



Farmers' Knowledge of uses of Various Parts of *Hibiscus Sabdariffa* (Roselle) and the Processes of Preparing *Sobo* Drink in Aniocha Local Government Area of Delta State, Nigeria

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ABSTRACT

Hibiscus sabdariffa L. which belong to the family of Malvaceae is cultivated for its leaves, seeds, calyces and roots because every part of the plant is useful. The study assessed farmers' knowledge of uses of various parts of *hibiscus sabdariffa* (Roselle) and the processes of preparing *sobo* drink in Amiocha Local Government Area of Delta State, Nigeria. Multistage sampling procedure was employed to select a sample of 140 farm families who responded to a 22-item interview schedule that was used for data collection. Relevant data were analyzed using descriptive statistics such as mean, percentage, pooled mean and ranking. Among others, it was found that majority of the respondents have knowledge of only four (4) out of 27 listed uses of various parts of *Hibiscus Sabdariffa*. For example, about 92.1% and 68.6% of respondents have knowledge that the leaves are used as vegetables in soup and in food manufacturing respectively. Between 62.9% and 92.1% of respondents are ignorant of the over 23 other uses of the leaves, calyx, seed, juice and roots highlighted in this study. Majority of respondents are aware of only 3 health benefits of *sobo* drink while they are ignorant of its several other health benefits. Only about 27.1% of sampled farm families have adequate knowledge of materials used and processes of preparation of *sobo* drink while as large as 72.9% are ignorant of its preparation processes. It was recommended that appropriate extension programmes and activities be planned and implemented with a view to bridging the wide gap in farmers' knowledge of the numerous medicinal, health, economic and other uses of various parts of *Hibiscus sabdariffa*. For example, the Women In Agriculture should undertake massive awareness and training campaign to farm families on uses of the various parts of the plant, processes for preparing *sobo* drink and information on the other health benefits of utilizing this cheap source of vitamin and minerals salts.

Keywords: Farmers' knowledge, *hibiscus sabdariffa*, Roselle, preparation, *sobo* drink

1. INTRODUCTION

According to Akor (2014), agriculture sector is particularly important in terms of its employment generation and its contribution to Nigeria's Gross Domestic Product (GDP). Since 1999, agriculture's share of GDP has risen from 30% in 1981 to about 36% in 2000 and 42% in 2007. However, achievement of Nigerian government's vision 2020 and the "Transformation Agenda" envisioning a transformation in agriculture that expected to bring about food security and sustainable development appears to be elusive. First of all, large percentage of Nigeria's farmers are illiterates, lives in rural areas and practice subsistence agriculture as against mechanized agriculture that has the potentials of fast-forwarding the processes of agricultural transformation. Thus, human labour is an indispensable factor of production in agriculture in Nigeria as observed by Rahji, (2005). The implication is that one cannot extricate agriculture productivity and labour supply from the one who produces it and the person's health status. Consequently, the health status of the farmers would, to a large extent, determine the output of labour supply and agricultural productivity (Ajani and

Vgwu, 2008). Several studies have noted that most farm families are not in close proximity to primary health care facilities (Olatunji, Etuk and Adesope, 2012; Olatunji and Juwe, 2013 and Olowogbon *et al*, 2013).

Among the six essential food nutrients that humans require for healthy growth and development, vitamins and minerals are indispensable. Vitamins and minerals salts help to maintain body tissues. They help the bones and teeth grow strong and healthy while protecting the body from diseases by fighting disease germs in the body (Oyegbeda, 2008). As noted by Olatunji and Juwe (2013), deficiency of vitamins A, C, and D predisposes humans to night blindness, scurvy, abnormal bone growth and the like. These ill-health conditions are capable of incapacitating farmers and reduce their productivity. One good thing about Nigeria is that the country is endowed with large human and material resources but one of the bone to development is her inability to effectively harness these resources to the benefit of the citizenry. For example, Olatunji, Agumagu and Adesope (2011) found that about 26.3% of their study sample in Abia State were not aware of Soya bean products. Those who



claimed awareness were utilizing soyabean products at the rate of once-a-week dosage. This rate was considered grossly inadequate to meet protein calories requirements of farmers, infants, children, pregnant women and lactating mothers. Olatunji, Agumaju and Adesope (2011) reiterated the views of the World's Healthiest Foods (WHF) (2004) and Fabiyi (2007) that the rate of morbidity and mortality are on the increase in Nigeria due, partly to inadequate protein calories consumption by most farm families. In another study, Olatunji, Etuk and Adesope (2012) found that some farmers who discontinued utilization of Soya bean products did so because of ignorance of the health benefits of utilizing Soya bean products. Others discontinued for lack of either knowledge of Soya bean products preparation or lack of time to do so. In a related study, Olatunji and Juwe (2014) found that although 91.4% of their study sample were aware of *sobo* drink, more than 29% of the respondents have not been utilizing *sobo* drink at all. Again, most of the respondents do not know more than three (3) benefits of utilizing *sobo* drink. The implication is that about one-third of farm families are likely to remain susceptible to vitamin and mineral salt malnutrition-related diseases which may, in turns, increase the already high morbidity and mortality among rural farm families.

It should be noted, according to Wong *et al* (2002) that the calyces of *Hibiscus sabdariffa* is rich in vitamins, natural carbohydrates, protein and other antioxidants. *Hibiscus sabdariffa* L. belongs to the family of Malvaceae. It is also called Roselle. It is cultivated for its leaves, seeds and calyces (which is used as vegetables and refreshing drink oil and food preservatives (Wong 2000). According to Ijeomah *et al* (2012); D'Heureux and Badrie (2004); and Mukhtar (2007) every part of roselle plant (*Hibiscus Sabdariffa*) is important and useful. For example, few uses of the various parts of the plant are highlighted below:

- i. The Leaves:** Used as vegetables in soup. It is high in antioxidants and contains alkaloid, tannin, flavonoids, ascorbic acid, saponin, anthocyanin pigments used in food manufacture, poly-phenols, oxalate and phytate in detectable amounts. Heated leaves are applied to cracks in the feet and on boils and ulcers to speed maturation. A lotion made from leaves is used on sore and wounds. The leaves are emollient and are used as a diuretic refrigerant and sedative.
- ii. Calyx (Flower):** Rich in phenolic compounds. Used as vegetables in soup. The fleshy calyces are used for making roselle wine, jelly, syrup, gelatin, refreshing beverages, pudding and cakes. The dry roselle is used for tea, jelly, marmalade, ice cream, shebets, butter, pies, snacks, tarts and other desserts. Leave extract rich

in anthocyanins, a good source of brilliant red colourant for many foods. It is also used in soap thickening, and for health and medicinal purposes. Used as "sudan tea" for relieving cough. Roselle juice with salt, pepper, asafetida and molasses is taken as remedy for biliousness. It is used to create appetite and as anti-bacteria reagent. It is also used in food production such as yougurts, ice cream and butter with wonderful aroma. Chemical components are also extracted from dry calyces and used in experiments and treatments.

- iii. Seeds:** used as substitute a locust bean. Used as feed meal for fish and domestic animals. The edible oil is used as substitute to castor oil. Residual meal used for food in soup or cakes. The brownish-yellow seed oil is claimed to heal sores on camels. A decoction of seeds is given to relieve dysuria, strangury and mild cases of dyspepsia.
- iv. Roots:** The root is bitter but has stomachic, emollient and resolutive properties. It is used as an appetitive and tonic. It is also used as a preventive and cough remedy.
- v. Fibrous parts:** The fibrous parts are used in production of twine and cords known as "rosella hemp"

Thus, literature is replete with various uses of every part of hibiscus Sabdariffa. It is, however possible that all farmers are not aware of these beneficial uses to which leaves, flowers (calyces) seeds and the fibrous parts of this wonderful plant may be put. This research, in one part, was geared towards investigating, farmers' awareness of the uses of the various parts of hibiscus Sadariffa.

In Nigeria, it is the red coloured soft drink which is a hot-water extract of the red flower of hibiscus Sabdariffa that is usually called '*soborodo*' or "*Sobo*" drink. Literature reveal several health benefits of utilizing "*sobo*" drink made from roselle (hibiscus sabdariffa). Among others, it helps to lower blood pressure, balance cholesterol levels in the body and improve blood circulation. According to Olatunji, and Juwe (2014), *sobo* helps to reduce viscosity of the blood, stimulates peristaltic movement in the intestines and improves the health condition of diabetic patients. *Sobo* drink has been noted to be effective in relieving coughs, stimulating the production of bill in the liver and suppression of appetite. Awhin (2012) and Babajide (2014) have also indicated that roselle contains a wide range of vitamins and minerals including vitamins C, calcium, Niacin, riboflavim and flavonoids. Olatunji and Juwe (2014) have also cited Chukwuma (2010) who explained that "*sobo*" has antihypertensive properties, as it contains 15-30% organic acids including citric acid, maleic acid, and tartaric acid. It has been used in folk medicine as a diuretic, mild laxative



treatment of cardiac, nerve disease, cancer and urinary tract infections. In the Caribbean Islands, “*sobo*” is a very popular traditional Christmas drink and the festivities are considered incomplete if it was not serve.

Preparation processes are simple and involves:

- i. thoroughly washing the sorrel (dried calyces) in water to remove dirt.
- ii. placing the washed sorrel in container filled with water.
- iii. placing a few heads of cloves, a few sticks of cinnamon and a piece of ginger.
- iv. boiling the solution for about twenty minutes.
- v. allowing the product to cool down
- vi. Adding a few drops of vanilla essence, sugar to taste and a dash of angostura bitters. Other flavourings like strawberry and banana flavours may also be added depending on individual’s taste (Bola and Aboaba, 2004).

In Nigeria, the processes of preparation of *sobo* is similar to what is obtainable elsewhere in the Caribbean islands and other parts of the world. For example, it involves seven stages, namely:

- i. Pick the dried calyces and wash in water to remove dirt
- ii. Place in a pot of clean water
- iii. Add pineapple peels, ginger and gloves (black pepper)
- iv. Cook for 30 minutes so that the ingredients are absorbed
- v. Allow to cool for some time
- vi. Filter to remove used calyces
- vii. Add flavor to taste. This may be sugar or other types of flavor.

Studies have shown that there are almost numberless medical uses of *hibiscus sabdariffa* and several health benefits of *sobo* drink (Olatunji and Juwe, 2014). The requirement for preparing *sobo* drink are relatively very cheap and materials preparation processes are by no means cumbersome. All parts of *Hibiscus sabdariffa* (Roselle) are useful in preventive and curative medicine. *Sobo* drink (which is a hot extract of Roselle calyces) is a very cheap source of vitamin and minerals. It is expected that most farm families would take advantage of this nature’s miracle plant with a view to reducing high mobility and mortality which has been on the increase in Nigeria. This study investigated knowledge of various medicinal and other uses of all parts of *hibiscus*

sabdariffa by farm families in Anocha North Local Government Area of Delta State.

More specifically, the objectives of the study are:

1. to assess knowledge of uses of the various parts of *Hibiscus sabdariffa* (Roselle) among farm families in the area of study
2. to determine farm families' perceived benefits of utilizing *sobo* drink and
3. to assess adequacy of knowledge of materials required and the processes for preparation of *sobo* drink by farm families' in the study area.

2. METHODOLOGY

All the farm families in the 24 communities that make up Aniocha Local Government Area of Delta State comprised the population for the study. Multistage sampling procedure was employed to select a sample. First, simple random sampling technique was employed to select 5 out of the 24 communities in the area of study. Secondly, 4 villages were selected per community through simple random sampling technique. In each of the villages sampled, at least 7 farm families were purposively selected from every 4th household. Thus, the sample for the study comprised 140 farm families. Most farm families in the area of study was made up of 5-7 persons. These include, father, mother and 3-5 children. In each of the sampled farm families, the father, mother or a grown up child (above 18 years) who was accessible at the time of data collection was interviewed and his or her responses taken as data elicited from that farm family. A 22-item structured interview schedule was used to collect data for the research. Relevant data were subjected to descriptive statistical analysis (mean, percentage, pooled mean and ranking).

3. RESULTS AND DISCUSSION

The results of data analyses are presented and discussed in the paragraphs that follow.

1. Knowledge of uses of the various parts of *Hibiscus sabdariffa* (Roselle)

The sampled farm-families were asked to indicate uses of the various parts of *hibiscus sabdariffa* (Roselle) that they know. The results of data analyses are presented in Table I.



Table I: Percentage distribution of sampled farm families on the basis of knowledge of uses of various parts of *hibiscus sabdariffa* (Roselle)

Parts of Hibiscus Sabdariffa	Uses	Have knowledge of usage	%	Ignorant of usage	%
Leaves	1. Used as vegetables in soap	129	92.1	11	7.9
	2. Used in food manufacturing	96	68.6	44	31.5
	3. Lotion made from leaves, Used for on sores wounds	28	20.0	112	80.0
	4. Heated leaves applied to cracks in the feet and on ulcer to speed maturation	36	25.7	104	74.3
	5. Used as antioxidants	30	21.5	110	78.5
	6. Used as a diuretic refrigerant and sedative	14	10.0	126	90.0
Calyx (Flower)	1. Used as vegetables in soup	118	84.3	22	15.7
	2. The Fleshly calyces are used for making Roselle wine	34	24.3	106	75.7
	3. Calyces used for making jelly	25	17.9	115	82.1
	4. Used in making syrup and gelatin	32	22.9	108	77.1
	5. Used in making refreshing beverages	134	95.7	6	4.3
	6. Dry roselle used for tea	16	11.4	124	88.6
	7. Used in desserts such as ice cream, she bets, snacks, and butter for wonderful aroma	43	30.7	97	69.3
	8. Extracts used as brilliant red colorant for many foods	39	22.9	101	72.1
	9. Used for soap thickening	52	37.1	88	62.9
	10. Used for health and medicinal Purposes e.g. "Sudan Tea" for relieving cough	46	32.9	94	67.1
	11. Chemical components are extracted and used in experiments and treatments	18	12.9	122	77.9
Seed	1. Used as substitute for locust bean	31	22.1	109	77.9
	2. Used in feed meal for fish and Domestic animals edible oil. (as Substitute to castol oil)	24	17.1	116	82.9
	3. Residual meal for food in soup or cakes.	12	8.6	128	91.4
	4. Seed oil used for healing sores on camels	16	11.4	124	88.6
	5. Decoction of seeds given to relieve diysuria, Strangury and mild cases of dyspepsia	11	7.9	129	92.1
Roots	1. Used as apontive and cough remedy	22	15.7	118	84.3
	2. used as tonic	34	24.3	106	75.7
	3. the fibrous roots are used in production of twine and cords known as "roselle hemp"	51	36.4	89	63.6
Roselle Juice	With salt, pepper, sabdariffa and molasses- antibacterial reagent taken is	20	14.3	120	85.7

It can be discerned in Table I that majority of the respondents only have knowledge of two uses of *Hibiscus sabdariffa*'s

leaves and two uses of its calyx (flower). About 92.1% and 68.8% of respondents have the knowledge that the leaves of



Hibiscus sabdariffa are used as vegetables and in food manufacturing respectively. About 84.3% and 95.7% have knowledge that the calyx (flower) of *Hibiscus sabdariffa* is used as vegetable in soap and for making refreshing beverages respectively. The finding is commendable because it reveals that a large percentage of farm families in the study area are aware of at least 4 important uses of *Hibiscus sabdariffa*. The first step in the process of adoption of any innovation is awareness. Awareness lays the foundation upon which adoption is usually built (Olatunji, 2005). It should be noted also that "knowledge" is the first step in Rogers and Shoemaker's model of innovation decision process (Roger and Shoemaker, 1971). According to Rogers and Shoemaker, the model of innovation decision making consist of 4-stages namely: Knowledge, Persuasion, Decision and Confirmation. At the knowledge level, the individual is exposed to the existence of the innovation and gains more understanding of how it functions. It is only after an individual has gained knowledge of an innovation that he can move to the stage of persuasion (developing favorable or unfavorable attitude towards the innovation). The farmer may then move to the stage of decision to engage in activities which leads to the choice to adapt the innovation. All things being equal, these high percentage of farm families who have knowledge of four (4) uses of *Hibiscus sabdariffa*'s leaves and calyces will more likely than not, adopt the usage of these parts of the plant. It is not likely that a farmer who do not have knowledge of their uses will ever adopt them. There are chances that majority of the respondents who have knowledge of their uses will adopt them and consequently increase their individual's vitamin and mineral salt intake and consequently reduce vitamin and mineral salt malnutrition-related morbidity and mortality which Igbedioh (1990) had already noted was on the increase in Nigeria.

It should be noted however, in Table 1 that out of at least twenty seven (27) uses that the leaves, calyx, seed, juice and roots of *Hibiscus sabdariffa* can be put, its only four uses (representing 14.8%) that more than 68% of the respondents know. Between 62.9% and 92.1% of sampled from farm families are ignorant of more than 23 other uses of the various parts of this miracle plant. Majority of the respondents do not have knowledge of medicinal, economic, industrial, ornamental and other uses of *Hibiscus sabdariffa*. Knowledge of its medicinal uses is particularly important for farm families in Nigeria where there is epileptic health care-services. Literature is replete with health and medicinal uses of *Hibiscus sabdariffa* (Babajide, *et al*, 2004). Knowledge of these uses would definitely enhance farmers' health through adoption of simple preventive and curative medicine-using the various parts of this miracle plant. This will, more likely than not, reduce farmers' dependence on government health-care services that are usually grossly inadequate to cater for the health needs of most rural dwellers. Indeed, knowledge of the various uses of the plant can translate to improvement in the economic base of farm families. Farmers could learn how to prepare *sobo* drink, lotions, antioxidants, wine, jelly, tea, twine (Rosella hemp) and other products from *Hibiscus sabdariffa* with a view to generating additional income. What is required is to strengthen the extension service and incorporate relevant trainings programmes for farmers through the Extension Agents and the Women In Agriculture. As noted by Etuk, *et al* (2013), Extension Agents should be sufficiently exposed to training on health issues for appropriate dissemination of health information to farm families.

2. Respondents' mean rating of perceived benefits of *sobo* drink

Respondents assessed the benefits of *sobo* drink and their mean ratings, pooled mean and ranking are indicated in Table 2.

Table 2: Mean ratings of respondents' perceived benefits of *sobo* drink

S/N	Statement	Mean	Rank	Pooled Mean
1	<i>Sobo</i> drink is cheaper than carbonated drinks (e.g fanta, coke, sprite, etc)	3.47*	2	
2	<i>Sobo</i> is used for treating sores and wounds	2.00	5	
3	<i>Sobo</i> is used as food thickener	1.94	6	
4	<i>Sobo</i> is used as food colorant	2.25	4	2.64



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5	<i>Sobo</i> is used as an appetite booster	3.40*	3
6	<i>Sobo</i> is used as a laundering agent	1.91	7
7	<i>Sobo</i> drink is rich in mineral	3.49*	1

*Mean \geq 2.5 = agreed

As shown in Table 2, respondents agreed that the most important benefit of *sobo* drink is that it is rich in vitamins and minerals (mean 3.49; ranked 1). This is closely followed by the fact that *sobo* drink is cheaper than other carbonated drinks such as Fanta, Cokacola, Sprite, Pepsi, Mirinda and the like. This was ranked 2nd with a mean rating of 3.47. Respondents also agree that *sobo* drink is an appetite booster (mean 3.40, ranked 3rd). Respondents' assessment corroborates literature which is replete with health and medicinal benefits of *sobo* drink. Babajide *et al* (2004) had explained that *sobo* drink (Roselle) is an inexpensive source of a wide range of vitamins and minerals. Since majority of the farmers agree that *sobo* drink has health and medicinal benefits, and that it is comparably cheaper than carbonated soft drinks, the barrier that remain is how farmers would transmit knowledge into practice .

It should be noted that farmers do not significantly agree with the other statements:

1. *Sobo* is used for food colorant (mean=2.25, rank 4)
2. *Sobo* is used for treating sores and wounds (mean = 2.00, rank 5)
3. *Sobo* is used as food thickener (mean= 1.94, rank 6)
4. *Sobo* is used as a laundering agent (mean = 1.91, rank 7)

The implication of this finding is that most of the respondents are ignorant of other benefits of *sobo*. Thus, there exists a gap in their knowledge which agricultural extension service should seek to fill.

3. Respondents' knowledge of materials used and processes for preparation of *sobo* drink

The respondents were asked to describe the materials used and itemize the step by step processes involved in the preparation of *sobo* drink. Farmers' responses were scored and classified. The findings are described in Table 3.

Table 3: Percentage distribution of respondents' on the basis of knowledge of materials and processes of preparation of *sobo* drink

Knowledge	Score range	Frequency	Percentage (%)
Very adequate	16-20	15	10.7
Adequate	11-15	23	16.4
Inadequate	5-10	25	17.9
Grossly inadequate	1-5	77	55.0
Total		140	100

As shown in Table 3, about 57.9% and 17.9% of respondents have grossly inadequate and inadequate knowledge respectively. Put together, 75.8% of the study sample do not quite know how to prepare *sobo* drink. Only 16.3% and 7.8% (24.1%) exhibited adequate and very adequate knowledge of *sobo* drink preparation. Inability to prepare *sobo* will definitely impact negatively on its rate of adoption. Extension efforts that focus on dissemination of technologies for

preparation of *sobo* drink should be popularized among the farm families in the study area. This will, more likely than not, increase adoption of *sobo* drink among farm families.

4. CONCLUSION

A large percentage (68.8% - 95.7%) of the sampled farm families have knowledge of only two uses each of the leaves



and calyx (flower) of *Hibiscus sabdariffa*. However, there exist a very wide gap in their knowledge, even as between 62.9% and 92.1% of these farm families are ignorant of more than twenty three (23) other uses of the leaves, calyx (flower), seeds, roots and juice of *Hibiscus sabdariffa*. There is a need to bridge this unfortunate gap in their knowledge.

Majority of the farmers only agree to three benefits of utilizing *sobo* drink namely; i. that *sobo* is rich in vitamins and mineral salts ii. that *sobo* is cheaper comparable to carbonated soft drinks such as Coca cola, Sprite, Mirinda, and the like. iii. that *sobo* is an appetite booster. Their mean rating of other numerous health and medicinal benefits were very low. This gap in farmers' knowledge requires immediate intervention through worthwhile extension activities and programmes. About 72.9% of the sample do not have adequate knowledge of *sobo* drink preparation. Majority of the farm families have to depend on hawkers whose products' preparation hygiene they cannot ascertain. This finding calls for worry. Since *sobo* drink has a short shelf life, it is imperative that most farm families have knowledge of its preparation so that they can easily prepare the quantity required at every occasion.

Recommendations

1. Majority of the respondents have very limited knowledge of several medicinal, health, economic, industrial and other uses of the various parts of *Hibiscus sabdariffa* (Roselle). Appropriate extension activities and programmes should be planned, implemented and evaluated with a view to bridging the gap in farmers' knowledge as observed in this study. The Extension service should be strengthened and health issues incorporated in the training of Extension Agents and Women In Agriculture (WIA) programmes. Extension Departments of the Universities could also conduct out-of-school training of the farm families as a part of their cooperate social responsibility to the University environment. This is with a view to empowering the farmers to increase their income, better their livelihood and become healthier labour force for the much needed agricultural transformation.
2. The gap in knowledge about the several health benefits of utilizing *sobo* drink should be bridged through awareness and dissemination of relevant information to farmers. This could be invigorated through effective use of the mass media.
3. There should be a special health extension or education intervention programme aimed at training of all farm families on the processes of preparing *sobo* drink. Since the processes are not cumbersome, it would only require

the Women In Agriculture (for example) to be proactive to get most farm families identify materials required and the simple processes involved in the preparation of this vitamin and mineral-salt-rich *sobo* drink.

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