

## Animal Review

2015 Vol. 2, No. 3, pp. 76-80

ISSN(e): 2409-6490

ISSN(p): 2412-3382

DOI: 10.18488/journal.ar/2015.2.3/101.3.76.80

© 2015 Conscientia Beam. All Rights Reserved.



# CHEMICAL ANALYSIS OF ACACIA EHREBERGIANA (SALAM) TREE FRUITS (SEED AND PODS) AS DRY SEASON SUPPLEMENT FOR LIVESTOCK IN ARID AND SEMI –ARID LANDS OF SUDAN

Mohamed S .A Abdalla<sup>1</sup> --- Izeldin A. Babiker<sup>2†</sup> --- Kamal F. Elkalifa<sup>3</sup>

<sup>1</sup>Organic Farming Project, GIZ, Riyadh - Saudi Arabia

<sup>2</sup>Department of Animal Production, Faculty of Agriculture, University of Zalingei, Sudan

<sup>3</sup>Department of silviculture , faculty of forestry, university of Khartoum, Shambat Sudan

## ABSTRACT

*In developing countries farming and livestock keeping are the most dominant activities for the indigenous people, proper farming maintain good and adequate grazing for livestock and hence support livelihood in such countries. Therefore, local inhabitants largely depend on some tree species suitable for grazing purposes. In the present study, the nutritional value for fruits of Acacia ehrenbergiana (Salam) (seeds and pods) at the lower Atbra river basin in north eastern part of Sudan was investigated. Field samples of fruits were collected, each sample kept separately in a small cloth kit. Chemical analysis of fruit samples was conducted to quantify the content of various nutritional attributes including: the crude protein, crude fibers, fats, starch, ash, and moisture content. In addition to some minerals namely P, Ca, Mg, Na, Cur and Fe. Chemical analysis revealed that CP is found to be as high as 30.99%, CF reached 25.11%, the starch content 12.12%, fat 4.1%, and ash content 11.81% .These values showed the high nutritional values fruits. Similarly mineral contents demonstrate good amounts of Na and Ca that needed by livestock for adequate growth, but lower amounts of P that should be supplemented to the diets. Most tested browse fruits revealed adequate nutritional values of Acacia ehrenbergiana (Salam) fruits as a protein or dry season supplement. Fodder trees still need to be fully evaluated in order to reduce the cost of feed . This can be done by being used as a feed supplement to livestock .Increasing the base for feed options (forages) with high quality feed will support the ever increasing demand for livestock products ,as feed is the most important factor influencing livestock production in the harsh environment of the dry lands.*

**Keywords:** Fodder analysis, Acacia, Nutritional value.

**Received:** 24 March 2015/ **Revised:** 28 April 2015/ **Accepted:** 3 May 2015/ **Published:** 9 May 2015

† Corresponding author

© 2015 Conscientia Beam. All Rights Reserved.

## 1. INTRODUCTION

In the Butana (central eastern Sudan) the household economy is based on an agro-pastoralist system of production where both livestock (goats, sheep, cattle and camels) and crop production (sorghum) are practiced [1]. Small holder livestock keepers in this part of Sudan, rarely use conventional concentrate feeds in livestock production system as they are expensive. Non-conventional feeds need to be considered for this sector and areas [2]. Camel and goats depend largely on natural range lands for their feed requirements, a situation unlikely to change in the foreseeable future. Tropical rangeland is endowed with flora that is rich in protein. Most range lands in Sudan are dominated by Acacia species beside other fodder tree species. In The dry season period in Sudan, livestock experience serious shortage of feed, which in turn causes pressure on the range lands, resulting in degradation. The nutritional inadequacy of the dry season grazing imposes a major constraint on sustainable livestock production under traditional systems where grazing constitutes the only source of feed for livestock. The non-availability of forage during the dry season affects sedentary livestock more, as they lack the advantage of mobility exercised in the transhumant and nomadic systems. The utilization of protein rich fodder trees as feed supplement can counter the seasonal shortage of good quality forage for livestock.

*Acacia ehrenbergiana* has a wide distribution range at present. It is an important legume fodder tree for indigenous populations (it is used to feed animals, such as goats, sheep and camels). It is a valued fodder (leaves, flowers and seed pods) for camels, sheep and goats in the Sahelian regions, where it is pollarded in the dry season. The role of fodder trees and shrubs (*Acacia*, *Cadaba*, *Maerua* etc) as a dry season source of feed (pods, leaves and twigs) should not be underestimated. They are particularly valuable in the Semi-desert and Low Rainfall Savanna zones. El- Behairy [3] evaluated *Acacia ehrenbergiana* as browse tree in southwestern Saudi Arabia and found CP value of 8.45% while digestible crude protein (DCP) reached 4.6%, 12.78 for the ash content, 2.26% EE, and 35.22% CF. mineral concentration reported by the same researcher showed 2.19% Na, 1.38% K, 1.17% Ca, 1.56 Mg and 0.4 % P. He concluded that, the potential nutritive value of *Acacia ehrenbergiana* when comparable to the other browsers is rich in most minerals. FadelElSeed, et al. [4] studied the nutritive evaluation of some fodder tree species during the dry season in central Sudan, he reported that, *Acacia ehrenbergiana* may have potential value for supplementation of energy or protein better in early dry or wet season, it contains higher levels of crude protein at early period of the season, but decreased at the late period. Mineral concentration of *Acacia ehrenbergiana* was found to be of relatively higher Ca content as reported by [4-6], but with extremely low P content. The objective of this study was to assess the chemical analysis and potential nutritive value of some selected species of *Acacia ehrenbergiana* fruits (pods and seeds) in Lower Atbara River area, based on their chemical composition

## 2. MATERIAL AND METHODS

### 2.1. Samples Collection

*Acaciaehrenbergiana(Salam)*grown along the downstream of Atbara Riverbank, Sudan, as the most desirable sites bygrazers, was examined. Eleven random seeds and pods were manually collected from *Acacia ehrenbergiana(Salam)* trees at different positions on the adopted sites .The fruit was hand-picked to eliminate damaged pieces Fruits,. These were immediately weighed and stored in cloth bags. Samples were identified and labeled with botanical and local names.

### 2.2. Laboratory Sample Preparation

Fruit samples were sun dried and their moisture contents were calculated. The dry samples were ground, burned to ash and treated with HCl and HNO<sub>3</sub> acid in order to digest any residues of organic matter. The samples were filtered for chemical analysis [7].

### 2.3. Sample Chemical Analysis

Proximate analysis for chemical components; moisture, crude protein, crude fiber, ash, fat and starch were determined by using (NIRS=Near-Infrared Reflectance Spectroscopy).

### 2.4. Chemical Composition of Fruits of Commonly Grazed Species in the Study Area

Fruits minerals were determined as for phosphorus (P), calcium (Ca), sodium (Na), potassium (K), magnesium (Mg), iron (Fe) and copper (Cu) according to the methods described by Naumann and Bassler [8]. Potassium and sodium were analyzed by flame-photometer (Coring EEL 100) while calcium, magnesium, iron and copper were determined by atomic absorption spectrophotometer (2380 Perkin Elmer) and phosphorus was determined by the spectrophotometer (SP 6-200 Unicam).

## 3. RESULTS AND DISCUSSION

The current proximate analysis at table (1) showed that, the nutritive attributes of *Acacia ehrenbergiana* regarding CP content are as high as (30.99%) than the values for CP contents of the shoots and leaves reported by El- Behairy [3] and FadelElSeed, et al. [4]. This is due to that, in this study the whole fruit (pods and seeds) was involved in the chemical analysis, but both of them is higher than protein content of the shoots and forage of the same fodder tree. Again, Walker [9] reported that the crude protein content of browse plants is generally considerably higher than that for the grasses at all times other than the early growing season. The crude fiber (CF) content in the present study (25.11%), is lower than values reported by El- Behairy [3] for the tree shoots as 35.22%, the difference is partly reasonable due to lower values of cell wall fraction in seeds which being included in the chemical analysis in this study. Minerals content of *Acacia ehrenbergiana* fruits shown on table (2) is consistent with what had been reported by [4-6] and slightly lower than those reported by El- Behairy [3] as .It showed adequate Ca

concentration, but with extremely low P content. Its strongly recommended to supplement using an appropriate amount of phosphorus.

**Table-1.** Proximal composition of fruits of commonly grazed species in the study area

Nutrient	%
DM	90.32
Fat	4.10
CP	30.99
Starch	12.12
CF	25.11
Ash	11.81

**Table-2.** Mineral composition of fruits of commonly grazed species in the study area

Mineral	concentration
Ca	0.71
P	0.23
K	1.25
Mg	0.26
Na	1055 ppm
Fe	215ppm
Cu	15.25 ppm

#### 4. CONCLUSION

Fodder trees fruits (pods and seeds) provide a considerable part of animal demand for protein and macro- minerals to overcome the negative impact of the dry season as shown in our findings. Efficient utilization of the available feed resources is a key factor in livestock production that may improve livelihood of resource - poor communities and increase opportunities for the provision of animal protein in the forms of meat and milk. Cheap protein sources will be a prerequisite for viable and sustainable animal production in the dry lands of Sudan.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Contributors/Acknowledgement: All authors contributed equally to the conception and design of the study.

#### REFERENCES

- [1] M. Abdalla, I. Babiker, J. Al-Brahim, A. Mohammed, M. El-Kordufani, and M. Elobeid, "Potential of *prosopischilensis* (Molina) stuntz as a non-conventional animal feed in the dry lands of Sudan," *International Journal of Plant, Animal and Environmental Sciences*, vol. 4, pp. 673-676, 1997.
- [2] T. Smith, E. Owen, I. Mueller- Hrvy, J. Sikosana, and V. Mlambo, "Increasing the productivity of small holder owned goats through supplementation with terr fruits," in *Proceedings of the British Society of Animal Science York*, 2005, p. 33.

- [3] M. A. H. El- Behairy, "Nutritive evaluation of two acacia populations in Southeastern Saudi Arabia," *J. App. Sci. Res.*, vol. 5, pp. 1030-1039, 2009.
- [4] A. M. FadelElSeed, A. E. Amin, K. A. Abdel Ati, J. Sekine, M. Hishinuma, and K. Hmana, "Nutritive evaluation of some fodder tree species during the dry season in central Sudan," *Ausian-Aust J. Anim. Sci.*, vol. 15, pp. 844-850, 2002.
- [5] S. Abdulrazak, A. Fujihara, J. K. Ondeik, and R. E. Orskov, "Nutritive value of some acacia tree leaves from Kenya," *Anim. Feed Sci. Technol.*, vol. 85, pp. 89-98, 2000.
- [6] A. A. Aganga, T. Adogla-Bessa, U. J. Omphile, and K. Tshirelesto, "Significance of browses in the nutrition of tswana goats," *Archivos De Zootecnia*, vol. 49, pp. 469-480, 2000.
- [7] J. B. Jones, *Laboratory guide for conducting soil tests and plant analysis*. Florida: CRC Press LLC, 2001.
- [8] C. Naumann and R. Bassler, "Diechemische untersuchung von futtermittelnbuch Bd.III, Melsungen Feedipedia (2014), FAO." Available <http://www.feedipedia.org/node/12591>. [Accessed 01 May 2014], 1976.
- [9] B. H. Walker, *A review of browse and its role in livestock in Africa. Production in Southern Africa*. In: *Le Houerou, H. N. (Ed). Browse in Africa. The current state of knowledge* vol. 7. Addis Ababa: ILCA, 1980.

*Views and opinions expressed in this article are the views and opinions of the author(s), Animal Review shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.*