



## Cassava Processors utilization of Hygienic Practices in Imo State, Nigeria

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**Abstract:** Cassava is a staple food but its processing has constituted menace to the environment, this study assessed cassava processors utilization of hygienic practices. Data were collected using structured questionnaire from 120 cassava processors selected through multi sampling technique. Statistical tools used for analyzing the generated data were percentages, frequency, mean score and multiple regression analysis. The result showed that the average age of the cassava processors was 44.5 years, majority (58.3%) were married, dominated by female (61%) with average household size of 6 persons. Majority (40%) of them had primary education with 1.0ha average farm size and average processing experience of 8 years. The major hygienic practices identified were peeling (98.3%), washing (98.3%), pressing (93.3%), grating (85.0%), fermenting (81.7%) and drying (73.4%). Majority had a high knowledge of cassava processing hygienic practices and utilized them during processing. The major constraints in utilization of hygienic practices were identified as lack of disposal facility (92.5%), lack of finance for use to purchase modern equipment (88.3%), inadequate access to clean water (82.5%). The study showed that age; years of processing experience, farm size, access to credit extension contact and income were statistically significant at 5% probability level with utilization of hygienic practices. This study concludes that cassava processors in the study had high knowledge of environmental hygienic practices and utilized them but had constraints in access to adequate disposal facility. Therefore, the research recommends that extension agents should sensitize and do more enlightening campaign in cassava processing hygienic practices which will make the environmental friendly expose cassava processors to modern processing technology to make processing easier.

**Keywords:** Cassava, Processor, Knowledge Level, Utilization, Hygienic Practices,

### 1.0 INTRODUCTION

Cassava *manihot esculenta crantz* is a staple crop and a primary source of dietary food which also provides energy to so many people that are living in West and Central Africa (Echebiri and Edaba, 2012). The leaves can be consumed while tender as vegetables after being boiled and the roots are utilized for direct human consumption and either for food or non-food product. The cassava roots are processed into fufu, garri, starch, flour and tapioca for consumption. To enhance the quality of cassava roots, there is need to reduce the cyanide content to avoid food poisoning upon consumption thereby maintaining the quality of food production. However, despite the importance of cassava, the processing of cassava had contributed problem to the environment. Processing of Cassava has been known to contribute significantly to

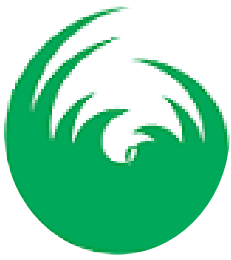
environmental pollution. Ranging from the improper disposal of the cassava peels to the cyanide water coming out from the cassava processing to *gari* and *fufu* which hampered human health. Ume (2020) identified cassava sievates as main wastes of cassava processing in Nigeria, the sievates are product from fufu and garri processing. These peels are regarded as wastes discarded and allowed to rot. Products of fermentation of cassava peels from such heaps includes foul odour, poisonous and polluted air which inhaled by man and animals may result into infections and diseases that take a long time to manifest, in the same vein, vegetation and soil around the heaps of cassava peels are rendered unproductive and devastated due to biological and chemical reactions taking place between the continuously fermenting peels, soil and surrounding vegetation (Nweke, 2008). Since these peels

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could make up to 10 percent of the weight of the roots, they constitute an important potential resource if properly harnessed biotechnologically (Obadina, 2008). Processing of cassava into garri and fufu and garri always produces large amounts of liquid effluent high in inorganic contents and if not properly disposed will produce strong odours which could hamper the environment.

Environmental hygiene practices should be observed e.g disposal and burning of cassava peels far from the processing centre to avoid soil pollution, channeling of the effluent water into septic tanks to avoid land pollution and also sweeping and cleaning of the processing centers (Shackelford, 2018). Solid wastes from cassava processing could be used in the farm as soil conditioners and in the farm as soil conditioners and in improving soil fertility. Use of land filling to dispose solid wastes is encouraged but such land used for this purpose should not be closed to water bodies to avoid ultimate pollution (Nweke, 2008). Protective devices like mouth and nose masks should be used while operating the generator plant to avoid pollution resulting to respiratory problems (Ume, 2018). Peels can also be dried and burnt especially in large cassava process industries (Ofuya and Obilor, 2009). These will improve the quality and yield of cassava and therefore enhance sustainability which could be important for food security in Africa, where the human population is expected to double by 2050 (United Nation, 2017). Increasing production of food and reducing environmental impacts have led to calls for the “sustainable intensification” or “ecological intensification” of food production through the use of “good agricultural practices” (Pretty et al, 2011). It is against these backdrops that this study therefore analyzed the following objectives: to describe the socio-economic characteristics of cassava processors; ascertain different forms of cassava processing; determine the knowledge level of the respondent on the hygienic practices; determine processors utilization level of hygienic practices and identify the constraints to cassava processors in the utilization of hygienic practices.

## 2.0 METHODOLOGY

The study was carried out in Imo State, Nigeria. Imo State is situated in the South-East geopolitical zone of Nigeria. The State is bordered by Abia State on the East and

Northeast, Anambra State to the North and Rivers State to the South. Imo State comprises of three agricultural zones, namely Owerri zone, Orlu zone and Okigwe zone made up of 27 Local Government Areas. The total land area of the State is 5,530 Km<sup>2</sup> with an estimated population of about 4.8 million people and an annual growth rate of 3.35 percent (National Population Commission, 2010).

The sample was drawn from the three Agricultural zones (Okigwe, Orlu and Owerri). The study randomly selected two Local Government Areas (LGAs) from each zone while 2 communities were randomly selected from the selected LGAs. Lastly, purposive sampling procedure was used in selection of 10 cassava processors in the study area to give a total sample size of one hundred and twenty (120) cassava processors. Primary data were collected with the aid of structured questionnaire. The objectives were analyzed with frequency distribution, percentages, means and multiple regression. In addition, a 4-point Likert scale type rating was used to obtain data in determining the level of knowledge of the respondent on the hygienic practices and determining the level of utilization of hygiene practices. The mean scores were obtained by adding up the weighted values and dividing by the number of scales. Then, divided by the number of scales to obtain the discriminating index e.g  $(4+3+2+1)/4 = 2.50$  - cut-off point.

## 3.0 RESULTS AND DISCUSSION

### 3.1 Socio-economic characteristics of cassava processors

The result in Table 1 reveals that majority (61.6%) of the cassava processors were females. This indicates that mostly females are involved in processing of cassava compared to male cassava farmers. Ajanaku *et al* (2021) found females as dominant sex in the production, processing and utilization of agricultural food products. Result also shows that the cassava processors average age was 44.5 years indicating higher proportion of middle aged members among the respondents. Also, majority (58.3%) of the respondents were married which means they could get support from their spouses with the mean household size of 6 persons processors in the area had small household size. The entire respondent had some formal education with majority (40%) with primary education. The mean



years of their processing experience was 8 years, this implies that cassava processor had experienced in cassava processing, this is enough to help their understanding of the need to observe hygiene during cassava processing. Average farm size was 1.0 hectare. The result affirms that Imo State Ministry of Environment (2011) classified rural households in the study areas as being largely small scale farmers who own and cultivate less than 5 plot of farmland. It is also revealed that majority (76.6%) of the respondents did not have access to credit. Federal Ministry of

Agriculture & Rural Development (FMARD, 2011) stated that credit facilities for rural household activities is increasingly becoming one of those farfetched dreams of genuine rural households who need it to boost their production. The majority (70%) of the rural households had no contact with extension agents. Agbamu (2011) corroborates this result when he stated that the visit to rural households by extension agents have become abysmally poor thereby creating more gaps between what research promises and what obtains at the end of the day.

**Table 1: Socio-economic characteristics of cassava processors**

Socio-economic characteristics	Frequency	Percentage	Mean/ Mode
<b>Sex</b>			
Male	46	38.3	
Female	74	61.7	
<b>Age</b>			
21-30	22	18.3	
31-40	22	18.3	
41-50	42	35.0	44.5 years
51-60	34	28.3	
60-70	3	2.5	
<b>Marital status</b>			
Married	70	58.3	
Single	16	13.3	
Divorced	2	1.6	
Widowed	32	26.7	
<b>Educational level</b>			
Primary Education	48	40.0	
Secondary Education	36	30.0	
Tertiary Education	36	30.0	
<b>Household size</b>			
1-5	48	40.0	
6-10	72	60.0	6 persons
11 and above	3	2.5	
<b>Farm size</b>			
0.1 - 1.0	90	75.0	
1.1 – 2.0	12	10.0	1.0hactare
2.1 – 3.0	18	15.0	
0.1 - 1.0	90	75.0	



**Processing experience (years)**

1-5	42	35.0	13years
6-10	58	48.3	
11-15	16	13.3	
16-20	2	1.6	
21-25	2	1.6	

**Access to credit**

Yes	28	23.3
No	92	76.6

**Extension contact**

No contact at all	84	70.0
Once	30	25.0
Twice	6	5.0

N = 120; Source: Field Survey Data, 2021.

**3.2 Cassava Hygienic Practices Engaged in by Cassava Processors.**

The Table 2 result shows that the respondents engaged in various hygienic practices like peeling (98.3%), washing (98.3%), pressing (93.3%), grating (85.0%), fermenting (81.7%), drying (73.4%), soaking (63.4%). These show

that the most important cassava processing were peeling, washing, pressing, grating fermenting, these were practiced in order to ensure good food quality. This result is in line with findings of Ume, 2020; Adeoye, 2019 that to get quality cassava products, these practices must be ensured.

**Table 2: Distribution of Cassava hygienic practices engaged in by cassava processors.**

Cassava processing activities	Frequency	Percentage (%)
a) Peeling	118	93.3
b) Washing	118	98.3
c) Slicing	66	55.0
d) Boiling	32	26.7
e) Steaming	4	3.3
f) Grating	102	85.0
g) Soaking	76	63.4
h) Fermenting	98	81.7
i) Pounding	48	40.0
j) Roasting	54	45.0
k) Pressing	112	93.3
l) Drying	88	73.4
m) Milling	68	56.7

Source: Field Survey Data, 2021

**3.3 Level of Knowledge on Hygienic Practices of Cassava Processors**

Table 3 shows that the cassava processors in the study area had very good knowledge of hygienic practices of cassava

processing such as selection of fresh and mature cassava roots ( $\bar{x} = 3.83$ ), products should be packed or stored after processing in a neat, cool and dry place and in polythene bags ( $\bar{x} = 3.75$ ), adequate washing of cassava tubers to



remove sand and dirt before grating ( $\bar{x} = 3.72$ ), cyanide substance in cassava contains a poisonous substance called cyanide ( $\bar{x} = 3.67$ ), drying cassava mesh in a raised platform ( $\bar{x} = 3.67$ ), fermenting mash for about 3to 5 days ( $\bar{x} = 3.58$ ), dried in a raised platform ( $\bar{x} = 3.57$ ), press water out from the cassava mash ( $\bar{x} = 3.53$ ), disposal of cassava peels and burnt to prevent environmental pollution outside the processing center ( $\bar{x} = 3.52$ ), processing the cassava

roots after 10-12 months of planting ( $\bar{x} = 3.50$ ), prevention of pollution by channeling liquid effluent into septic tanks ( $\bar{x} = 3.48$ ), peeling of edible cassava leads to loss of edible tissue ( $\bar{x} = 3.42$ ), This result suggests that the cassava processors have a good knowledge of environmental hygienic practices during cassava processing. This is in line with (Adeoye *et al*, 2019) that cassava processors have in depth knowledge in cassava hygienic practices.

**Table 3 Knowledge level on hygienic practices of Cassava processors**

S/N	Hygienic practices Cassava processing	Mean
1	Selection of fresh and mature Cassava roots	3.83
2	Peeling of edible Cassava leads to loss of edible tissue	3.42
3	Adequate washing of cassava tubers to remove sand and dirt before grating	3.72
4	Processing the cassava roots after 10-12 months of planting	3.50
5	Cassava contains a poisonous substance called cyanide	3.67
6	Press water out from the cassava mash	3.53
7	prevention of pollution by channeling liquid effluent into septic tanks	3.48
8	Drying cassava mesh in a raised platform	3.57
9	Improperly processed cassava can be hazardous	3.67
10	Wearing hand gloves while washing to prevent piercing of tubers	3.41
11	Use of protective eye glasses and nose masks to prevent bad odour	3.27
12	Using a wooden sieve to separate a fibrous material	3.28
13	Disposal of cassava peels and burnt to prevent environmental pollution outside the processing center	3.52
14	Products should be packed or stored after processing in a neat, cool and dry place and in polythene bags	3.75
15	Fermenting mash for about 3to 5 days	3.58

**Source:** Field survey data, 2021; **Cut off point  $\bar{x} \geq 2.50$  Accepted**

### 3.4 Level of Utilization of Hygienic Practices among Cassava Processors

Cassava processors made use of hygienic practices cassava processing as revealed in Table 4. The processor agreed that they highly made use of raised platform for drying of my cassava mash ( $\bar{x} = 3.40$ ), I dispose cassava peels far from the processing centre ( $\bar{x} = 3.52$ ), I wash my cassava tubers after peeling to remove dirt and sand ( $\bar{x} = 3.75$ ), I make use of gloves during processing ( $\bar{x} = 2.57$ ), I am adequately immunized against contagious infection associated with processing activities ( $\bar{x} = 3.17$ ), and I store my products in a neat place after processing ( $\bar{x} = 3.77$ ). This shows that cassava processors in the study area were aware of the knowledge of proper cassava handling

practices and processors highly utilized hygienic practices of cassava processing. This result is in line with the study carried out by Ackah *et al* (2011) and Ume (2020) that cassava farmers usually wash their cassava after peeling, washing their knives and dispose cassava peels away from the processing centre. However, despite the farmers knowledge of hygienic practices of cassava processing, some hygienic practices were not highly utilized by the processors such use of specialized ventilated processing center ( $\bar{x} = 2.42$ ), I channel liquid effluent into a septic pit ( $\bar{x} = 2.48$ ), use protective overall during processing ( $\bar{x} = 2.23$ ), usage of protective eye glasses and nose masks ( $\bar{x} = 2.30$ ).

**Table 4: Distribution of level of utilization of Hygienic practices among Cassava processors**



S/N	Hygienic practices Cassava processing	Mean
1	I make use of protective overall during processing	2.23
2	I make use of raised platform for drying of my Cassava mash	3.40
3	I can make use of specialized ventilated processing center	2.42
4	I channel liquid effluent into a septic pit	2.48
5	I dispose cassava peels far from the processing centre	3.52
6	I wash my cassava tubers after peeling to remove dirt and sand	3.75
7	I make use of gloves during processing	2.57
8	I use protective eye glasses and nose masks	2.30
9	I am adequately immunized against contagious infection associated with processing activities	3.17
10	I store my products in a neat place after processing	3.77

Source: Field survey data; 2021; Cut off point  $\bar{x} \geq 2.50$  Accepted

### 3.5 Constraints of Cassava Processors in the Utilization of Hygienic Practices

The result in Table 5 shows that cassava processors were constrained in the utilization of hygienic practices. Majority of the processors identified constraints as lack of disposal facility (92.5%), this happens due to shortage of land and no adequate place to dispose the waste from the cassava. Inadequate finance for use to purchase modern equipment (88.3%), inadequate access to clean water (82.5%), inadequate institutional support services by extension workers (76.7%), skilled labour not readily available (66.7%) and difficulty on some of the practices

(63.3%). However, constraints as processing activity is time consuming (46.7%) and old age (39.2%) were seen as less constraints by the cassava processors. Awor, (2008) observed that “the unfavourable disposition by the respondents about cassava processing hygienic practices is adduced to the views of the majority who considered the hygienic practices to be a difficult task that would be associated with the cumbersome nature and drudgery involved in cassava processing”. If some of these obstacle could be solved, the cassava processors will improve on their hygienic practices that will favour the environment

**Table 5: Distribution of constraints of cassava processors in the utilization of hygienic practices**

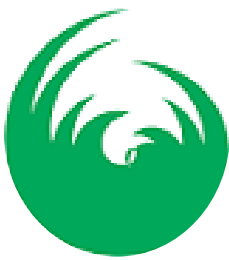
S/N	Constraints	Frequency	Percentage
1	Processing activity is time consuming	56	46.7
2	Difficulty on some of the practices	76	63.3
3	Inadequate access to clean water	99	82.5
4	Inadequate finance for use to purchase modern equipment	106	88.3
5	Inadequate of institutional support services by extension workers	92	76.7
6	Lack of disposal facility	111	92.5
7	Skilled labour not readily available	80	66.7
8	Old age	47	39.2

Source: Field survey data, 2021

### 3.6 Influence of socio-economic characteristics of cassava processor on utilization of hygienic practices

From the Table 6, the R squared value is 0.506; showing that 50.6 percent of the change that occurred in the dependent variable can be explained by the explanatory variables. This also shows that the model produces a good fit for the data. Age, years of processing experience, farm

size, access to credit extension contact and income were statistically significant at five percent. However, sex, marital status, household size and education were not statistically significant. However, the negative beta coefficient of age implies that farmers’ utilization of hygienic practices decreases with increase in age. This is expected because processing of cassava decreases as they



approach old age because of loss of agility and strength. The positive beta coefficient of years of experience in cassava processing is also expected as increase cassava processors utilization of hygienic practices of cassava processing. Increase in farm size also increases utilization of hygienic cassava processing. Access to credit also increases with increase in utilization of hygienic practices, because the more access to credit the greater the cassava processors will be able to utilize hygienic practices, with credit they can get modern equipment in cassava

processing which will increase their utilization. The positive beta coefficient of extension visit/contact increases the utilization of hygienic practices of cassava processing. This is expected because the more contact cassava processors have with extension agents the more they learn more about good hygienic practices and when utilize will bring about good quality of cassava product and also make the environment friendly. Also, the increase in income of cassava processors will increase their utilization of hygienic practices of cassava processing.

**Table 6: Multiple regression showing the influence of socio-economic characteristics of cassava processors on the farm income of farmers**

Explanatory Variables	Coefficients	Std. Error	t	Sig.
(Constant)	9.774	2.520	3.878	.000
Age	-.174	.040	-4.393	.000
Sex	.556	.597	.931	.354
Marital Status	-.070	.323	-.216	.829
Household Size	.307	.231	1.331	.186
Education Level	.113	.064	1.752	.083
Years Of Experience	.342	.105	3.240	.002
Farm Size	.745	.173	4.302	.000
Access To Credit	2.709	.622	4.358	.000
Extension contact	2.113	.813	2.598	.011
Income	1.803	.442	4.080	.000

**R= 0.711; R<sup>2</sup>=0.506; F-ratio = 11.152; p<0.05**

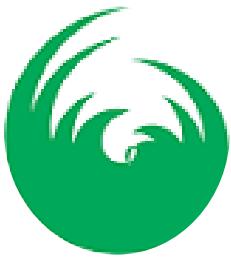
#### 4.0 CONCLUSION AND RECOMMENDATION

The study reveals that the cassava processors were mostly married women who were mostly within their productive age and maintaining a modest household size. The cassava processors were experienced in cassava processing with small farm size and had no access to credit. This means that cassava processors were knowledgeable of good environmental hygienic practices in cassava processing. However, processor major constraints to utilization of hygienic practices were inadequate finance, inadequate support from the extension services and lack of disposal facility. Based on the findings of this study, the study therefore recommends that extension agents should

intensify their training on environmental hygienic practices on cassava; modern processing technology should be provided for the processors to ensure processing is easy and less time consuming; also, there is more need of sensitization and enlightenment campaign in cassava processing hygienic practices which will make the environmental friendly.

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