. 2004). Miraglia et al. (1999) reported that the digestibility coefficients obtained using acid insoluble ash is very close to those obtained with total collection method.

Digestibility coefficients of dry matter and the organic matter were 71.40 and 72.97% respectively. These values are much higher than those obtained by Ben Arfa et al. (2004) who reported that dry and organic matter digestibility of halophyte plant in Tunisia were 33.9 and 34.6% respectively. These differences between those results and our data could be attributed to type of ingesta. However, Le Houérou (1995) cited by Ben Arfa et al. (2004) reported that

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digestibility coefficient of dry matter of halophyte plants ranged from 40 to 70%. Also, digestibility coefficients of NDF, ADF in this study appeared slightly higher than those reported by Le Hou  rou (1995) in stall-feeding. Cianci et al. (2004) reported that digestibility coefficients of NDF and ADF were 52.23 and 59.45%, respectively for stall-fed camels offered a diet of natural meadow hay and straw mixture.

Table 2: Apparent digestibility coefficients of pastures nutrients.

Items	%
DM	71.40
OM	72.97
CP	60.40
EE	79.99
NDF	68.10
ADF	55.17

CONCLUSION

Digestibility coefficients of vegetation suggest the possibility of exploiting the grazing areas of Green Mountain for camel in times of forage shortage in their normal habitat due to rain fluctuations, providing the respecting of environment is fulfilled.

ACKNOWLEDGMENTS

The authors would like to thank the camel flock owner for his cooperation during this study.

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دراسة مبدئية على التركيب الكيميائي ومعاملات الهضم لبعض النباتات المختارة بواسطة الإبل بمنطقة الجبل الأخضر في ليبيا

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أجريت هذه الدراسة المبدئية لتقدير التركيب الكيميائي والقيمة الهضمية للنباتات المختارة من الإبل في بيئة غير معتادة لهذه الحيوانات. جمعت العينات النباتية وعينات الروث بطريقة الملاحظة المباشرة للحيوان في المرعى. استخدم الرماد الغير ذائب في الحمض كدليل داخلي في كل من العينات النباتية و عينات الروث لحساب معاملات الهضم الظاهرية. تتكون النباتات التي اختارها الحيوانات في اغلبها من *Echinopes spp.* بالإضافة الى *Avena fatua* و *Sorghum halepense* وشجيرات *Olea europaea var. sylvestris* و *Pistacia lentis*.

نسبة المادة الجافة لهذه النباتات كانت ٥٠,٧٧%. المكونات الغذائية للنباتات المختارة من الإبل كانت (% من المادة الجافة) : 92.94، ٤٥,٤٧، ٣٢,٨٣، ٦,٤٥، ٨,١٦ و ٧,٠٦ لكل من المادة العضوية، الالياف المتبقية بعد المعاملة بمحلول الالياف المتعادل، الالياف المتبقية بعد المعاملة بمحلول الالياف الحمضي، البروتين الخام، المستخلص الاثيري و الرماد على التوالي. تميزت النباتات المأكولة بانخفاض نسبة البروتين الخام. معاملات الهضم الظاهري للعناصر الغذائية كانت ٧١,٤٠%، ٧٢,٩٧%، ٦٨,١٠%، ٥٥,١٧%، ٦٠,٤٠% و ٧٩,٩٩% لكل من المادة الجافة، المادة العضوية، الالياف المتبقية بعد المعاملة بمحلول الالياف المتعادل، الالياف المتبقية بعد المعاملة بمحلول الالياف الحمضي، البروتين الخام، والمستخلص الاثيري على التوالي. بالرغم من انخفاض نسبة البروتين فان نتائج هذه الدراسة توصي بامكانية استغلال بعض مناطق الجبل الأخضر في فترات الجفاف ونقص المادة العلفية للإبل في بيئتها الطبيعية، مع مراعاة الحفاظ على البيئة. تحتاج هذه النتائج الى دراسة اخرى تستخدم فيها تجارب الجمع الكلي للروث للتأكد من معاملات الهضم العالية في هذه الدراسة وتحديد الكميات المأكولة ومدى استساغة الإبل لتلك النباتات الرعوية.