

Survey Assessment of Indigenous Knowledge Systems for Seed Storage of Rainforest Spice (*Monodora myristica*) in Southeastern Nigeria.

Peter-Onoh, C. A., Onoh, P. A., Obiefuna, J. C., Ofor, M. O., Ngwuta, A. A., Ibeawuchi, I. I., Korie, C. O., Orji, J. O., Agomuo, C. I., and Onoh, A. L.
School of Agriculture and Agricultural Technology, Federal University of Technology, Owerri Imo State.

Abstract: The assessment of indigenous knowledge for the storage of *Monodora myristica* seed for planting was carried out in three states (Abia, Enugu and Akwa-Ibom states) of South eastern agroecology. A structured questionnaire was administered to 150 farmers from two LGAs each and 135 retrieved. Data collected were subjected to descriptive statistics like percentage, mean scores, frequency, bar and pie chart. Collection/gathering of *M. myristica* is mostly done by men between the ages of 61-70%. Those involved in gathering of *M. myristica* seeds were married and formally educated people. The study further revealed that traditional method of storage is widely accepted since it promotes seed germination as investigated by 74% of the respondents. Insect pest is one of the problems encountered by the farmers hence 66.7% of the respondents have solicited for government assistance. This problem should therefore be addressed as seed security is essential in ensuring increased use of agro-biodiversity which would in turn expand the options, opportunities and remains available at the rural grassroots level to improve nutrition and health, safeguard the household economic security and enhance sustainable agriculture.

Keywords: Indigenous knowledge, *Monodora myristica*, respondents, seed, storage,

I. Introduction

Monodora myristica (African nutmeg) belongs to the family Annonaceae plants. The tree can reach a height of 35m and 2m in diameter at breast height and are found in the wild. The fruit is a berry of 20cm diameter and is smooth, green and spherical and becomes woody at maturity. It is attached to a long stalk which is up to 60cm long. Inside the fruit the numerous oblongoid, pale brown, 1.5cm long seeds are surrounded by a whitish fragrant pulp. The odour and taste of the *M. myristica* seed is similar to nutmeg and it is used as a popular spice in the West African cuisine [1]. Spices are plant products used in flavouring foods and beverages [2]. It has nutritional value and often referred to as food accessories or adjuncts because of their ability to stimulate appetite and increase the flow of gastric juice [3]. The essential oils and terpenoid alcohol of spices contribute to their smell, taste and tactile sensation, that mostly spicy herbs have traditional medicinal values.

1.1 Concept of Indigenous Knowledge Systems

Indigenous knowledge (IK) is the local knowledge – knowledge that is unique to a given culture or society [4]. It is based on experience, often tested over centuries of use and entails many insights, perceptions and intuitions relating to local culture and environment [5]. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities. [6]. According to [7] sharing knowledge with the poor is most effective when we also solicit knowledge from them about their needs and circumstances. Therefore, development activities, especially those that aim to benefit the poor directly, need to consider IK in the design and implementation stages of the process.

Storage of seeds as ex situ germplasm is an essential step for the long-term conservation of plant genetic resources. Maintaining seed viability in store for longer period is very essential to preserve the genetic integrity as well as the physiological state for use.

The importance and demand of this spice in food and medicine, call for improvement in traditional storage methods and systems. Traditionally, farmers save and store seeds for two purposes, consumption and cultivation. In seeds for consumption, quality conservation is the priority while in seeds for cultivation viability is the primary concern. Quite often unviable seeds serve the alternative purposes of human food, livestock feed or manure. This paper surveyed and investigated the socio economic characteristic of indigenous knowledge systems for *Monodora myristica* seed storage skewed to seed storage for cultivation in Southeastern Nigeria.

II. Materials And Methods

The study was carried out in three states (Abia, Enugu, Akwa Ibom) of southeast agroecological zone of Nigeria, which is characterized by coastal plains [8], and located within latitude 4⁰15'N and 7⁰N and longitude 5⁰50'E and 9⁰30'E. The entire southeast is about 7581126ha with mean minimum and maximum temperatures ranging from 21 -30°C in the coast (Calabar and Port Harcourt), while it ranges from 29-33°C in the interior (Enugu). Rainfall is bimodal and decreases from over 3000mm in Calabar to 1,700mm in Abakiliki. The vegetation stretches from mangrove swamp in the coast through rainforest to derived savannah in the interior [9].

2.1 Sampling Technique.

Two (2) local government areas from each of the three (3) states were randomly selected. Abia consisted Umuahia and Bende; Akwa-Ibom is Obot-Akara and Ikot-Ekpene and Enugu is Udi and Ezeagu Local Government Areas respectively. A structured questionnaire was administered while oral interview complimented the questionnaire. Fifty (50) farmers who had contact with extension agents in the two (2) LGAs of each state were sampled systematically to give a total number of one hundred and fifty (150) farmers. One hundred and thirty five (135) questionnaires which represented ninety percent (90%) were retrieved. Important information on socio- economic characteristics of the farmers in relation to storage was elicited from the respondents. Data collected were subjected to **descriptive statistics** like percentage, mean scores, frequency, bar and pie chart.

III. Results And Discussion

3.1 Socio-economic characteristics distribution of *Monodora myristica*.

The results of socio-economic analysis of the respondents include sex, age, marital status, family size, level of education and occupation is shown in Table (1). The results showed that the respondents were predominantly males in the study area. This is evident as 60% were males relative to 40% females. The farmers between the ages of 41- 70 years were actively involved in the farming and use of *M. myristica*. Specifically, the ages 61-70 were the highest proportion with 34% followed by 41-50 (33%). The greatest percentage of *M. myristica* users are predominately married (88%) within the study area, relative to singles (27%), widows (11%) and widowers (9%). The family size of majority of respondents have been shown to be in the range of 5-7 (34.8%) and 0-4 (31%), followed by 8-10 (22.9%). The results also show that the highest level of education attained by majority of respondents is secondary education (37%), while primary and tertiary education is 31% and 20% respectively. Greater percentages of respondents are farmers. This is shown in the results as 49.6% relative to civil service (25%) and traders (13%).

The results show in (Fig.1), showed that 95.3% of respondents store *M. myristica* but only 3.70% of respondents do not store *M. myristica*. Amidst the various methods of storage the majority of respondents use baskets in storage. This is proved by 59.3% respondent as against 14.8%, 14.7% and 11.9% respectively for plastic containers, claypot and calabash. Figure (2) also showed that *M. myristica* is stored mostly from 10-18 months (37.0%) and 36.5% for 1-3 months. *M. myristica* has been shown to germinate after storage. This is evident as 74% of respondents (Fig 3) from the study area believed as against 26% that said *M. myristica* do not germinate after storage. According to the results (Fig 4) 59.3% of respondents do not use preservatives as against 40.7% who uses preservatives in *M. myristica* storage. More than half of the respondents (66.7%) need government assistance in the storage of *M. myristica*, contrary to 33.3% respondent who reported that there is no need for government assistance in the storage of *M. myristica*.

Dried pepper (65.9%) is found to be the most preferred and effective preservative used in preserving *M. myristica* seeds as observed in Figure (5) to compare with the poor acceptance of synthetic pesticides (11.1%), Ashes (6.67%) and Neem leaves powder (16.3%). Sun drying (54.8%) is generally accepted as the most functional method of seed treatment or preservatives. The results proved that smoking (25.1%), use of pesticides (8.21%) and pepper (11.9%) are poorly practiced (Fig.6).The results from the study area revealed that pest infestation (54%) is one of the major problems encountered in storage, followed by lack of chemicals (23%) and Fungus infestation (15.6%) (Fig.7).

TABLE 1. Distribution of respondent according to socio-economic characteristics.

Variables	Range	Frequency	Percentage
Sex	Male	81	60
	Female	54	40
	Total	135	100
Age	31-40	16	11.85
	41-50	33	24.44
	51-60	31	22.96
	61-70	46	34.07
	70 and above	09	6.68

Marital status	Total	135	100
	Single	27	20.00
	Married	88	65.18
	Widow	09	6.67
	Widower	11	8.15
Family size	Total	135	100
	0-4	42	31.11
	5-7	47	34.81
	8-10	31	22.96
	10 and above	15	11.11
Level of Education	Total	135	100
	No formal education	15	11.11
	Primary	43	31.85
	Secondary	50	37.04
	Tertiary education	27	20.00
Occupation	Total	135	100
	Farming	67	49.63
	Trading	18	13.33
	Civil service	35	25.93
	Others	15	11.11
Total	135	100	

Source: Field survey, 2011

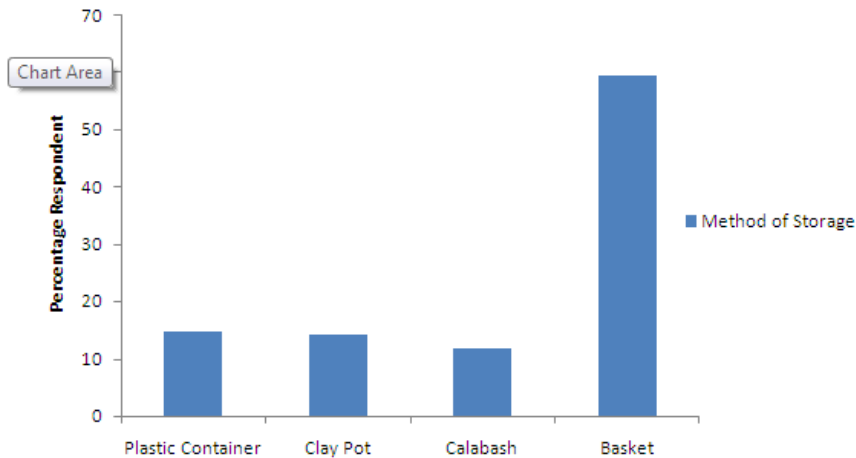


FIGURE 4.1: Distribution according to method of storage of monodora.

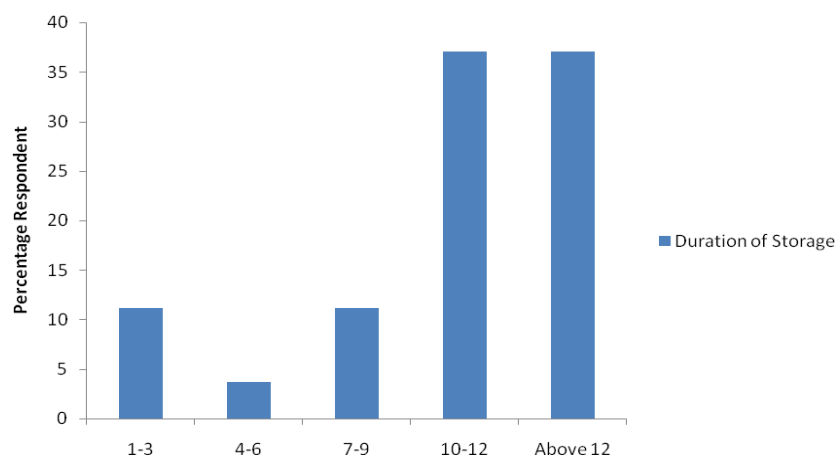


FIGURE 4.2: Distribution according to duration of storage.

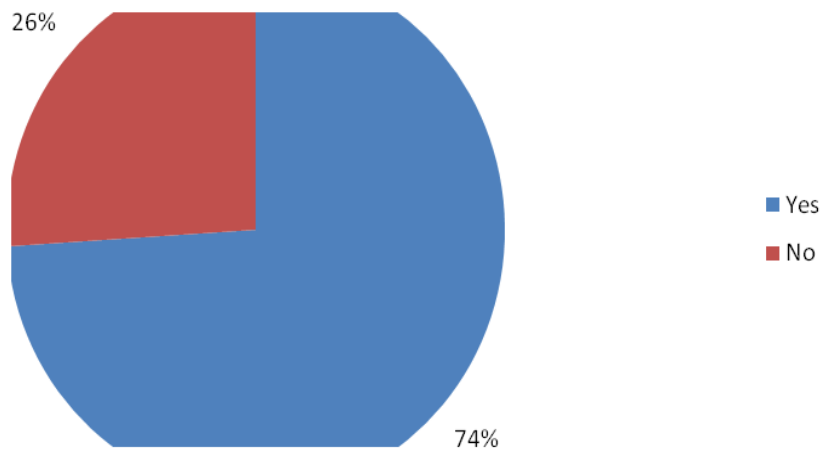


FIGURE 4 .3. Distribution according to germination after storage

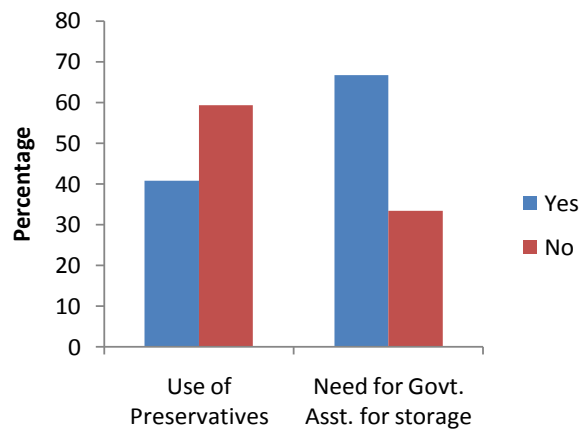


FIGURE 4.4: Distribution according to use of preservatives and need for government assistance for storage.

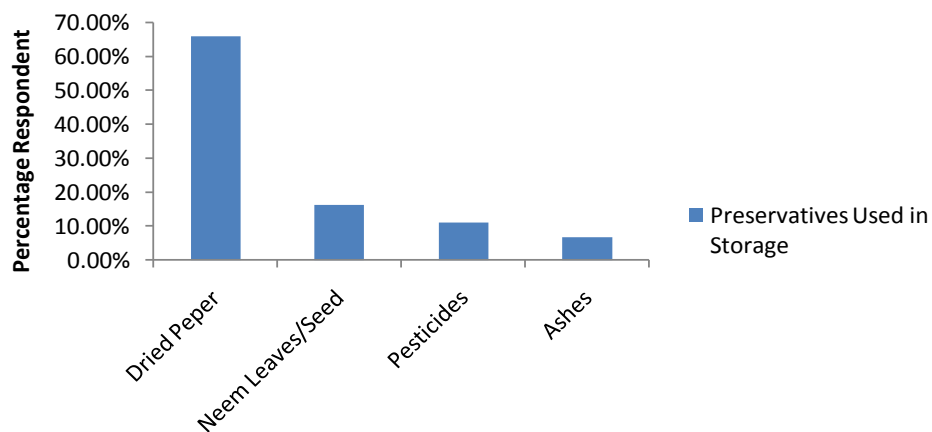


FIGURE. 4.5: Distribution according to preservatives used in storage

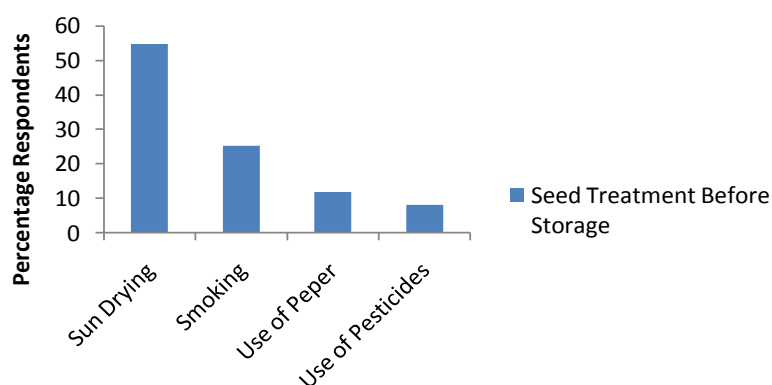


FIGURE.4.6: Distribution according to seed treatment before storage

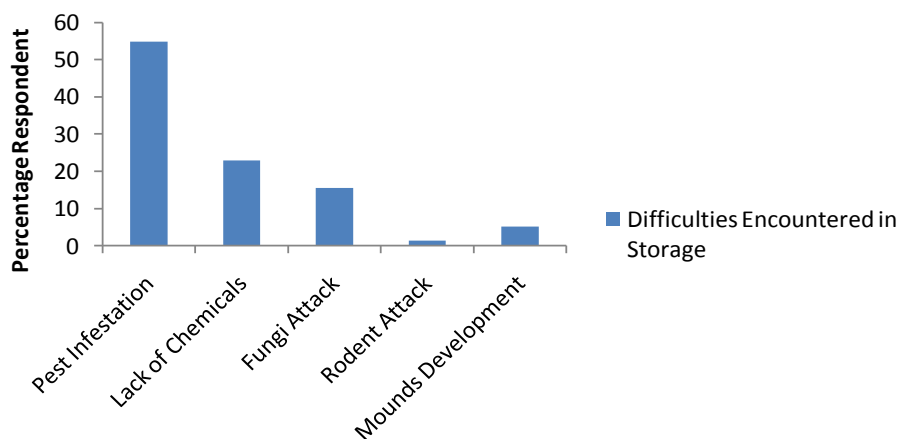


FIGURE 4.7: Distribution according to difficulties encountered in storage.

IV. Discussion

The Socio-economic characteristics distribution of *M. myristica* collection\gathering in Southeastern Nigeria is mostly done by male (60%). This could be attributed to the nature of the farming which is mainly in the wild in combination with other forest species including teck (*Tectona* species or Baobab). This disagrees with the findings of [10] observed women as major stakeholders in the provision of food. According to the results 61-70 years (34.1%) of age of the respondents were actively involved in the farming *Monodora* seeds. This tend to disagree with [11] and [12] which reported that Nigerian farmers are with the age bracket of 40-60years, and agrees with [13] who stated that small-scale farmers are 50 years and above. Although experience in farming is very important and it depends on years of farming, yet average young farmers are needed on farms because agricultural production is energy demanding especially collection\ gathering of *Monodora* fruits. *Monodora* users are mainly married (65. 3%), this shows how important marriage institution is in Africa and signifies the possibility of more availability of family labour for farming activities. It also showed the importance of spice as source of food security to individual household. The results (Table 1) showed that 89% respondents had formal education. [14] and [15] viewed formal education as means of facilitating farmers use of written information sources and increasing their knowledge and comprehension of new farm practices and [16] stated that formal education also predisposes them to adopt improve farm practices. This is also in line with [17] who reported that ability and readiness with which a particular producer accepts an innovation depends on his educational background.

The results from Table (2) shows respondent attitude to storage methods. It indicated that the study area accepts traditional methods storage. This is in line with [18] and [19] which reported that traditional methods of storage have been considered as being highly effective. Good storage systems \ methods affect seed germination after storage as investigated by 74 % of respondents. About 59.6% of the farmers did not use

preservatives in storing *Monodora* seeds, this could result to poor storage which was reported to cause up to 10% loss in seed quality in the Tropics [20]. Insect pest infestation (54%) is one of the major problems encountered by the farmers. This agrees with [21] which reported that seed storage problems are partly responsible for farmers' failure to save seeds of non-traditional crops. Government assistance in Africa is a recurrent problem which is more acute among the poor farmers, hence 66.7% of the respondents have solicited for government assistance. This problem should therefore be addressed as seed security is essential in ensuring increased use of agro- biodiversity which would in turn expand the options, opportunities and remains available at the rural grassroots level to improve nutrition and health, safeguard the household economic security and enhance sustainable agriculture.

V. Conclusion

The results show that men of about 61-70 years were actively involved in gathering/ collection of *M. myristica* seeds in the study area. 88.9% of the respondents have knowledge and use *M. myristica* as the need arises. Most respondents stated that good storage systems affect seed germination after storage. Insect pest is one of the major problems encountered by the farmers. Government assistance in Africa is a recurrent problems which is more acute among the poor farmer enhance 66.7% respondents have solicited for government assistance to improve seed storage for planting.

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