

Provided for non-commercial research and education use.

Not for reproduction, distribution or commercial use.



This article was published in an Sjournals journal. The attached copy is furnished to the author for non-commercial research and education use, including for instruction at the authors institution, sharing with colleagues and providing to institution administration.

Other uses, including reproduction and distribution, or selling or licensing copied, or posting to personal, institutional or third party websites are prohibited.

In most cases authors are permitted to post their version of the article (e.g. in Word or Text form) to their personal website or institutional repository. Authors requiring further information regarding Sjournals's archiving and manuscript policies encouraged to visit:

<http://www.sjournals.com>

© 2020 Sjournals Publishing Company

Contents lists available at Sjournals
Scientific Journal of Animal Science

Journal homepage: www.sjournals.com



Original article

Small holding farmers perception on supplementation and feeding sweet potato peels to ruminants in some selected local government areas of Kebbi State, Nigeria

Aishatu Aliyu Kwaido^{a,*}, Shehu Ahmad Maigandi^b, Eneh Chigozie Vitalis^a

^aDepartment of Animal Science, Kebbi State University of Science and Technology, Aliero, Kebbi State, Nigeria.

^bDepartment of Animal Science, Usmanu Danfodiyo University Sokoto, Sokoto State, Nigeria.

*Corresponding author: aakwaido1711@gmail.com

ARTICLE INFO

Article history,

Received 11 October 2020

Accepted 12 November 2020

Available online 19 November 2020

iThenticate screening 13 October 2020

English editing 11 November 2020

Quality control 18 November 2020

Keywords,

Feed

Ruminants

Small holding

Farmers' knowledge

ABSTRACT

The study was conducted to obtain information on farmers' perception on the utilization of sweet potato peels for livestock feeding. The data were generated by administering a total of 90 structured questionnaires. Results indicated that all the respondents (100%) were males and use sweet potato peel as supplementary feed for their animals. Furthermore, the majority of the farmers were having between 1-10 number of small ruminants (68.9%) feeding them mostly from their crop residues (73.3%) for fattening purposes (53.3%). All the farmers affirm that the peel is available all year round which is solely used for animal feed and usually costs between 42-52 Nigerian Naira per kg. In conclusion, sweet potato peel is a potential feed ingredient in livestock feeding and the involvement of women in crop/livestock production is still a challenge in sub-Saharan Africa since males are still dominating the industry. Thus, women need to be empowered with all the necessary support in the agricultural sector particularly in the study area where the current work was conducted.

© 2020 Sjournals. All rights reserved.

1. Introduction

Due to the competition between man, animal and industries for conventional feed materials in Nigeria, feed is now one of the major problem of intensive livestock production. According to Akinmutimi (2004), the prices of conventional sources of energy and protein in livestock ration have risen exorbitantly. Thus, necessitated the search for alternative feed materials that can meet the nutritional requirements of farm animals. Furthermore, these alternative feed resources should not be in high demand by humans and cheaper compared to the conventional types (Ahamefule, 2005). Therefore, the use of farm or agro byproducts such as cassava peels, sweet potato peels, etc. could provide solution to the current problem.

Small ruminants play a major role in many local economies and build important part of the global agricultural economy (Weaver, 2005). Ruminant animals provide many functions ranging from food, byproducts and income that are essential to human life in both developed and underdeveloped countries (Gatenby, 2002). In the traditional set up, small ruminants served as means of ready cash and a reserve against economic and agricultural production hardship (Hamito, 2008). About 50% of the sheep are found in third world countries where they contribute significantly to the economy of those countries (NRC, 2007; Kwaido and Nasiru, 2016).

Small ruminants usually thrives on low-quality feeds particularly fibrous vegetation which are not normally eaten by non-ruminant animals (pigs, poultry, etc.) and humans. Consequently, smallholding farmers do keep ruminants due to their ability of converting poor quality feeds into desirable products like manure, skin, wool, milk and meat (Kwaido and Nasiru, 2016).

Sweet potato is a sweet-tasting, tuberous root crop that is produced for cash or food. It is adapted well to wide ecological conditions in addition to drought-resistance, versatility and high yielding with a short maturity period between 3-6 months (Laurie et al., 2012).

Sweet potato ranks fourth in production and importance after cassava and yam, hence is regarded as a staple food in Nigeria (Ikwelle et al., 2003). The production level of sweet potato was 2.5 metric tons in the year 2004 (FAO, 2005) of which some fractional parts constitute the peels. The crop residue from sweet potato peels was projected to be about 4.72 metric tons as of the year 2000 (Tewe, 1997). The peels are good sources of quality plant carbohydrates.

Information on the utilization of sweet potato peels for feeding ruminants is very scarce. Major researches conducted on crop residues and agro-industrial by-products had been on sorghum, maize, millet and wheat by-products (Adegbola, 2002). Livestock farmers in Nigeria especially ruminants animals were using sweet potato peels as feed for their animals, but there is no documented information on the quantities used, mode of feeding (sole or in combination with other feeds), sources of the sweet potato peels, results on the use of sweet potato peels as feed etc. In view of this, the present study was designed to evaluate the perception of farmers at a smallholding level on the utilization of sweet potato peels in the diet of ruminant animals.

2. Materials and methods

2.1. Study location

The current work was conducted in some selected local governments areas of Kebbi State, Nigeria. Kebbi state is located between latitude 10° and 13°N and longitude 2°-6°E with a total population of 2,062, 226 (Males: 1,024,334; Females: 1,037,892) according to NPC (1991). The state has an overall density of about 50 persons/sq km which is boarded by Sokoto State, Niger State, and Benin republic with a total land area of 36,800km (Saidu et al., 2009). Kebbi State is divided into 35 districts, four emirate councils (Gwandu, Argungu, Yauri and Zuru) and 21 Local Government Areas (LGAs). The climate of the area is generally characterized by high temperatures (38°C to 42°C) usually between March and May and the area experiences Harmattan wind between late November to early February with temperatures as low as 23°C.

2.2. Sampling method

The selection of three Local Government Areas (LGAs) with three villages each was guided by purposive sampling method based on the availability of farmers who owned ruminant animals and produce sweet potatoes using farmers checklist. The Local Government and villages selected are; Aliero (Marmaro, Kashinzama and Tari),

Jega (Alelu, Gindi and Kimba) and Maiyama (Sambawa, Mayalo and Mungadi). Thirty respondents were chosen from each local government making a total of 90 respondents.

2.3. Data collection

The data was collected from two sources (primary and secondary data). Primary data was collected using a structured questionnaire that sought the following information; the number of animals, occupational status, educational status, availability of the target ingredients, sources of feed, processing method, combination and cost of the target ingredients. While the secondary source was obtained from books, journals, conference proceedings, the internet and past thesis and dissertation.

2.4. Statistical analysis

The data collected were analyzed using IBM SPSS (2015) and descriptive statistics were used to generate mean and percentage (Gomez and Gomez, 1984).

3. Results and discussion

3.1. Socio-economic characteristics of the farmers

Farmers' demographical characteristics indicated that all the respondents (100%) were male having 46%, 21%, 15% and 8% of qur'anic education, primary education, secondary and tertiary education, respectively as shown in Table 1.

Table 1
Socio-economic characteristics of the respondents.

Parameters	Frequency	Percentage
Sex		
Male	90	100
Female	0	0
Total	90	100
Educational status		
Quranic education	46	51.1
Primary education	21	23.3
Secondary education	15	16.7
Tertiary education	8	8.9
Total	90	100
Occupation		
Farming	48	53.3
Traditional healers	2	2.2
Cattle sheep and goat rearers	33	36.7
Fisher men	2	2.2
Craftsman	5	5.6
Total	90	100
Number of animals possessed		
1-10	62	68.9
10-20	23	25.6
20-30	5	5.5
Total	90	100
Source of feed		
Purchase	13	14.4
Crop residues	66	73.3
Purchase and crop residues	11	12.3
Total	90	100

Source: Field survey, 2017

The majority (53.3%) of the respondents are arable crop farmers while 36.7% are livestock farmers, 5.6% are craftsmen, 2.2% represent traditional healers and 2.2% fishermen. The result also indicates that the majority (68.9%) of the respondents had 1 to 10 numbers of animals, 25.6% had 11 to 10 while only 5.5% of the respondents had 20 to 30 animals. On the respondent's source of feed, the majority (73.3%) get their feed from crop residue and 14.4% from the market (purchase) while only 12.3% source their feed from both crop residues and purchase.

3.2. Perception of farmers on the utilization of sweet potato peel as feed for animal

Table 2 shows results on the farmers' perception of sources, quantity offered and mode of feeding of sweet potato peel as feed for their animals. About 41.1% use the potato peels as feed for sheep, 34.4% for goats and 24.5% for cattle. Regarding the respondents' source of sweet potato peel, 87.8% sourced theirs from the farm while 12.2% source it from the market around their villages.

On the quantity offered per day, the majority of the respondents (91.1%) offer 1 to 10kg per day, 5.6% of the respondents offer 11 to 20 kg per day and only 3.3% of the respondents offer 21 to 30 kg per day depending on the number of animals owned by the farmers. The major mode of feeding adopted by the respondents is in combination with other ingredients (90%) but only 10% feed the peel alone. Among the respondents, 24.4% use cowpea hay in combination with the peel, 10% use rice husk, 10% use rice bran, 20% use cowpea husk, 18.9% use wheat offal and 16.7% use maize husk in combination with the peel.

Table 2

Source and quantity of sweet potato peels, mode of feeding and type of animal offered.

Parameters	Frequency	Percentage%
Types of animals offered to		
Sheep	37	41.1
Goat	31	34.4
Cattle	22	24.5
Others	0	0
Total	90	100
Source of sweet potato peel		
Purchase	11	12.2
Crop residues	79	87.8
Total	90	100
Mode of feeding		
Alone	9	10
In combination with other ingredients	81	90
Total	90	100
Quantity offered per day (kg)		
1-10	82	91.1
11-20	5	5.6
21-30	3	3.3
Total	90	100
Potato peel combination with other feed sources		
Wheat offal	22	18.9
Rice husk	9	10
Rice bran	9	10
Cowpea husk	18	20
Cowpea hay	17	24.4
Maize husk	15	16.7
Total	90	100

Source: Field survey, 2017

Table 3 indicates the farmer's perception on the purpose of feeding and the availability of sweet potato peels. Results showed that 53.3% of the respondents use the sweet potato peels to fatten the animals, 15.5% for milk production and 31.2% for both fattening and milk production. All the respondents (100%) indicated that sweet potato peels are readily available for feeding livestock.

Moreover, results on the farmers' perception on the cost of sweet potato peel show that 46.7% buy the sweet potato peel at an average cost of ₦48.50 naira per kg while 53.3% of the respondents got it at a higher cost of ₦52.00 naira per kg.

Table 3

Farmers' perception on the purpose of feeding, availability, uses and cost of sweet potato peels.

Parameters	Frequency	Percentage (%)
Purpose of feeding		
Fattening	48	53.3
Milk production	14	15.5
Both	28	31.2
Total	90	100
Availability of sweet potato peel		
Available	90	100
Not available	0	0
Total	90	100
Season available for use		
Dry season	0	0
Rainy season	0	0
All season	90	100
Total	90	100
Other use		
Animal feed	90	100
Medicinal	0	0
Food	0	0
Total	90	100
Cost per kg(₦)*		
48:50	42	46.7
52:00	48	53.3
Total	90	100

Source; Field survey 2017. *1 USD= ₦345 (Nigerian Naira)

3.3. Socio-economic characteristics of the farmers

Males farmers have dominated the livestock production sector compared to the number of females and sometimes farming (crops and livestock production) is culturally considered a man's task (Aguilar et al., 2014). This trend is common in Sub-Saharan African, Cynthia et al. (2019) reported a similar scenario in South Africa and Gebre et al. (2019) in Ethiopia. Furthermore, women face gender-specific constraints related to socio-cultural factors that limit their ability to ensure production. The majority of the respondents engaged in farming as their main occupation with only Quranic education (51.1%) without western education. Our findings were consistent with the previous report of Cattle herd keepers biodata by Garba et al. (2012). It is generally known that crop production or small ruminants' production does not require a high level of western education. Furthermore, results indicated that the majority (68.9%) of the respondent having 1 to 10 number of animals is a trend that was reported by Maigandi (2001). Small ruminants have been reported to form an integral part of the socio-cultural life and farming system of Nigeria's peasantry (Ajala, 2004). The relatively small size of the animals as seen in the present study can be explained by the predominantly Hausa system whereby ownership is fragmented into a small number owned by members of the households (Shittu et al., 2008). On the respondent source of feed, it is observed that the majority of the respondents (73.3%) sourced their feed from the farm and 14.4% source their feed from the market

(purchase) while only 12.3% source their feed from both the farm and market. The quality and the timely availability of the feed have been reported to affect feed cost and livestock productivity (Adesehinwa et al., 2003). The majority of the respondents (41.1%) used the sweet potato peel to feed sheep only. This could be attributed to the fact that the peel is used for fattening and it well-known fact that farmers in the study area are engaged in fattening operations (Shittu et al., 2008). It could also be attributed to the fact that the peel is readily available in the market at a cheaper rate and no further processing is required as the peel is already processed. This reduces the labour incurred during processing, thus reduces the cost of the peel.

3.4. Farmers' perception on the utilization of sweet potato peels as feed for animals

From the results it could be observed that 91.1% of the respondents offer 1 to 10 kg per day, 5.6% of the respondents offer 11 to 20kg per day while the remaining 3.3% of the respondents offer 21 to 30 kg per day. The quantity offered is largely determined by the number of the animals reared by the respondents. The majority of the respondents are rearing 1-10 number of animals as seen in the results, this translates that 1kg of the peel is offered per animal. The relatively small size of the flock as seen in this study can be explained by the management system practiced in the study area which is predominantly extensive or semi-intensive (Shittu et al., 2008). Ninety percent (90%) of the respondents claimed that the feed is available throughout all the seasons fed the peel in combination with other feed ingredients such as cowpea hay and husk, wheat offal, rice bran and husk, etc. Among the ingredients, cowpea hay had the highest (24.4%) frequency of usage while rice husk and bran have the lowest (10%) which may probably be associated to the fact that rice is not widely cultivated in the study area. All the farmers used potato peel as animal feed. Charry et al. (1992) have reported that majority of household in Africa keeps small groups of animals alongside cropping and could be attributed to the fact that most of the respondents are involved in both crop and livestock production as a primary occupation. Thus, the fattening of small ruminants was the major reason for keeping animals alongside crop production. According to a Nigerian livestock resources survey reported that the household fattening of sheep for sale is among the major economic activity (Bourn et al., 1994).

4. Conclusion

In conclusion, sweet Potato Peels is a potential feed ingredient in livestock feeding and shall be fully harnessed as a potential supplementation source of feed. However, our findings have indicated that the involvement of women in agriculture is still a challenge since males are still dominating the industry. Thus, women need to be empowered in the agricultural sector particularly in the study area where the current work was conducted.

References

- Adegbola, T.A., 2002. Nutrient intake, digestibility and rumen metabolites in bull fed rice straw with or without supplement. *Nig. J. Anim. Prod.*, 29, 40-45.
- Adesehinwa, A.O.K., Okunola, J.O., Adewumi, M.K., 2004. Socio-economic characteristics of ruminant livestock farmers and their production constraints in some parts of South-western Nigeria. *Livest. Res. Rural Dev.*, 16(8).
- Aguiar, A., Carranza, E., Goldstein, M., Kilic, T., Oseni, G., 2014. Decomposition of gender differentials in agricultural productivity in Ethiopia. The World Bank, Africa Region, Poverty Reduction and Economic Management Unit, Policy Research Working Paper 6764.
- Ahamefule, F.O., 2005. Evaluation of pigeon pea-cassava peel based diets for goat production in South-Eastern Nigeria. Ph.D. Dissertation. Michael Okpara University of Agriculture, Umudike. Nigeria.
- Ajala, A.A., 2004. Intake and digestibility of potato peel-yeast slurry diet by West African Dwarf Goats. B.Sc. Project, Micheal Okpara University of Agriculture Umudike.
- Akinmutimi, A.H., 2004. Evaluation of sword bean (*Canavaliagladinata*) as an alternative feed resource for broiler chickens. Ph.D. Thesis Micheal Okpara University of Agriculture Umudike, 10-26.
- Bourn, D., Wint, W., Blench, R., Woolley, E., 1994. Nigerian livestock resources survey. *A Quarterly Journal on Animal Health, Production and Products*.

- Charry, J.M.H., Levif, J., 1992. Manual of sheep production in the humid tropics of Africa. C.A.B. International Netherlands. 1-8.
- Cynthia, L., Fabian, F., Busisiwe, G., 2019. Knowledge and perception of smallholding farmers on supplementation and feeding sweet potato vines to goats. *Pastoralism: Research, Policy and Practice*, 9(18), 1-6.
- FAO, 2005. Food Agricultural Organisation Bulletin, Rome Italy.
- Garba, S., Bello, A., Na-Allah, Y., Abdullahi, A.U., Jibir, M., Abdullahi, A.N., 2012. Livestock management practices: Utilization of veterinary services by cattle keepers in North-Western, Nigeria. *IRCAB J. Nat. Appl. Sci.*, 2(2), 12-19.
- Gatenby, R.M., 2002. Sheep. *The Tropical Agriculturalist*. 2nd Ed., Macmillan Publishers Ltd., CTA, Wageningen. 184p.
- Gebre, G.G., Isoda, H., Rahut, D.B. et al., 2019. Gender differences in agricultural productivity: evidence from maize farm households in southern Ethiopia. *GeoJournal*.
- Gomez, K.A., Gomez, A.A., 1984. Statistical procedures for agricultural research. Longman, Singapore, 680p.
- Hamito, D., 2008. Preface. In: *Sheep and Goat Production Handbook for Ethiopia*. USAID, 5p.
- IBM SPSS, 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.
- Ikwelle, M.C., Ezulike, T.O., Eke-Okoro, O.N., 2003. Contribution of root and tuber crops to the Nigerian economy. Proc. 8th Triennial Symposium of the International Society for Tropical Root Crops-African Branch (ISTRAC-AB) held at the International Institute of Tropical Agriculture, Ibadan, Nov 12-16. 13-18.
- Kwaido, A.A., Nasiru, A., 2016. Chemical composition of camel fore-stomach digesta (FSD) ensiled with urea and rice milling waste (RMW). *Int. J. Sci. Res. Publ.*, 6, 328-332.
- Laurie, S.M., Van Jaarsveld, P.J., Faber, M., Philpott, M.F., Labuschagne, M.T., 2012. Trans-b-Carotene, selected mineral content and potential nutritional contribution of 12 sweet potato varieties. *J. Food Compos. Anal.*, 27, 151-159.
- Maigandi, S.A., 2001. Quantification and utilization of fore-stomach digesta in the diet of growing and fattening sheep. Ph.D. Thesis, Usmanu Danfodiyo University Sokoto, Nigeria.
- NPC, 1991. National Population Commission. Census '91 Final Results, Kebbi State.
- NRC, 2007. National Research Council. Nutrient requirements of small ruminants. National Academy of Sciences, Washington, DC.
- Saidu, A.S., Bunza, M.D.A., Abubakar, U., Adamu, T., Ladan, M.J., Fana, S.A., 2009. A survey of opportunistic infections in HIV seropositive patients attending major hospitals of Kebbi State, Nigeria. *Bayero J. Pure Appl. Sci.*, 2(1), 70-74.
- Shittu, A., Chafe, U.M., Buhari, S.J., Junaidu, A.U., Magaji, A.A., Salihi, M.D., Jibril, A., 2008. An overview of mastitis in Sokoto red goat. *Sokoto J. Vet. Sci.*, 7(1), 65-70.
- Tewe, O.O., 1997. Sustainability and developments paradigms from Nigerians livestock industry. Inaugural Lecture, University of Ibadan Nigeria.
- Weaver, S., 2005. *Sheep: Small-scale sheep keeping for pleasure and profit*. 3 Burroughs Irvine, CA 92618: Hobby Farm Press, an imprint of Bow Tie Press, a division of Bow Tie Inc.

How to cite this article: Kwaido, A.A., Maigandi, S.A., Vitalis, E.C., 2020. Small holding farmers perception on supplementation and feeding sweet potato peels to ruminants in some selected local government areas of Kebbi State, Nigeria. *Scientific Journal of Animal Science*, 9(11), 684-690.

Submit your next manuscript to Sjournals Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in DOAJ, and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.sjournals.com

Sjournals
where the scientific revolution begins