

## **Sabara (*Guiera senegalensis*) as Browse and a Potential Milk Enhancer in Ruminants in the Semi-Arid Environment**

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**Abstract:** The objective of this study was to investigate and ascertain the claim by farmers for proper documentation of the use of Sabara plant as milk enhancer in livestock. A diagnostic survey was conducted in 5 Local Government Areas of Kano State located within the semi arid region. The results obtained revealed the age groups of the majority of the respondents were between 48-58 years (24.2%). Male respondents constitute 76.8 and 79.6% married. Ninety two percent of the respondents (91.8%) had some form of education but majority (44%) had Quranic education. Responses from farmers with only livestock constituted 46.3 and crop-livestock farmers were 45.4%. Majority of respondents (35.4%) relied on livestock farming as an occupation. Species of animals encountered showed 65% were kept alone (Goat, Sheep, Camel, Cattle and Donkey) but the top 3 were in the order of sheep (26.3%), goats (20.2%) and cattle (14.1%). There were cases of keeping combinations of livestock species. Respondents recognized animals browsing leaf fraction (64.6%), followed by combination of leaves and flowers fraction. It was reported that all categories of animals (75.8%) irrespective of their physiological stages browse on Sabara in the decreasing order of young, pregnant and lactating animals. The result obtained in this study, revealed sabara plant is a browse used more prominently during the late dry season to the early wet seasons (87%). It is therefore, recommended that phyto-chemical analysis and bioassay be conducted with lactating animals to ascertain its implication in milk production and determine its level of inclusion in the ration of lactating animals. It is hoped that results of the present study stimulates further studies in its role in milk production of livestock and development of conservation strategies.

**Key words:** Sabara, Browse, milk enhancer, *Guiera senegalensis*, semi-arid zone

### **INTRODUCTION**

Milk production is the most efficient conversion of feed to food by all of the common food producing animal species (Damron, 2006). Milk output from small holder cattle production system is low due to poor and insufficient feed especially during the dry season (Agyemang *et al.*, 1998). Unconventional feed originating from indigenous plant species comprising, trees, grasses, legumes and shrubs have been shown to improve a great deal, milk yield of dairy livestock (Kilongozi *et al.*, 1989).

In Nigeria, there are speculations by inhabitants of the semi-arid and sub-humid zone that some native plant species enhance milk production. One of such plant species implicated is Sabara (*Guiera senegalensis*). Sabara, a dwarf perennial shrub belonging to the family Combretaceae, grows naturally in the semi-arid and sub-humid zones of West Africa (Le Houérou, 1980). Literature reports show its use in traditional treatment of malaria

(Azas *et al.*, 2002; Fiot *et al.*, 2006). Also it has anti-diarrhea and anti-ulcer properties (Aniagu *et al.*, 2005). Lamien *et al.* (2005) reported its use for treatment of fowl pox in poultry production. Claim by natives of the semi-arid and sub-humid zones is that the plant enhances milk in nursing humans. It could in that case be possible it stimulates more milk production in lactating does.

The objective of this study was therefore, to investigate and ascertain the claim by farmers for proper documentation of the use of Sabara plant as milk enhancer. It is hoped that results of the present study will provide baseline data on its use as milk enhancer and stimulate further studies that will examine its role in milk production of livestock.

### **MATERIALS AND METHODS**

**Description of study area:** Kano lies on longitude 9°30' and 12° 30' North and latitude 9° 30' and 8° 42' East. It is

characterized by tropical wet and dry climate. The vegetation of Kano State is the tropical type composed of a variety of trees (such as *Adansonia digitata*, *Vitex domiana*, *Tamarindus indica* and *Moringa oleifera*) scattered over an expanse of grassland (Ahmed, 1998). The wet season is from May to September and dry season is from October to April. Annual rainfall and temperature ranges between 787 and 960 mm and 21-39°C, respectively (KNARDA, 2001). Commonly grown crops in the region include millet, sorghum, cowpea and groundnut while cattle, sheep, goats and poultry are the predominant livestock reared.

**Diagnostic survey:** A diagnostic survey was conducted in 5 Local Government Areas (L.G.As) of Kano State. The L.G.As were Kumbotso, Dambatta, Karaye, Ajingi and Takai. One hundred structured questionnaires were administered to randomly selected Fulani settlements within the local governments. In each of the study area, 20 respondents were selected by systematic sampling procedure and interviewed. The questionnaire comprised of questions on biodata of respondents, species of livestock reared parts of sabara plant browsed as well as uses to which the plant is put.

**Data analysis:** Records collected from the questionnaires were managed using Microsoft Excel Software (2003). Data thus, generated were analyzed using simple descriptive statistics.

## RESULTS

**Biodata of respondents aware of the use of sabara as a milk enhancer:** Biodata of the respondents is presented in Table 1. The respondents examined vary in age group from 15 years to above 70 years with majority being within the ages of 48-58 years (24.2%). This was followed by those within the ages of 37-47 years (21.2%). Respondents within the ages of 15-25 years were the least and constituted 8%. Male respondents constitute 76.8%. Approximately 89% (79.6%) of the respondents were married. About 92% of the respondents (91.8%) had some form of education. Of these, 44% of the respondents had acquired Quranic education. Respondents with primary education were 17.5% while those with tertiary education were the least (5.2%). Respondents that acquired adult education and those that never had any form of education are similar but low (8.3%).

Ninety-nine percent of respondents encountered were farmers, those with livestock only constituting 46.3 and those keeping livestock and growing crops were

Table 1: Biodata of respondents aware of the use of sabara as milk enhancer in semi-Arid zone

Variables	Frequency	Percentage
<b>Age (years)</b>		
15-25	8	8.08
26-36	18	18.18
37-47	21	21.22
48-58	24	24.24
59-69	18	18.18
70 and above	10	10.10
<b>Gender</b>		
Male	76	76.77
Female	23	23.23
<b>Marital status</b>		
Married	79	79.59
Single	16	16.33
Widowed	4	4.08
<b>Educational status</b>		
Quranic education	44	44.33
Primary school	18	17.53
Secondary school	16	16.49
Tertiary education	5	5.15
Adult education	8	8.25
None	8	8.25
<b>Occupation of respondents</b>		
Crop farmer	7	7.22
Livestock farmer	46	46.39
Crop livestock	45	45.36
Others	1	1.03
<b>Duration in farming (years)</b>		
1-10	21	21.22
11-20	35	35.35
21-30	24	24.24
31-40	14	14.14
41-50	4	4.04
51-60	1	1.01

Source: 2007 survey data

Table 2: Livestock species owned by respondents aware of the use of Sabara as milk enhancer

Variables	Frequency	Percentage
<b>Livestock species kept</b>		
Goat	20	20.21
Sheep	26	26.26
Cattle	14	14.14
Camel	2	2.02
Donkey	2	2.02
Goat and sheep	13	13.13
Goat and cattle	8	8.08
Cattle and sheep	8	8.08
Goat, sheep and cattle	6	6.06

Source: 2007 Survey Data

45.4%. All the respondents had been engaged in livestock farming as an occupation with the duration varying from 1-60 years. Majority had duration of between 11-20 years (35.4%), followed by those with duration of between 21-30 years (24.2%) while those having between 51-60 years were the least.

**Species of livestock owned by the respondents:** Livestock species owned by the respondents that are aware of the use of sabara as milk enhancer is presented in Table 2. Species of animals encountered showed 65% were kept alone (Goat, Sheep, Camel, Cattle and Donkey). Amongst

Table 3: Sabara plant fractions, season of browsing and the categories of livestock

Variables	Frequency	Percentage
Leaves	65	65.61
Leaves and stem	8	8.08
Leaves, stem and flowers	10	10.10
Leaves and flowers	16	16.16
<b>Season</b>		
Late dry season	47	47.47
Early wet season	39	39.40
Late wet season	9	9.09
Early dry season	4	4.04
<b>Categories of animals</b>		
Young	8	8.08
Pregnant	6	6.06
Dry	1	1.01
Lactating	5	5.05
Young and lactating	1	1.01
Wearners	2	2.02
Dry and pregnant	1	1.01
All categories	75	75.76

Source: 2007 survey data

the ruminant species encountered, sheep occurred most (26.3%) followed by goats (20.2%) then cattle (14.1%). The ruminant species noted were in some cases kept in combination with others. For example, from Table 2, goat and sheep were kept together and constitute 13% of the ownership. Comparative to keeping the combination of goat and sheep, other combinations encountered were however, lower.

**Sabara plant parts browsed by different categories of livestock:** Sabara plant segments browsed by livestock, season of browsing and categories of livestock that browse is shown in Table 3. The respondents recognized vividly animals ingesting leaf or combination of leaf with stem, leaf with flower and a mixture of leaf, flower and stem (Table 3). Ingestion of leaf fraction constitutes 64.6% of the plant part which was followed by ingestion of combination of leaves and flowers fraction.

Browsing on Sabara was observed to be more prominent during the late dry season to the early wet season (87%). Browse of the plant was low during the late wet season to early dry season.

Respondents reported all categories of animals (75.8%) irrespective of their physiological stages browse on Sabara. Young animals were reported to browse on Sabara most (8.1%) followed by pregnant and lactating animals.

**Uses of sabara as perceived by the respondents:** Respondents interviewed recognized Sabara plant to have multiple uses both in livestock and humans (Table 4). Ninety six percent of the respondents know the plant but 72% of them know it as a milk enhancer in humans. Fifty four percent of the respondents attested to the use of

Table 4: Perception of respondents on the uses of Sabara

Uses of Sabara plant	Frequency	Percentage
Feed	53	53.54
Milk enhancer in animals	7	7.07
Feed and milk enhancer	6	6.06
Medicinal	10	10.10
Feed and medicine	22	22.22
Milk enhancer and medicine	1	1.01
<b>Sabara as milk enhancer in Humans</b>		
Awareness	72	72.53
Non-awareness	27	27.47
<b>Familiarity of respondents with the plant</b>		
Familiar	95	95.96
Non-familiar	4	4.04

Source: 2007 survey data

Sabara as a browse or feed for livestock. Others recognized it as a medicant or milk enhancer. There were however cases of its multiple uses.

## DISCUSSION

Awareness of sabara plant and its uses increases with increase in age up to between 48-58 years and decline thereafter. The decline could be as a result of disengagement in livestock husbandry with advance in age. The active age group obtained in this study, differed from age group of 31-40 years reported for respondents involved in livestock processing at Kano abattoir located in the same region of the present study (Muhammad *et al.*, 2007). The 48-58 years age group obtained in the present study could comprise of very energetic individuals involved in livestock rearing usually in their prime, which was in agreement with Sodiya (2008b). However, this suggested inherited knowledge could be associated with age. More males were encountered relative to females (Sodiya, 2005). Majority of the respondents encountered in the present study were married which was in agreement with report by Sodiya (2008a), who earlier observed that the Fulani culture discourages divorce. This tradition could explain why majority of the respondents were married. Also, the non divorce attitude could provide opportunity for transfer of oral information from one generation to the other.

Western education was low among the category of our respondents. Majority of the respondents acquired only Quranic education while those with tertiary form of education were the least which according to Sodiya (2008a) could result to low reception of innovations since western education is considered a key factor in shaping perception of individuals and widening of mental horizon.

The involvement of our respondents in crop-livestock production as obtained from the results of the present study revealed the possibility of development of integrated technology for both crop-livestock and livestock farmers. Similarly, duration of involvement of

respondents in livestock or crop-livestock production was within 1-20 years and declined thereafter which, suggests that testing of dairy improvement technology should focus respondents with production experiences of 1-20 years for possible meaningful impact.

Result obtained in the present study revealed that ownership of sheep by the respondents was higher. Muhammad (2008) attributed the presence of high number of small ruminants to little space requirement for housing, ease of handling and higher fecundity relative to cattle. Furthermore, combination of sheep and goat are complimentary in feeding habits. Smith (2006) reported that sheep grazes lower grasses while goats browses shrubs and trees. The livestock ownership structure which showed variation in acquisition from single species to combinations was typical of the Fulani production system (Otchere *et al.*, 1987).

Findings from the present study showed that leaf was the most ingested plant part. Lakpini (2002) reported that leaves are more nutritious than stem. This could explain why leaf was the most part of sabara ingested by the animals. Browsing on the plant was year-round. It was however, higher in the late dry season and early wet season. This finding was in agreement with report by Otchere and Nuru (1988) who reported that ruminant animals reared in the Sahel zone are primarily on native rangelands where browse woody vegetation contribute to their nutrition. Furthermore, in the sub-humid zone of Nigeria, it was reported that during the months of February to April, cattle spent about 12% of the day's grazing time on browsing (Bayer and Otchere, 1982). Several reports have demonstrated the superior nutritive value of browse plants and their acceptability (Agishi, 1984; Bibi-Farouk *et al.*, 2006). Their reports all indicated higher levels of phosphorus contents relative to native grasses. Literature report on the chemical composition of Sabara plant reveals it consists of 13.9% crude protein and 28.1% crude fibre (Le Houérou, 1980).

Amongst the categories of livestock reared, younger animals were observed to browse more. This was in agreement with Smith (2006) who reported younger animals, particularly goats eat more than older ones because they are growing. The observed higher consumption noted by pregnant then lactating animals perhaps was to enable them meet their requirements for foetal development and milk production.

A meager proportion of the respondents attested to its use as a milk enhancer in livestock but majority of the respondents certified it as a milk enhancer in humans. Data obtained showed inhabitants of the region are familiar with the plant and its being indigenous and abundant in the environment makes it easier to harness for incorporation into the ration of lactating animals.

## CONCLUSION

Male were the majority of the respondents encountered. This could imply males would be the major decision makers and should be target of testing improved technological innovations. There exist potential for introduction of crop-livestock integrated interventions. However, the low level of western education would be a major limitation to introduction and understanding of innovation. There is the need to encourage western education in the region. The result obtained in this study, revealed sabara plant is a perennial browse indigenous to the semi-arid environment. It is recommended therefore, that phyto-chemical analysis and bioassay with lactating animals be conducted to ascertain its implication in milk production and determine its level of inclusion in the ration of lactating animals. It is hoped that results of the present study stimulates further studies on the role of sabara in milk production in livestock and development of strategies for conservation of Sabara plant.

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