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Research Article

Assessment of indigenous methods of shea butter processing among rural women in Borgu Local Government Area of Niger State, Nigeria

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Abstract

Indigenous food processing and preservation methods are on the verge of collapse, yet they proved promising and sustainable. The study assessed the indigenous methods of shea butter processing among rural women in the Borgu Local Government Area of Niger State, Nigeria. Specifically, it described the socioeconomic characteristics of respondents, examined the shea butter processing techniques used and identified the information sources of shea butter processors in the study area. A multistage sampling technique was used to select 100 respondents. Descriptive (such as frequency count, percentage, charts and tables) and inferential statistics (such as Pearson correlation and chi-square) were used to analyze the data. Findings showed the mean age of respondents was 45.61 ± 11.82, with mean years of experience of 20.39 ± 12.96, the majority (85%) were married and the major sources of information on indigenous shea butter processing came from family members and friends. At $p \leq 0.01$ there was a significant association between respondents' usage of indigenous methods and their marital status ($\chi^2 = 84.24$; $p \leq 0.01$), membership in cooperative society ($\chi^2 = 40.43$; $p \leq 0.01$), and community membership ($\chi^2 = 53.21$; $p \leq 0.01$). However, there was a significant relationship between respondents' usage of indigenous methods and household size (b = 0.290; $p \leq 0.05$), quantity produced (b = 0.616; $p \leq 0.10$) and annual income (b = -0.765; $p \leq 0.05$). It was concluded that indigenous methods of processing shea butter are widespread among respondents; knowledge is acquired through family and friends. Among others, the study recommends that extension agents be posted to rural areas to educate rural women and build on their indigenous knowledge of processing shea butter to introduce high-quality butter.

More Information

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Introduction

Shea butter is an oil extract from the kernel of the shea nut. The shea butter tree (Vitellaria) is native to the African continent and sub-Saharan Africa and belongs to the Sapotaceae family. The shea tree grows naturally in the southern regions of the Sahel and the northern regions of the Guinea zone. Global production thrives in the West African countries of Mali, Burkina Faso, Benin, Senegal, Cote D´Ivoire, Ghana, Namibia, and Nigeria. In Nigeria, the Hausas call it 'mankade', the Ibos Okwuma and the Yorubas Igi-emi [1]. Issahaku, et al. [2], stated that the Shea tree is valued for its nutritional value of cooking oil and fruit pulp. Bark, roots, and leaves are used in traditional medicines. The tree is naturally endowed with vitamins such as A, E, and F [3] and is widely used for domestic uses such as cooking and skin moisturizers and commercially as an active ingredient in cosmetic, pharmaceutical, and edible products (Alexander 2004).

From time immemorial women have traditionally played a significant role in the extraction of shea butter, right from the stage of collection of shea nuts to final processing into shea butter. Indigenous food processing and preservation techniques enable people, particularly women in rural areas, to survive under stressful conditions. This collective knowledge is imperative to the survival and future safety of local communities and of the indigenous population as they try to maintain their livelihoods under difficult environmental conditions (Parrotta and Agnoletti 2007).

All over the globe, rural women have elegant indigenous food processing and preservation techniques that are recognized to be more sustainable. Rural women are known

to possess indigenous cultural practices which support maintaining household food security, notably in terms of drought and famine as well as offering a reserve for expanded periods of financial hardship. Rural women in Borgu Local government and elsewhere exert indigenous approaches to food processing and preservation because they are perceived to be cheaper than modern techniques. Rural women generally use a diversity of simple and traditional food processing approaches to make a range of traditional food products including shea butter. This processing approaches aids in preventing the development of microorganism that causes food spoilage.

However, indigenous knowledge systems are on the brink of becoming extinct because of rapidly changing environments and fast-growing technologies on a large scale. Adesiji, et al. (2009), noted that many practices disappear only because of the interruption of foreign technologies or advancement concepts that promise short-term gains or outcomes to problems without being capable of sustaining them. Indeed, shea butter is mostly processed using indigenous methods by rural women in small villages and towns within the Borgu local government area of Niger State. It is against this background the study seeks answers to the following research questions;

1. What are the socioeconomic characteristics of respondents in the study area?
2. What are the indigenous methods of shea butter processing techniques used in the study area?
3. What is the level of usage of these methods in the study area?
4. What are the sources of indigenous knowledge used by respondents in the study area?

Materials and methods

The study was carried out in Borgu Local Government Area of Niger State, Nigeria. The study population consisted of rural women involved in shea butter processing. Borgu is an Emirate with its capital in New Bussa, Niger State, Nigeria. Borgu is situated between latitude $9^{0}53'$ Northeast. The Emirate was formed in 1954 when Bussa and Kaiama merged.

The LGA occupies a land area of 12,000-square-mile (31,000 square kilometers). Major towns include New Bussa, the capital, Wawa (here), Babbana, and Karabonde. The LGA is the nerve center of shea kernel and butter. Most importantly, it symbolizes a gateway for smuggling shea products out of Nigeria in an unethical way into the neighboring country of the Benin Republic. Borgu falls around plain and wooded savanna and is drained by several small streams that flow eastward to the Niger River (Encyclopedia Britannica, July 20, 2008). There is a distinct raining season from May to October with maximum rain in August and September with an average total accumulation of 7.3 mm. The dry season period of the year lasts for 4.5 months with an average total accumulation of 0.0 mm (NASA's MERRA-2 satellite-era reanalysis, 2019). The major crops grown are sorghum, rice, millet, cowpea, cassava, maize groundnut, and fishing farming

Sample and sampling techniques

The study sample was drawn from the rural communities in Borgu local government area. The local government is divided into two districts: the Babbana district and the Wawa district. A multistage sampling technique was used to select respondents. In the first stage, all the two districts were purposively selected because of the preponderance of shea butter processors. In the second stage, two rural communities were purposively selected to give a total of four rural communities. In the final stage, twenty-five rural women were purposively selected from each of the rural communities to give a total of 100 respondents. A validated interview schedule which was subjected to Cronbach's Alpha reliability test ($r = 0.78$) was used for data collection.

Data were collected on rural women's socio-economic characteristics. Age, educational level and years of shea butter processing experience were measured in years while income from shea butter was measured in naira and the quantity of shea butter produced was measured in kilograms. A list of indigenous methods of shea butter processing was presented to the respondents to tick as appropriate and was measured on a three-point Likert scale such as rarely (1 = point) sometimes (2 = points) and always (3 = points). The composite score was used to test the hypothesis and equal intervals were later used to categorize respondents' levels of usage of indigenous methods into high, moderate, and low usage. Sources of indigenous methods of shea butter processing were measured by asking the respondents to indicate their sources of indigenous knowledge of shea butter processing methods. A field survey for data collection was conducted between January to April 2019. Data were analyzed using descriptive statistics (such as frequency counts, percentages, and tables) and chi-square and multiple regression were used to test the hypothesis.

Results and discussion

The socioeconomic characteristics considered in the study include age, sex, marital status, income, the quantity of shea butter produced, household size and years of experience in shea butter processing.

The respondents' ages ranged from 25 to 60 years, with an average of 45 years (Table 1). However, the majority (47%) fell within the age bracket of 26 to 42 years, 34% within 43 to 59 years and 17% were above 60 years and only 2.0% of respondents were between 25 years. The Table further indicates that all the respondents were female (100%). Quite a majority of the respondents were married (85%) this finding is similar to that of Adesiji, et al. [1] who reported that a higher

percentage of shea butter processors are married, 8.0% were widows, 5.0% of the rural women were separated and only a few 2.0% were divorced. The respondents earned an average of ₦10707.00 per rural woman as shown in Figure 1 and an average of 13.19 kg of shea butter produced per rural woman as shown in Figure 2. On average respondents' household size were 7.73 people per family and 20.39 years of shea butter processing experience with 46.0% of respondents ranging between 11 to 26 years, 24.0% falling within 10 years, and only 22.0% having 27 to 42 years respectively. Middle age implies that rural women are old enough to make decisions on the use of indigenous methods of shea butter processing. Age is an important factor in agriculture, and vibrant farmers are perceived to be more productive than older ones [1]. The preponderance of married respondents in shea butter processing shows that they drive some support from family labor.

Table 1: Distribution of respondents according to their socioeconomic characteristics (*N* = 100)

Variables	Frequency	%	Mean	Std. deviation
Age			45.61	11.82
< 25	2.0	2		
26 - 42	47.0	47		
43 - 53	34.0	34		
> 60	17.0	17		
Sex				
Female	100	100		
Marital status				
Married	85.0	85		
Divorced	2.00	2		
Separated	5.0	5		
Widow	8.0	8		
Household size			7.73	5.17
< 5	37.00	37		
6 - 12	51.00	51		
13 - 20	8.00	8		
> 21	4.00	4		
Years of experience			20.39	12.96
< 10	24.0	24		
11 - 26	46.00	46		
27 - 42	22.00	22		

Source: Field survey, 2019

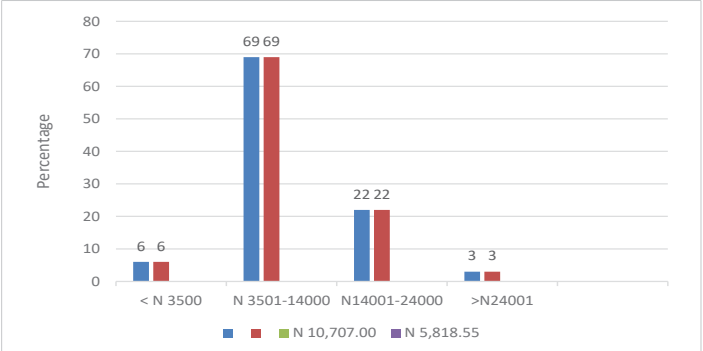

Figure 1: Distribution of respondents according to the quantity of shea butter produced.

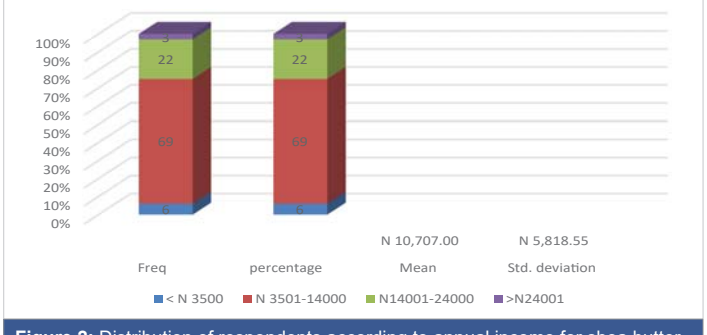

Figure 2: Distribution of respondents according to annual income for shea butter.

Distribution of respondents according to indigenous methods of shea butter processing

The processing methods in Table 2 are the ones found in practice in the study area. Nearly all (99.0%) respondents pick or harvest shea fruit themselves and only a few (1.0%) of them buy the fruits from the market. This shows that there was little division of labor. Hygiene practices in processing shea butter have been high as processors have a very high hygienic attitude with 99.0% washing or pitting the fruits before consumption and 100% selecting the good seeds from the bad or spoiled ones.

The data in Table 2 further showed that all respondents depulped, dried, and cracked the shea seed before grinding. Most respondents (100%) roast their shea butter kernels. All respondents ground their dried, crushed, and roasted shea kernels. Most respondents (98.0% and 100% respectively) said they had cooked their ground shea kernels and kneaded them into a dough.

Additionally, the results in Table 2 show that all respondents blended, filtered, and solidify their shea butter. Finally, a minority of respondents packaged their processed shea butter before marketing.

Distribution of respondents according to levels of the indigenous method used in shea butter processing (*N* = 100)

Data in Table 3 shows the distribution of the respondents

Table 2: Distribution of respondents according to indigenous methods used (*N* = 100).

Indigenous methods of shea butter processing	Always (4)	Sometimes (3)	Rarely (2)	Not all (1)
Picking or harvesting of fruits	13(13.0%)	86 (86.0%)	1(1.0%)	
Washing of fruits	25(25.0%)	74(74.0%)	1(1.0%)	
De-pulping	98(98.0%)	2(2.0%)		
Seed drying	98(98.0%)	2(2.0%)		
Seed selection	98(98.0%)	2(2.0%)		
Seed cracking/de-husking	100(100%)			
Winnowing	97(97.0%)	1(1.0%)	1(1.0%)	1(1.0%)
Roasting of kernels	98(98.0%)	2(2.0%)		
Milling of kernels	100(100%)			
Boiling of grounded kernels	100(100%)			
Kneading into dough	99(99.0%)	1(1.0%)		
Cold water mixing	100(100%)			
Filtration	100(100%)			
Solidification	100(100%)			
Packaging	2(2.0%)	2(2.0%)	10(10.0%)	86(86.0%)

Source: Field survey, 2019

Table 3: Distribution of respondents based on indigenous methods used (N = 100).

Indigenous score	Frequency	Percentage	Decision
≤ 17.3	1	1.0	Low
17.4 - 34.17	3	3.0	Moderate
34.18 - 52	96	96.0	High

Mean = 54.18; Source: Field survey, 2019

based on indigenous processing methods used. Nearly all (96.0%) of the respondents had a high level of indigenous methods of shea butter processing in the study area, while 3.0% had a moderate usage of indigenous methods and only a few (1.0%) had a low usage level of indigenous methods of shea butter processing. This illustrates that the respondents in the study area have a very high use of indigenous methods in shea butter processing and this may not be unconnected to the fact that people are conscious of the food they consumed.

Distribution of respondents according to their knowledge sources of indigenous methods

Data in Table 4 shows that all (100%) respondents indicated that indigenous methods knowledge of shea butter processing in the study area is derived from family members who share this knowledge from generation to generation from parents to children and friends whom they visit from time to time. The result further showed that shea butter processors attach more importance to information from their offspring as it is an important resource for improving their processing methods and productivity. This is in line with the findings of Grenier [4], indigenous knowledge practices are developed over the centuries, passed down through the generations, and are anchored in the peoples' culture. This implies that information from family members plays a crucial role in indigenous shea butter processing methods in the study area.

Hypothesis testing

$H0_1$: There is no significant relationship between respondents' usage of indigenous methods and their socio-economic characteristics.

Results in Table 5 show that two variables explained 2.5 percent (R^2 = 0.025) of the total variation in rural women's usage of indigenous methods of shea butter processing. In terms of percentage contribution, the contribution is less, but still, it is statistically significant. Regression analysis revealed the magnitude of change in the level of the usage of indigenous methods because of a change in the selected variables by one unit. The result of the regression coefficient (b) shows that household size (b = 0.290; $p \leq 0.05$), quantity produced (b = 0.616; $p \leq 0.10$), and annual income (b = -0.765; $p \leq 0.05$) were significant with the usage of indigenous methods by rural women. The results show that a unit change in the variable under consideration may cause a 2.5 percent increase in the usage of indigenous methods by rural women with a value of (R^2 = 0.025). This implies that any slight increase in household size, the quantity of shea butter produced, and income would affect the usage of indigenous methods in the study area. However, variables such as total modern methods, total knowledge, age, and years of experience in shea butter processing were not statistically significant, but these variables are important to the usage of indigenous methods by rural women. In addition, the analysis of variance for regression yields an F - value of 2.495, which is significant at a 0.05 level of significance.

Association between respondents' usage of indigenous methods and their socioeconomic characteristics

$H0_1$: There is no significant association between the respondents' usage of indigenous methods and some selected socio-economic characteristics.

The results in Table 6 showed that at $p \leq 0.01$, there was a significant association between marital status (χ^2 = 84.24), cooperative membership (χ^2 = 40.43), and community membership ((χ^2 = 53.21). However, there was no significant association between the occupation of respondents (χ^2 = 3.28) and the level of education of respondents (χ^2 = 6.65).

Conclusions and recommendations

The study assessed the indigenous methods of shea butter processing among rural women in the Borgu local

Table 4: Distribution of respondents according to their sources of indigenous methods.

S/n	Sources of knowledge	Frequency	Percentage
1	Family members	100	100.0
2	Visitors		
3	Extension bulletins		
4	Internet		
5	Local leaders		
6	Cooperative societies		
7	Non-governmental organizations		

Source: Field survey, 2019

Table 5: Results of multiple regression analysis show the relationship between respondents' usage of indigenous methods and their socio-economic characteristics.

Variables	Regression	Coefficient(b)	T=value	p - value	Decision
Total modern methods	-0.017	0.012	-0.092	0.927	NS
Total knowledge	0.115	0.082	0.816	0.417	NS
Age	-0.020	-0.252	-1.303	0.196	NS
Household Size	0.054	0.290	2.772	0.007**	S
Quantity Produced	0.072	0.616	1.775	0.079*	S
Annual income	0.000	-0.765	-2.204	0.030*	S
Years of experience	0.024	0.325	1.625	0.108	NS

**Significant at 0.05 level; *Significant at 0.01 level; R = 0.399; R^2 = 0.025; F = 2.495
Source: Field survey, 2019

Table 6: Chi-square analysis shows the association between respondents' use of indigenous methods and some selected socio-economic characteristics.

Variables	x^2	d.f	C	p - value	Decision
Marital status	84.20	6	0.67	0.01**	S
Occupation	3.28	2	0.17	0.19	NS
Level of education	6.65	16	0.25	0.97	NS
Cooperative membership	40.43	2	0.53	0.01**	S
Community Membership	53.21	2	0.58	0.01**	S

**Significant at 0.01 level; *Significant at 0.05 level;
Source: field survey, 2019

government area of Niger State, Nigeria. It was concluded that rural women in the study area use more indigenous methods of shea butter processing and it is recommended that much younger people be encouraged in the processing of shea butter using indigenous methods as it's a more promising and sustainable; information source of the respondents be strengthened for greater productivity; government and non-government organizations should assist rural women with financial grants for them to increase the quantity of shea butter being produced.

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