Rural Women Use of Improved Shea butter Processing Technologies in Ilorin East Local Government Area, Kwara State, Nigeria
https://dx.doi.org/10.4314/jae.v22i1.24S

Egbunonu C.M., **Ogunjimi S.I***, **Alabi O.O**
Department of Agricultural Economics and Extension, Federal University Oye-Ekiti, Nigeria
Email: chinwe.egbunonu@fuoye.edu.ng, Phone: +23480616187579
*Correspondence author's email: jimisunday@yahoo.co.uk/ sunday.ogunjimi@fuoye.edu.ng

Abstract

This paper assessed the usage of improved Shea butter processing technology among rural women in kwara State. Specifically, the study focused on the socio economic characteristics of rural women in the study area, their access to information about Shea butter processing technology, knowledge level of respondents on the usage of the improved processing technology which comprises of the grinder (crusher), corn mil, kneader, and bridge press and also constraints experienced by the respondents in the usage of the improved processing technology. Multistage sampling technique was used to select 120 respondents for the study. The results show that Shea butter processing is mostly carried out by married women and had primary school education. Processors hardly seek information to improve their activity. Result further revealed low knowledge on the use of improved processing technologies. Constraints faced by processors on the use of these improved technologies include high cost of equipment and inadequate technical know -how. This paper is optimistic that Shea butter has a lot of potentials but is still underutilized and should be vitalised by government and NGO as a way of alleviating poverty among rural women.

Key words: Processing technology, Shea butter, rural women

Introduction

Shea butter is an oil extract processed from the seed in the fruit of a Shea tree *Vitellaria Paradoxa*, an indigenous tree of sub-Saharan Africa that belongs to the family Sapotaceae. The Shea butter is found from Shea butter tree grown widely within the savanna forest belt of Nigeria (Alonge and Olaniyan,2007) . They grow naturally in the wild and its fruit are gathered by the local community mainly women. It takes about 20years for a Shea tree to reach maturity and 42 years old for full fruit production which has often discourage its planting in an organised plantation (Garba, Nwawe and Oisakede, 2011). Shea tree remains an economic tree with a lot of potentials ranging from medicinal, nutritional and cosmetic values. Shea butter is naturally rich in Vitamin A, E, and F (Okullo etal,2010). Shea butter is widely utilized for domestic purposes such as cooking, skin moisturizer and commercially as ingredient in cosmetic industries(Alander,2004). The bark, roots and leaves are used in traditional medicine in rural communities where they are found(Issahaku, Ramatu and Sarpong ,2010).

Shea butter is mostly processed manually by rural women in small villages in Nigeria (Ademola, Oyesola and Osewa, 2012).Oil is removed from the nut through wet extraction procedure. The outer pulp of the berries, the Shea fruit is eaten at harvest time or parboiled to remove the pulp. The nuts is removed by pounding and later roasted in a frying pot. The fried nuts are later pounded and ground in wooden mortars to a paste or milled using attrition mills. The milled Shea nut is now thoroughly stirred or mixed with water vigorously to break emulsion and separate the fat. By cooking the mixed paste, the oil floats to the surface and then skimmed off. Traditional mixing takes place in a large pot strong enough to withstand the applied force through trampling that causes mixing or stirring of the milled Shea nut. The traditional Shea butter extracting technique is time consuming and produces low quality oil.

In an effort to assist rural women who engage in Shea butter processing at micro level as a source livelihood diversification of the rural economy, the Federal Government of Nigeria on realising the potentials of Shea tree included it as one of the mandate crops of economic importance of Nigeria Institute for Oil Palm Research, this led to establishment of NIFOR Shea-nut house (Olife, Onwualu and Jolaoso, 2013). In 2002, Raw Material Research and Development Council (RMRDC) initiated a project to upgrade the traditional method of Shea butter processing. This aims at upgrading the processing techniques employed by the local processors in order to enhance production in terms of quality and quantity, develop, design and fabricate machineries to reduce drudgery, poor quality of butter and low profit margin.

The introduction of equipment can improve the traditional methods of production by reducing the efforts and time involved in processing of Shea butter and by increasing the yield. Instead of pounding by hand in a mortar, a hand mill can be used. Oil can be extracted using a mechanical or hydraulic press. Manually turned roasters can be used rather than a traditional pot. The introduction of hammer mill for crushing with mortar and pestle and adoption of disc mill to replace grinding stone in the milling of Shea nut. Designing of kneading machine to reduce the use of legs and hands by processors and use of decanting machine to replace manual scooping of oil((Fadilah, Seth and Seidu, 2013). Despite all these efforts and expected benefits, these improved processing technologies has not been fully utilised by rural women who engage in Shea butter processing in the study area. This initiative has resulted to insignificant improvement in the production of quality Shea butter. Therefore, this study was conducted to assess the knowledge level of improved processing technologies among rural women in the study area. The specific objectives were to:
i. describe Shea butter processors' socio-economic characteristics in the study area;
ii. assess the level of awareness of improved processing technologies introduced to Shea butter processors; and
iii. identify the constraints to Shea butter processing and production in the study area.

Hypotheses of the study
Based on the above stated objectives, the following hypotheses were formulated and tested
 i There is no significant relationship between farmer's knowledge level of improved Shea butter processing technologies and scio-economic characteristics.

ii There is no significant relationship between farmer's knowledge level of improved Shea butter processing technologies and awareness level.

Methodology

The study was carried out in Ilorin East, Kwara State, Nigeria because kwara State is one of the major areas in Nigeria where Shea tree occurs and thrives well being part of Guinea and Savannah zone. Furthermore, It is one of states that were introduced to the new improved Shea butter processing technology by the Raw Material Research Council in 2002 to boost Shea-butter production. The interview schedule was administered fifteen years after the introduction of improved shea butter processing technology to Shea butter processors by Raw material Research Development Council Abuja, Nigeria.
The target group for the study consisted of the members of the Shea butter Processors Association. Multistage sampling procedure was used to select the respondents. At the first stage, purposive sampling procedure was employed to select four communities from Ilorin East Local Government been an areas where processing of Shea butter is their source of livelihood. At the second stage, 30 processors were selected from each community using snow ball technique, making a total of 120 respondents for the study.

 Data were obtained through well-structured and validated interview schedule. Mean, percentages and frequencies and parson correlation co-efficient were used to analyzed the data.

Result and Discussion

The socio economic characteristics of respondents presented in Table 1 showed that 51.7% were between the ages of 31 and 60 years. This indicates that the majority of the Shea butter processors in south-western Nigeria were within a productive age range. Furthermore, the majority (59.2%) were female and were married. This finding is in line with Onikoyi, Tijani and Oluwasusi , (2014) who reported that majority of Shea butter processors were females. These demographics corroborate the findings of Gbolagade, Olaleye and Komolafe (2015), who reported that majority of the Shea-butter processors in Nigeria are females who are married and opined that this might be as a result of female farmer's responsibility in diversifying livelihood in the rural household. Thus, they engage more in Shea-butter processing to generate income which can be use to supply food and other basic needs to their house-hold. Analysis further shows that a majority (60.8%) of Shea butter processors realised annual income less than 50,000 Naira per annum which is less than the World Bank Standard of US$1 per day (US$365 per annum) for people in developing countries. This is an indication that majority of the respondent generated low income from the sale of Shea butter which might be as a result of small scale production and crude methods of production. If farmers expand their scope of production using improved technologies, income would likely increase.

The educational attainment of Shea butter processors plays an important role in their ability to acquire new technologies. The majority of the Shea-butter processors surveyed (70.8%) had at least primary school education, while only (29.2%) of the respondents had never been to school. This indicates that most farmers can read instructional manuals. High educational levels imply that shea butter processors could easily be trained in improved shea-butter processing technologies. This goes with similar findings that education stimulate the acceptance of improved technology since education facilitates farmers adoption of innovation (Natukunda, Kugonza and Kyarisiima, 2011; Onemolease, 2005).

Table 1 also reveals that almost more than half of the respondents (53.3%) engaged in shea butter processing as full time business while the other (46.7%) engaged in shea butter processing as part time business. This indicates that Shea butter processing is time consuming and laborious.

Table 1: Distribution of shea-butter processors by socio-economic characteristics

Socio-economic characteristics	Percentage (N=120)	Mean(STD)
Age		
Less than 30	35.8	
31-60	51.7	41.6(15.8)
61 above	12.5	
Martial status		
Single	31.7	
Married	59.2	
Widow	6.7	
Separated	2.5	
Primary occupation		
Sheabutter processing	53.3	
Farming	29.2	
Tailoring	5.0	
Trading	12.5	
Year of schooling		
Never	29.2	
1-6	42.5	5.2(2.9)
7-12	20.8	
13 and above	7.5	
Household size		
1-5	51.7	
6-10	40.0	5 3(3.4)
11 and above	8.3	
Income realized from sheabutter annually		
Less 50,000	60.8	
51,000-100,000	21.7	
Above 100,000	17.5	

Source: Field survey,2017

Usage of various stages involved in using the traditional method in shea butter processing

Table 2 shows the usage of various stages involved in using the traditional (indigenous) method in Shea butter processing by respondents. The findings revealed that all the Shea butter processors (100%)uses parboiling to soften the fruit and to ease fermentation,92.0% uses roasting by heating the Shea nut with fire while 87.5% uses pestle and mortar in breaking the Shea nut. Also almost all the respondent mixes Shea butter with water to allow oil to float. This result corresponded with the findings of Alonge et al (2007) that, most Shea butter processors still use their traditional method in processing Shea butter. This implies that there will be low production in terms of yield produced and quality.

Table 2: Usage of Various stages involved in using the traditional(indigenous) method in Shea butter processing

| *Stages of indigenous processing	Percentage (N=120)
Parboiling (to soften the fruit and to ease fermentation)	100
Eating the fruit to remove the flesh	87.5
Roasting(heating the Shea nut with fire)	90.0
Breaking the Shea nut with mortar and pestle	87.5
Grinding with stone or pestle into paste	72.5
Mixing paste with water to allow oil to float	100
Heating of the oil to remove water and impurities	89.1

*Multiple responses

Shea butter processors awareness of improved processing technology

Table 3 shows that the majority (80.0%) of the respondents had experienced the use of grinding machine in making Shea butter into paste and 60.0 % of the respondents indicated that they have seen roaster. On the level of awareness, Fig 1 depicts that 62.5% had low level awareness of improved processing technologies,21.5% had moderate and (16.0%) had high awareness. The findings indicate that Shea butter processors had low awareness on improved processing technology except in the use of grinding machine with high level of awareness.

Table 3: Awareness on improved processing technology (conventional methods) of shea butter

List of machine	Never heard it %	Heard %	Seen %	Experience the use %
Par boiler	38.3	17.5	40.0	0.0
Roaster	27.5	60.0	12.5	0.0
Grinding	0.0	0.0	20.0	80.0
Decanting Vessel	55.8	44.2	0.0	0.0

Source: Field survey 2017
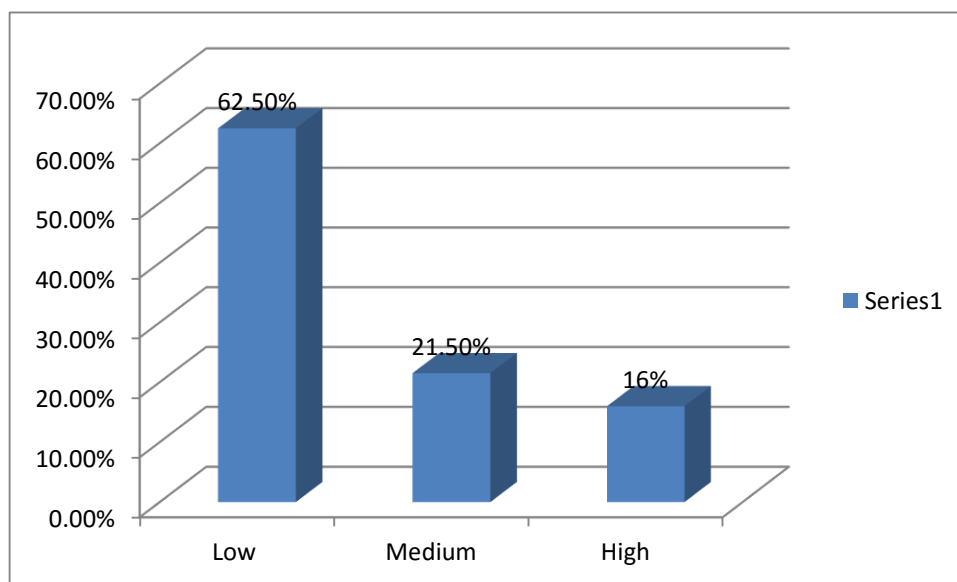
Fig 1: Bar chart of level of awareness of improved processing technologies

Knowledge level of Shea butter processor on usage of improved shea butter processing technologies

Results in Table 4 on Shea butter processors' level on knowledge of improved Shea butter processing technologies (Figure 2) indicated that almost all (91.60%) had low knowledge, while (5.30%) were moderately knowledgeable and only (3.10%) high knowledge in the usage of improved technologies. The lower the knowledge level, the lesser the skill and lower the productivity of Shea butter processors. Low and moderate knowledge levels will have a negative impact on the adoption of improved Shea butter processing technologies and will in turn lead to low productivity so processing technology that increase output of farmers will lead to increase in income(Garba and Sanni,2015)
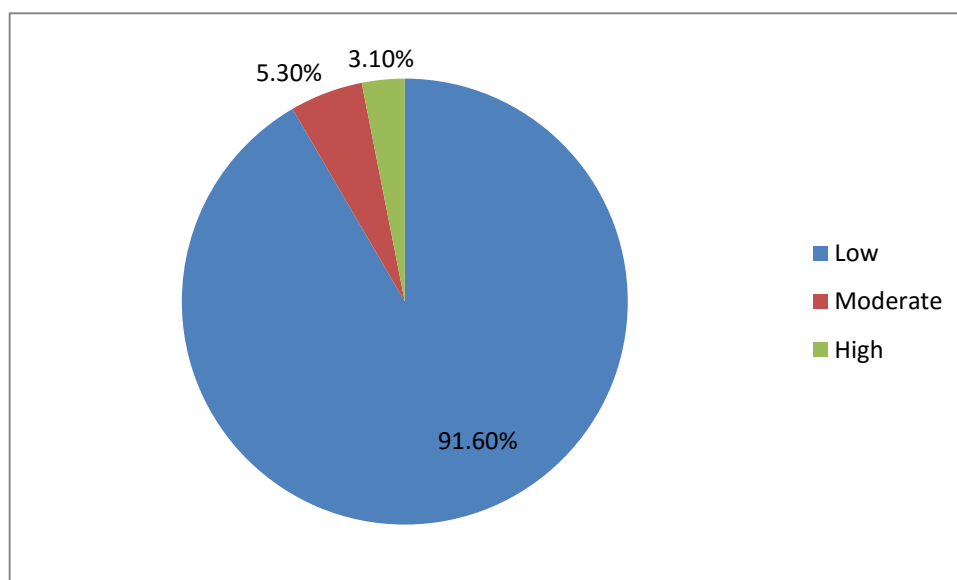

Fig 2: Knowledge level of usage of improved processing technologies

Usage of improved Shea butter processing technologies

Table 4 shows that the majority (93.2%) of the respondents always used grinding machine in processing Shea butter while majority were not using decanting vessel (100%), par boiler (96.7%) and roaster(93.3). The implication of the findings is that most of the processors were not using improved processing technologies which might be as a result of inadequate knowledge of how these technologies works. This findings is line with Ademola et al, 2012 findings in Oyo State when he asserted that limited processing equipments is a constraint that limit both quality and quantity of Shea butter available for the market in Nigeria.

Table 4: Usage of improved shea butter processing technologies

List of machine	Always used	Occasionally Used	Not used
Par boiler	0.0	3.3	96.7
Roaster	0.0	6.7	93.3
Grinding	93.2	6.8	0.0
Decanting Vessel	0.0	0.0	100

Source: Field survey 2017

Sources of information on improved processing technology of shea butter

 Table 5 shows that a majority of the respondents got information about improved Shea butter processing technology from other processors (90.0%), co-operative societies (60.0%) and Non-Governmental Organisation(NGO)(55.3%) respectively. However, below average of shea butter processors got information on improved shea butter processing from Agricultural Development Programme (ADP)(46.7%), Raw Material Development Research Council (RMDRC (45,0%), research institute(40.0%) . This implies that there is still much gap to fill in disseminating information on improved shea butter processing technologies if Shea butter is to realise its economic potential as one of the mandate crop of Nigerian Institute For Oil Palm Research(NIFOR).

Table 5 Sources of information on improved processing technology of shea butter

*Source of information	%
Raw Material Development Research Council (RMDRC)	45.0
Agricultural Development Programme (ADP)	46.7
Research institute	40.0
Mass media	44.2
NGO	55.3
Other processors	90.0
Co-operative society	60.0

*Multiple responses, **Source:** Field survey 2017

Constraints faced by respondents on the usage of the improved Shea butter processing technology

Table 6 shows the ranked mean scores of problems confronting shea butter processors in descending order of severity. High cost of machine with mean 3.80 was ranked highest, followed by inadequate credit facilities(M=3.20), inadequate knowledge on operational skill(M=3.02), high maintenance cost(M=2.63) followed by consumers 'preference(M=2.20) and inadequate extension contact(M=2.53). However, consumer's preference and unavailability of market (M=2.01) were ranked low. It could be interpreted that most of the shea butter processors surveyed encountered a lot of problems. The findings corroborated Onikoyi etal (2014) finding among Shea butter processors in Kwara State which identified constraints to shea butter processing to include inadequate transportation facilities, high cost of modern processing equipments, inadequate extension services, lack of water, lack of credit facilities and uncoordinated marketing systems for products.

Table 6: Constraints faced by respondents on the usage of the improved technology

Constraint faced by respondent	Mean	Rank
High cost of machine	3.80	1st
Inadequate credit facilities	3.20	2nd
Inadequate knowledge on operational skill	3.02	3rd
High maintenance cost	2.63	4th
Inadequate extension support	2.53	5th
Consumers' Preference	2.20	6th
Unavailability of market	2.01	7th

Grand mean= 2.51

Relationship Between farmers' knowledge of usage of processing technology and socio-economic characteristics

Table 7 shows the correlation coefficient, which establish at P <0.05 level of significant. Positive and significant relationship exist between farmers' knowledge of usage of processing technology and socio-economic characteristics such income(r=0.494) and year of schooling(r=0.189). However negative and significant relationship existed between farmers' knowledge of usage of processing technology and socio-economic characteristics such as age(r=-0.221) and household size r=-0.394). This implied that the higher the processor income and education the higher their level of knowledge on usage of processing technology. Meanwhile, the higher their age and household size, the lower their level of knowledge. Moreover, there exist a positive and significant relationship between farmers' knowledge of usage of processing technology and level of awareness(r=0.494), which implied that the higher the processors' awareness level of the technologies usage, the higher their knowledge level of usage

Table 7: Correlation of awareness level and socio-economic characteristics and level of knowledge of usage of processing technology.

Variables	R
Level of awareness	0.494**
Income	0.394**
Year of schooling	0.189**
Household size	-0.318*
Age	-0.221*

* P≤ 0.05 *

Conclusion and Recommendations

Shea butter processors in south-western Nigeria have inadequate knowledge of improved processing technology in shea butter production, resulting to low skill in most practices. The major problems confronting shea butter processors include high cost of machine, inadequate operational skill, maintenance cost and inadequate extension support. The result of correlation analysis shows that a unit increase in years of schooling, income, awareness are correlated with an increase in level of knowledge of improved processing technology.

The Nigerian government through its financial institution should provide loan with minimal interest charged so that farmers can purchase these machineries. Moreover, there should be a follow up visits by extension agents to ensure the desired results in shea butter processors knowledge and skills are achieved. Nigerian agricultural engineers should be empowered to combine shea butter indigenous knowledge with modern knowledge to devise appropriate adaptive technology. If these recommendations are put in place, an increase in shea-butter production may be achieved.

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