

The Nutritive Value of *Bosciasenegalensis* as Famine Food in Semi Arid Zone Case study Umkaddada Locality, North Darfur State, Sudan

¹Abdelrhman Ismail Adam, ² Ismail M. Fangama

¹Elfasher University, Faculty of environmental science & Natural resources, Department of Forestry & Range

²Sudan university of Science and technology, College of Forestry& Range science, Department of Botany and Environment

ABSTRACT

The study was carried out at Arais area north Umkaddada town, the objective were to study the nutritive role of *Bosciasenegalensis*, the effect of different seed soaking periods on the nutritive value and comparison with similar studies at other parts in the State. The study showed that *Bosciasenegalensis* was dominant and presented the differences in seed soaking periods did not influence the nutritional value of seeds.

Keywords: *Famine, nutritional value, soaking periods, Bosciasenegalensis.*

1. INTRODUCTION

The study area is at eastern part of the State, it is geographically located within 12th and 15th degree of latitude N, 25th and 28th degree of longitude E, covering an area of 40,000 sq² It is bordered on the east by North Kordofan State, on the south by eastern Darfur State on north and west by Milliet and Ekoma localities respectively.

1.1 Distribution of *Bosciasenegalensis*

According to IBGR (1984) *Bosciasenegalensis* is an evergreen shrub or small tree less than seven meter high, in the sahilian zones from Senegal and Mauritania to eastern Sudan an Ethiopia. In Sudan it is distributed at the Red Sea Hills, Kassala, Blue Nile, Kordofan, Darfur, Upper Nile, Equatorial and BaharElghazal (ALamin 1991).

Andrews (1950) described *Boscia* plant as a shrub or small tree. Leaves elliptic or ovate. Elliptic obtuse or mucronate at the apex, up to 80mm or (very rarely 110mm) broad, glabrous or more usually finely pubescent with about 5-6 lateral nerves raised on both surfaces and prominently looped.

1.2 Important of *Bosciasenegalensis* as Famine Food

In the eastern Sudan both men and women collect *Boscia* seeds, sometimes spending up to 8 hours/day searching for branches and carrying them back to their homes (FAO 1988). Preparation and uses of *Boscia* seeds has been described by (FAO, 1989) the outer flesh of the young berries is edible although once mature it becomes hard and inedible. The seed, which are used as emergency food at time of scarcity provide valuable substitute for millet and are used by poor families in place of lentils or in the form of flour.

Bosciasenegalensis was well known to the population of western Sudan as famine food. It also used as a food by the people of Senegal.

Rural people at Umkaddada area are consume *Boscia* seeds but these areas characterized by shortage of water, therefore the seeds sweetening treatment (soaking of seeds in water) differ from that at other areas where water is available in North Darfur State. The periods of sweetening in the study area varies from 2-3 weeks, the changing of soaked water was done after 4-5 days (due to shortage of water) while the normal period of sweetening is one week and changing of soaked water was done daily (Salih 1991). The study was done to show if the different periods of sweetening influence the nutritive value of protein and carbohydrate in comparison to the normal period of sweetening.

2. METHODOLOGY

In October 2012 three sites within Umkaddada area were selected around Miredyfa, Kharat and Sangarna village. The first was ten km north Umkaddada town; the second was located at twenty five km northwest to Umkaddada and the last one Twelve km northeast. The area of each site equal 100 fedans. Methods used include tree density, seed treatment, seed chemical analysis and socio-economic study.

2.1 Tree Density

Tree density index is defined as the number of individual species per unit area. For obtaining tree density each site was divided into 42 equal units, a quadrat of 10x10m was placed randomly at each unit and the individual species inside the quadrat were counted and recorded, then tree density was calculated by dividing the total individual species over the total of quadrat for each site separately.

2.2 Seed Treatment

Bosciasenegalensis seeds can be eaten raw but are very acid and are usually consumed after long preparations and cooking. Berries are dried in the sun, pounded to remove the outer seed coat and then soaked again for several days. If water was changed often, only 2 days

<http://www.ejournalofscience.org>

soaking is necessary. Seeds are boiled in a pot with local potash, and then soaked in cold water to be sweetened and finally mixed with salt and butter for serving. It had also been reported by FAO (1988) that roasted seeds are used as a substitute for coffee, the leaves that are floury and starchy are macerated in water for several days, then sun – dried, pounded and cooked with butter.

Another use of *Boscia* has also been reported by FAO (1988) and IBGER (1984), which indicated that the leaves and berries are browsed by camels, goats and sheep during the end of dry season and the beginning of the rainy season.

2.3 Seed Analysis

Seed analysis was done in order to investigate the crude protein and carbohydrate; fifty samples of sweetened seeds were selected randomly from five villages (500 grams from any 10 household at each village). The total weight of the samples was 2500 grams. These samples were mixed randomly and a sample of 500grams was taken for the purpose of analysis. The samples were milled using motor mill and passed through a one mm sieve.

Analysis was performed by standard methods (statutory Rules of Northern Ireland 1982).

2.4 Socio-Economic Study

Socio-economic study was conducted at the study area, a set of questions was prepared covering all aspects related to the importance of *Bosciasenegalensis* seeds (collection, drying, soaking in water, re drying and milling).

Sixty house hold heads were interviewed, 12 house hold were selected randomly from each village in the study area. These villages are Miredyfa, Sangarna, HillatAbogarin, Eldandana and Kharat, and then the data was analyzed.

3. RESULTS AND DISCUSSION

Table (1) showed that *Bosciasenegalensis* was the dominant tree species at the study area, this was because the preferred browse species in the area were subjected to intensive browsing all the year –around. Species like *Perminaresinosawas* influenced by intensive cutting for building and fire wood purposes, while *Bosciasenegalensis* has good natural regeneration but sensitive to fire (IBGR, 1984). Another thing that assisted in protecting of this tree was stated by (Abdelmajid, 2001) that Sultans Darfur region prohibited cutting of this tree because it considered as one of the essential wild food in the area.

Table 1: tree density/ha at three sites of study area

Species	Miredyfa	Sangarna	Kharat
<i>Bosciasenegalensis</i>	146	176	221
<i>Acacia senegal</i>	19	07	24
<i>Acacia mellifera</i>	11	07	13
<i>Balaniteaegyptiaca</i>	08	05	03
<i>Boswelliapapyrifera</i>	06	0.0	00
<i>Acacia radiana</i>	03	09	26
<i>Perminaresinosa</i>	02	05	31



Plate 1: Misuse Perminaresinosa

3.1 Sweetening of *Boscia Senegalensis*

Table (2) indicated that most of the interviewed persons with response to process of sweetening of *Boscia* seeds reported that seeds were soaked in water for 2-3 weeks or more. The process started by collection of mature seeds which naturally fall from the mother trees, drying for 2-3 days, pounded and cleaned from fleshy parts and seed coat. The cleaned seeds were soaked in water for 2-3 weeks; the water was changed every 4-5 days and finally the seeds were dried under the sun and milled to be ready for making local food like (Asida, Kissra or ballela).

Table 2: period of seeds soaking

Period/weeks	Frequency	%
2	6	10
2 - 3	30	50
>3	24	40
Total	30	100

P>0.05

3.2 Seed Analysis Results

The sweetened *Boscia* seeds are nutritionally a good source of energy with starch and soluble carbohydrate content comparable to those which were sweetened in the past at other areas of Northern Darfur State. Slight differences occurred in protein content. Generally the variation of periods of sweetened seeds showed slight differences in the protein content and soluble carbohydrate. Table (3) shows the results of protein and carbohydrate content of recent sweetened seeds within 2-3 weeks and changing of water every 4 days: ash was 1.1%, crude protein was 27.3% oil 0.96% fiber 4.2% and carbohydrate 66.44%.

Table (4) shows the result of a study conducted by Salih, (1991) at other area of north Darfur State, sweetening was done within 7 days and water was changed every day: ash content was 1.6%, crude protein was 25.6%, oil 1.3% crude fiber 3.4% and carbohydrate was 69.1%.

Table 3: composition of *Bosciasenegalensis* sweetened within 2-3 weeks

Composition	Ash	Crude protein	Oil	Crude fiber	Carbohydrate
%	1.1	27.3	0.96	4.2	66.44

Table 4: composition of *Bosciasenegalensis* sweetened within 7 days

Composition	Ash	Crude protein	Oil	Crude fiber	Carbohydrate
%	1.6	25.6	1.3	3.4	69.1

4. CONCLUSION

Measurement of tree density showed that *Bosciasenegalensis* had good distribution all over the study area, and dominated the area.

The investigation of the period of water change of soaked seeds for sweetening process showed that the people in the study area was changing the water every 4-5 days for 2 – 3 weeks, this period did not influence the nutritional value of the seeds as appeared when the result compared with results at other area in the State where water was changed every day for only one week soaking.

5. RECOMMENDATIONS

- There are need to use an appropriate program for *Bosciasenegalensis* planting and protection.
- Sustainable extension program is needed among inhabitants to guide them to adopt the protection of all tree species with special attention to *Bosciasenegalensis* and *Perminaresinosa*.
- The study area was vulnerable to desertification therefore special attention was needed from forest National Cooperation (FNC) through protecting, managing and re habilitation

REFERENCES

- [1] IBGR, (1984). Forage and browse plants for arid and semi arid African International Board for plant Genetics Resource. Royal Botanical Garden, Kew London P11- 218.
- [2] ALAmin, H.M (1990). Tree and shrubs of the Sudan.
- [3] Andrews, F. W, (1965). Flowering plants of Anglo AegyptiumSuda, Vol. 1-3.T. Buncl and co., Arbriath, Scotland.
- [4] FAO, WHO, (1988). Traditional food plants, FAO food and nutrition paper 42, Rome, Italy.
- [5] FAO, (1989). Forestry and food security, paper 9+0, food and agricultural organization, Rome, Italy.
- [6] Salih, O. M. (1991). Biochemistry and nutrition Ph.Dthesis University of Khartoum.
- [7] Abdelmaji, T. D (2001). Biodiversity and its influences on non wood forest products.