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Taxonomic Survey and Ethnobotanical Study on Some Selected Underutilized Grains and Oil Seeds in Three Southwest States of Nigeria

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Abstract:- The taxonomic survey and ethnobotanical study were conducted from August to November, 2017 with view to finding, identifying and obtaining enough information on the underutilized grains and oil seeds and their ethnobotanical importance from the local population within three states of the south western Nigeria. The fieldwork was done in two selected locations within Ekiti state; (Ado Ekiti, the state capital and Igogo Ekiti, in Moba local government area); two places in Osun state (Ikeji-ile and Owena) and IAR&T Apata in Ibadan Oyo state. Pictorial representation of plants and seeds gathered during the study and the survey were also made. By consulting with experts and comparing the acquired plant samples to published taxonomic compilations, the taxonomic identity of the plant was determined at the Institute of Agricultural Research and Training (IAR&T), Ibadan. To gathering pertinent ethnobotanical data, semi-structure questionnaires and oral interviews were the tools deployed. All data collected were based on semi-structured questionnaires and oral interview with farmers, grain sellers, researchers, students as well; at the study areas. It was determined that nineteen (19) plant species from 7 families were identified to be underutilized oil seeds and grains, the family Fabaceae is the most abundant of the plant population. This followed by Malvaceae with the next higher frequency, followed by Euphorbiacea family. Families Curcurbitaceae, Moringaceae, Pedaliaceae and Mimosaceae have a low frequency. Vine/Trailer/Climber/Ticket were the most abundant plant habits. The shrubs, Herbs and Trees are the lowest in terms of the frequency. The need to explore the processing and packaging of underutilized grains and oil seeds is recommended, more nutritional qualities through formulated food mixture of grains and edible oil seeds is also recommended.

Keywords:- *Taxonomic Survey, Ethnobotanical Study, Underutilized Grains, Oil Seeds.*

I. INTRODUCTION

According to Jamie, 2013; in an attempt to comprehend the evolutionary relationships among the enormous diversity of living creatures on our planets; Scientists, naturalists and conservationists use taxonomy to classify and arrange these organisms. The definition of taxonomy is not universally agreed upon, Nonetheless, the heart of the science remains: the invention, naming, and categorization of organism groupings (Wilkins, 2011). A branch of research (and an important component of systematics) concerned with naming, categorization, description, and identification. Simpson *et al*. (2010). Despite the fact that committed naturalists are regularly engaged in the publication of new species, biological taxonomy is a branch of biology that is typically conducted by scientists known as "taxonomists." The work of taxonomists is crucial to our understanding of biology in general. The study of biodiversity and conservation are two domains of applied biology in which taxonomic work is critical (Natural History Museum, 2014). Estimating the amount of diversity existing in any particular location is impossible without a working classification of the organisms there, making informed conservation decisions impossible. Plant taxonomy has two fundamental goals: identification and classification of plants; plant identification entails comparing certain traits and then allocating a certain plant to know taxonomic group, eventually arriving at a species (Isely, 1994). Following the identification of a plant specimen, its name and properties are known, the identification process links the specimen with a published name. taxonomic surveys offer fundamental knowledge about the components of biodiversity, which is essential for making informed decisions include monitoring endangered species and conducting bios- prospecting for underutilized of underexploited grains, legumes, and oil seeds varieties many of which are beneficial for maintaining the earth and all it holds in a healthy state. Underutilized or neglected oil seeds and legumes are essential foods for rural residents, particularly in tropical and subtropical region of the world (oshodi *et al*., 1985), wet guinea savannah and central guinea savannah agro-ecological environment of Nigeria (Aiyeloja and Bello, 2006). Grain legumes taxonomy is rather simple as compared to that of cereals, brassicas, and certain other plant groupings since, for the most part, only few gene pools have been accessible for selection and subsequently plant breeding. However, intergeneric hybrids of legumes are unknown in nature, and attempts to produce them through artificial crossings are rarely, if ever successful (McComb, 1975). In fact, there are frequently significant genetic barriers between different species and species groups (Smartt, 1976,). The taxonomic position in

grain legumes is not exceptional, and the classification of interspecific variations and interfertile species is intrinsically more challenging. In certain cases, the evidence at hand would seem to support revising the taxonomic system.

➢ *Ethnobotany*

The study of useful plants before they are commercially exploited and successfully domesticated is known as ethnobotany. Since information about a given plant varies from one ethnic group to another, it is based on the locals' understanding of plants and how valuable they are as understood by members of that community (Igoli *et al*., 2005). Is also regarded as a subfield of ethnobiology, which is the study of the interactions that human civilizations have had-both historical and contemporary—with the plants, animals, and other species that inhabit their surroundings. Similar to its parent discipline, ethnobotany reveals the relationship between biological subdisciplines and human cultural practices.

Furthermore, these studies are frequently essential in identifying locally valuable plant species, particularly in the search for unprocessed pharmaceuticals. From the outset, the recording of customary knowledge—particularly regarding the therapeutic applications of plants—has yielded numerous significant contemporary medications (Alio j, *et al*., 1996). To gain a better understanding and appreciation of the many underutilized grains that are sprouting everywhere, ethnobotanical study of some underutilized grains and oil seeds is important. It also assists in memory preservation of knowledge on the identity, medicinal and other important of this plant.

➢ *Underutilized Grains and Oil Seeds*

The term "underutilized" refers to species whose potential has not been completely realized and are less extensively cultivated. Farmers and consumers have so suppressed what was formerly a vital and substantial crop in the community due to agronomic, genetic, economic, environmental, and cultural causes (Hammer *et al*., 2001). Legumes and oil seeds are essential food and feed crops that have historically been farmed in dry parts of the developing world. They are frequently regarded as minor/forgotten/underutilized/poor man's pulse. Its inherent climatic resistance indicates its potential as a suitable option in the current climate change period. It is a treasure trove of medicinal, bioactive substances, and its outstanding nutritional content makes it a healthful meal that should be included in the diet on a regular basis.

➢ *Justification*

Neglected or underused, underutilized grains and oil seeds are important food plants including legumes and edible grass family. They are staple food among the rural dwellers especially in the tropical and sub-tropical region of the world (oshodi *et al*., 1985), wet guinea savannah and central guinea savannah agro-ecological environment of Nigeria (Aiyeloja and Bello, 2006). Studies on their nutritional quality, economic uses, and medicinal (Ajaiyeoba *et al*., 2012) and drought tolerance are available (Subbarao *et al*., 2000). One of the most pressing concerns affecting tropical developing countries today is protein-energy malnutrition. This is mostly due to rising population, greater reliance on cereal-based diets, a scarcity of arable land, and natural resource degradation. (FAO, 2000; Deshpande et al, 1992; Steiner, 1996). One of the most pressing concerns affecting tropical developing countries today is protein-energy malnutrition. This is mostly due to rising population, greater reliance on cereal-based diets, a scarcity of arable land, and natural resource degradation. (FAO, 2000; Deshpande et al, 1992; Steiner, 1996).

They are underutilized, underexploited crop despite their nutritional value; therefore, they are grown in small scale even in Nigeria crop farming system (Oshodi *et al*., 1985).

➢ *Main Objective of the Study*

This study will identify and make a glossary crop plant belonging to this category, as well as classifying them. To heighten public awareness of the nutritional benefits, therapeutic properties of underutilized grains and oil seeds as part of sustainable food security and nutrition.

➢ *Specific Objective of the Study.*

To identify, collect and document information on ethnobotanical use(s), method of preparation of underutilized grains and oil seeds.

II. LITERATURE REVIEW

➢ *Ethnobotany*

The term "ethnobotany" was first used in 1895 by American botanist J.M. Harshberger of the University of Pennsylvania. Various scholars (Schultes, 1986; Jain, 1989, 1991, Schultes & Von Reis, 1998) have defined the field of modern ethnobotany, expanded its scope, and acknowledged it as an interdisciplinary field that brings together experts from various disciplines, including anthropology, botany, geography, medicine, linguistics, economics, landscape architecture, and pharmacology.

Herbs are typically appreciated for their benefits as food and treatments, according to Oliver 1960. Legume and oil seed plant parts can be treated in a variety of ways to cure a variety of illnesses, ailments, and infections. They might be prepared as baths, poultices, decoctions, infusions, macerations, tinctures, and cooked meals. They could also be consumed raw for medicinal purposes. Of the approximately 265,000 plant species (flowering plants) known to science, only around 0.5 percent have undergone extensive research on their chemical makeup and potential medical uses. Actually, less than 5% of the rainforest's flora's chemical makeup is known to current science (Jackson, 1989). However, native inhabitants of rainforests are able to recognize 49–82% of the local environment's species (Weeks, 2000).

Worldwide, around 75% of people still rely on plants and plant extracts for medical purposes (Abelson, 1990). Numerous plant species and herbs that people use to season

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food also produce beneficial therapeutic components (Tapsell et al., 2006). In many poor nations, plants such as legumes and oil seed plants are utilized as a primary source of natural medicinal medicines for a variety of illnesses (Ody, 1993).

These days, natural plant-based products are the primary source of novel, safer, and more potent bioactive chemicals with therapeutic applications (Nitta et al., 2002). Compounds originating from plants are found in the great majority of prescription medications used worldwide, either directly or indirectly through semi-synthesis (Oksman-Caldentey and Inze, 2004).

- *Underutilized Grain and Oil Seeds*

Traditional farmers are the main cultivators of neglected crops. These species tend to occupy specific niches in the local production and consumption systems, despite the fact that they may be extensively spread outside their center of origin. Despite being crucial to local communities' survival, they are nevertheless underreported and disregarded by mainstream research and development initiatives.

Underutilized crops are ones that were formerly a significant and main crop in the society but were shunned by farmers and consumers for agronomic, genetic, economic, environmental, or cultural reasons (Hammer *et al*., 2001).

The fundamental source of food, feed, shelter, medicines, and a host of other goods and methods that make life on Earth feasible and pleasurable is plant biodiversity (WCMC, 1992; UNEP 1995). The total number of plant species that people utilize worldwide is just one-third of the total number of species that various civilizations have employed for millennia to create crops tailored to their own requirements. The majority of widely grown species have centers of diversification identified today (Zeven and de Wet, 1982); nevertheless, for many other locally significant species, little is still known about the distribution of their genetic diversity and patterns of usage. The food basket that humanity has depended on for millennia has shrunk as a result of an increased reliance on main food crops (Prescott-Allen & Prescott-Allen, 1990). The agricultural "simplification" process, which gave preference to some crops over others based on factors like their simple cultivation requirements, easier processing and storage, taste, nutritional qualities, and wider range of growing environments, is the source of this nutritional paradox (Ogle and Grivetti, 1995).

The term "underutilized" is frequently used to describe plant species whose full potential has not yet been reached. Regarding the geographical (underutilized where?), social (underutilized by whom?), and economic (underutilized to what extent?) implications, the phrase itself says nothing.

Therefore, it is not unexpected that a request for clarification on the precise meaning of the phrase "underutilized species" would always arise anytime these species are discussed in national or international forums. Here are a few illustrations to help clarify where people may be confused about this phrase. In terms of geographic distribution, it is common for a species to be underappreciated in certain areas and not in others. For example, millions of people in sub-Saharan Africa depend on the cowpea (Vigna unguiculata) as their staple crop. However, in some Mediterranean countries, where it was formerly grown widely but is now grown in restricted areas, it is regarded as an underutilized crop (Padulosi *et al*., 1987). (LEISA Magazine, 2004).

According to Vietmeyer (1990), underutilized crops are sometimes referred to as "new crops" since commercial enterprises and researchers have just lately begun to focus on them. Given that workers frequently struggle to distinguish between the terms "underutilized" and "neglected," it is important to present the IPGRI's definitions (Eyzaguirre et al., 1999) for these two crop types here:

For a combination of agronomic, genetic, economic, and cultural reasons, many underused crops that were previously widely farmed are now becoming less useful. Because these crops in some manners do not compete with other crop species in the same agricultural area, farmers and consumers are utilizing them less. The genetic foundation of many crops may be weakened by their overall decline, making it more difficult to employ unique, beneficial features for crop adaptation and development.

Crops that are largely farmed by traditional farmers in their centers of origin or diversity, where they remain vital to the local populations' livelihood, are considered neglected crops. Even while certain species are found all over the world, they often have particular roles in local ecosystems as well as in systems of production and consumption. Research and conservation have not done enough to describe and care for these crops, despite the fact that socio-cultural preferences and usage patterns continue to sustain them (Padulosi *et al*., 1987). What is ultimately required, nevertheless, to develop a suitable plan to address a crop's improvement is a knowledge of the reasons behind its low level of usage and/or neglect.

- *Attributes of Underutilized Grain Legumes and Oil Seeds*

Domesticated leguminous plants that have been utilized for food, oil, and medicinal purposes for ages or even millennia are considered neglected or underutilized crops. but have significantly decreased over time as a result of specific supply and usage restrictions. They include inadequate nutrition value recognition, poor self-life, Inter alia, and low customer awareness.

As the demand for plant and agricultural qualities changes, reconsideration or discovery of nutritional features, gastronomic value, adaptation to climatic change, and so on. Neglected Legume production and usage are not limited by any means. Actually, a lot of once-neglected crops like oil palm, soybean, and kiwi fruit are now important worldwide. Many species have the potential to improve food security, nutrition, nutritional and gastronomic diversity, health, and

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revenue generation even though it seems like there aren't many more possibilities for growing neglected crops for large-scale agriculture. They furthermore provide environmental services. It is hard to say what "correct" or "proper" levels of utilization are, but it is clear that many neglected species are underutilized in comparison to their production and nutritional worth. (FAO 2012).

These crops' overall decline might weaken their genetic foundation and make it impossible to exploit unique, helpful features for crop adaptation and enhancement. Because these crops aren't as competitive as other crop species grown in the same agricultural climate, farmers and consumers are utilizing them less. For a combination of agronomic, genetic, economic, and cultural reasons, many underused legumes that were formerly widely farmed are now becoming less useful (Williams and Haq, 2012).

It is challenging to pinpoint exactly which characteristics of a legume crop constitute "underutilized," yet these characteristics are frequently present. Hammer and colleagues, 2001).

- Connection to the cultural legacies of their birthplaces Local and traditional crops have little documentation on their biological distribution, production, and applications.
- Weak or nonexistent official seed supply networks.
- Manufactured using conventional production methods with minimal or no external assistance.
- Adjustment to a particular agro-ecological niche and marginal land with inadequate or nonexistent institutional seed supply networks.
- Customary applications in certain regions.
- Why Get scant attention from donors, policy and decision makers, extension services, consumers, and technology companies.

➢ *Field Work*

A fieldwork project must take into account a number of factors before it can begin. The primary and most time-consuming aspect of taxonomic surveys and ethnobotanical research is data collection. The tasks at hand must be clearly defined, we must stay focused on our goals, finish the project using our suggested methodology and quantification tools, and seek for funding for our proposal.

Even if every research has its own set of difficulties, the definition of sample size, the study region, the respondents, and the technique are the key problems in every fieldwork. A well-thought-out research proposal must be combined with the establishment of contacts and cooperative exchanges with colleagues and institutions in the host nation. For the purpose of collecting plant materials and conducting research, several nations demand formal licenses. The necessary procedures must be followed and approved before any fieldwork may begin. There is a wealth of information on intellectual property rights since traditional knowledge is regulated and is regarded as intellectual property (Haugen, 2005).

In order to interact with local communities and informants, we also need to outline and work on our purpose, methods of doing research, and our expectations from this study in a more straightforward yet precise manner. We cannot expect to succeed even if we have created the most excellent professional or theoretical proposal, obtained funding, and obtained authorization, if we are unable to communicate our goals and objectives to the individuals with whom we will collaborate.

➢ *Local Awareness*

One factor is that research should be done with locals rather than just for or about them, according to Alexiades (2006). The importance of taxonomy surveys and ethnobotanical studies has increased recently. To preserve local cultural diversity and biodiversity, we must raise awareness among those who live in these areas and support their knowledge by combining our strengths.

III. MATERIALS AND METHODS

The taxonomic survey and ethnobotanical study were conducted from August to November in view to seek and obtain enough information on underutilized grains and oil seeds from the local population about their knowledge of ethnobotanicals importance. All data collected were based on semi-structured questionnaires and oral interview with farmers, grain sellers, researchers, students as well; at the study areas.

The field study was carried out in Ado Ekiti, Igogo Ekiti, Ikeji-ile and Owena in Osun state, IAR&T Apata in Ibadan Oyo state. Consulted were farmers, grain and food dealers, researchers, students, and elderly individuals with extensive knowledge of plants, seeds, and herbs. Interviews using semi-structured questionnaires and oral interviews were conducted with those who inherited the expertise in the research region from their forebears. We did not exclude food canteens from this exercise. This was done in order to compile sufficient data on the plant species, cooking methods, regional names for them, methods of preparation, and any potential medicinal use.

The recipes' listed plant items were gathered, pressed, dried, mounted, and classified in compliance with taxonomic guidelines. Images of the plants and seeds collected for the study and survey were created and delivered to the Institute of Agriculture Research and Training (IAR&T) in Ibadan, Oyo State, Nigeria. This same place was consulted for collection of information on the endangered species which are scarce on the local farm and also for the local and botanical names to corroborate the claims by the farmers and traders. According to Huntington 2000, By comparing the obtained plant samples with recognized taxonomic literature, the taxonomy of the plants was determined. The botanical names and common names (in English) were sourced from the plant database and published reference sources.

ISSN No:-2456-2165

➢ *Study Area*

The study area includes three states in the south-western Nigeria including Ekiti state, Oyo State and Osun State. One of this Western Nigeria's state, Ekiti state, located at latitude 7.7190^0 N and longitude 5.3110^0 E, was one of five states that the military, led by General Sani Abacha, declared to be independent on October 1, 1996. The state, which was formed by carving away a portion of the former Ondo State, encompasses the 12 local government units that formerly comprised the Ekiti Zone. It had 16 Local Government Areas (LGAs) at the time of establishment after four more were divided from the original 16. One of the 36 states (together with the Federal Capital Territory of Nigeria) that make up Nigeria is Ekiti State. It is said that Ekiti State is the Nigerian state with the most professors created. High schools include Federal University of Oye-Ekiti, Federal Polytechnic, Ado-Ekiti, Ekiti State University (EKSU), Afe Babaola University Ado-Ekiti, and College of Education, Ikere-Ekiti (wiki.com).

Two markets were visited on September 12, 2017 namely Bisi market and king's market both in Ado Ekiti, the state capital in search for three grain legumes named Pakala (*Phaseolus lunatus*) commoly called Awuje, Feregede (*Cajanu cajan*), and Otili (*Sphenostylis stenocarpa*) `by Ekiti people and other melons family which are part of the oil seeds. Another village, Igogo Ekiti (7.9790^0 N and 5.1615^0 E) in Moba Local government area of the state was as well visited on august 28th to 31st to interview local farmers, herbalist and herb sellers in the local Market call **(UMOGUN MARKET)** about the ethnomedicinal importance of the aforementioned plant.

Osun State is an inland state in southwest Nigeria with latitude 7.5876 0N and longitude 4.56240 E. Osogbo is the capital city. Its borders are as follows: Kwara State to the north; Ekiti State and Ondo State to the east; Ogun State to the south; and Oyo State to the west. Osun State Polytechnic, Iree; Ila College of Education; Osun State College of Education, Ilesha; Osun State College of Technology, Esa-oke Uniosun are a few of the state's educational institutions (wiki.com).

A farm in Ikeji-ile (7.4824^0 N and 4.9260^0 E), a village along Ife-Akure express way, close to Ipetu Ijesha was visited on September 26-28 in search for African oil seed, and on 27th, owena market located in Owena town; along Ondo-Akure Road was visited to gather more information on the ethnobotanical value of grains and oil seeds.

➢ *Oyo State*

Oyo is an inland state in southwest Nigeria with its capital city of Ibadan. It is commonly referred to as Oyo State to differentiate it from the city of Oyo. Its latitude is 8.11960 N and its longitude is 3.41960 E. Its borders are as follows: Kwara State to the north; Osun State to the east; Ogun State to the south; and the Republic of Benin to part of the west. The Old Oyo National Park is one of the many natural wonders of Oyo State. The critically endangered African wild dog, *Lycaon Pictus*, once lived in this area; however, it is currently believed that this canid has been locally exterminated. (wiki.com).

Institute of agriculture research and training apata, in Ibadan was visited to collect Information on other underutilized grains and oil seeds. Apata market in Iwajowa Local government area of Ibadan was visited as well to obtained information from herb sellers, grain sellers, and few farmers, researchers, students.

➢ *Survey*

The survey was conducted to obtain information about underutilized grains and oil seed. Data were collected based on oral interview and semi-structure questionnaires with farmers and market women, farmers, grain sellers, researchers, students, herb sellers, old men and women they provide the local names and their ethnobotanical/medicinal importance so also the means of processing into food, recipes and oil. 3.3 Enquires from farmers, grains traders, researchers and others. Information was obtained and gathered from farmers and market women farmers, grain sellers, researchers, students in the areas under survey so as to know legumes grains and oil seeds that have existed in time past if any, existing in the present time in the area. Those consulted provided the local names of the plants seen on the farm and the seeds found in the market. Identity and name of the samples was confirmed by IAR&T. Pictures of plants gathered during field work was captured using digital camera.

➢ *Questionnaire Administration*

To gather pertinent ethnobotanical data, semi-structured questionnaires and oral interviews were used. With the assistance of skilled interviewers, one hundred (100) semi-structured questionnaires were distributed; in certain instances, respondents who declined were offered financial incentives for travel and lodging. There were three sections in the questionnaire. The first portion included questions about the respondent's nationality, gender, and length of practice or employment in order to gather demographic data. In the second section, you will find open-ended questions regarding your personal experiences, such as where and how traditional knowledge about underutilized grains and oil seeds was formed, how useful they are as food, their folk, local, and traditional names, when they were collected, how readily available they were, how they were processed or cooked, any difficulties you encountered along the way, how the plant was used, how it looked and tasted, etc.

The last part dealt only with functional uses (medicinal) and other things obtained from them be it fiber; any beneficial effect on human health, method of preparation and accompanied side effect. Because many of the respondents lacked literacy, the surveys were read aloud to them in the local tongue, and the investigators completed questionnaires following each interview. Samples of some of the underutilized grains was collected and was taken to IAR&T (Institute of Agriculture Research and training Apata, Ibadan Department of Grain Legumes Improvement Program for proper Identification.

ISSN No:-2456-2165

IV. RESULTS

➢ *Documented Information from the Respondents*

A total of a hundred (100) questionnaires were administered, and 80 was recovered. In which all 80 respondents are Nigerians, the female to male ratio of respondents was 1:1.2 (46% and 54%) respectively, of which 75% are Christians, 20% are Muslims and the remaining 5% are traditional as displayed in figure 8. The different responder groups gave details about the different plant species that were found to be underused oil seeds and grains where 29% are farmers, 30% are civil servant, 21% are traders and the remaining 20% are students as shown in figure 2. In table 4(a), 29% of the respondents get to know about these categories of plants species during their childhood, 31% during teenage and 40% at their adult place. And according to table 4(b), It was recorded that a great percentage of the respondents indicated that their knowledge is both from parent and guardians while others are from school and work place as illustrated below: 55% get to know about crops belonging to this categories from their parent, 20% from there guardians and 11% from schools also 19% from other sources which included place of work and the remaining 3% got the information from friends; figure (7) give precise summary on Data on the age distributions of the informant shows the modal age group being 26-40 years (44%). 55% of the identified plants are underutilized grains and 33% are underutilized oil seeds while 12% falls in between the categories (they are underutilized grains and as well underutilized oil seeds.

➢ *Species Distribution*

Table 1 lists the various plant species along with their families, botanical names, local/vernacular names, uses as food or medicine, taste, other uses as a cure for disease, health benefits, and any side effects. A total of 19 plant species, belonging to seven (7) families, were identified as underutilized grains and oil seeds in the site allocated for the project work. This is a result of the studied regions' rich variety and richness of economically significant plant species. This could be attributed to Nigeria large floral biodiversity. With regards to table 2, the family Fabaceae is the most abundant occupying 47% of the population followed by Malvaceae with the next higher frequency of occurrence of 16% and next is Euphorbiacea family with 11% of the total population; families like Curcurbitaceae, Moringaceae, Pedaliaceae and Mimosaceae has a low frequency have just 1 and 2 respectively.

Most of the plant identified in this work has been certified by different researchers but local (herbalist) and advanced/international and according to them are quite effective plant species like *Jatropha curcas*, *J. gossipifolia*, *Sphenostylis stenocarpa, Pentaclenthra macrophylla, Pakia biglobosa* were noted by each of the four categories of responders. Most of the recipes were given by the famers while others were collected from the traders and even from the civil servants. This is as a result of the fact that most of the plants are available in the local markets (48%) while others are grown around homes or garden (13%) or forest (15%) and about 10% are available in other different places and about 3% are not really accessible due to the fact that they are endangered species this is credited to figure 3. Medicinally, the recipes are either freshly collected (80%) or dry plant (20%).

A column of data in table (1) indicated various plant parts used for food as well as medicine, the leaves and the stem back were usually common parts used as all the plants has their varies 23 part utilized in fighting one health challenges/ hunger; there seeds and pods are commonly utilized as food/feed for human and animal consumption.

Figure 4 revealed the opinion of the respondent on if any of the plant species is used as food, for how long the plant species has been using as food or food recipes and 61% of the total population of the respondent replied was yes, while 14% responded no, and the 9% and 10% gave response on how long the plant species has been using as food, as yes, in the past and yes, nowadays.

Data also revealed the rate of consumption and information was obtained from the informant based on if they eat it once a day, once a week, once a month once in a year and some haven't eaten it before but only hear or read about it. The data are express as follow 24%, 33%, 15%, 10%, and 18% respectively as shown in figure 7.

It is interesting to know that these identified species were known to serve as cure for more than one infection, they are found to possess various therapeutic advantages as stated by the respondent during the oral interviews and are used in the local communities- including anti-bacterial as well as increasing fertility in woman *Pentaclenthra macropylla*, in the treatment of skin disorder and snake bite *J. gossipifolia and J. cucars* etc.

➢ *Method of Preparation*

As food, various method of preparation was adopted ranging from cooking, roasting, fermentation, steaming, and some plant required combination of two to 3 method to give a save wholesome meal/oil, others/pressing method was employed in the oil extractions from the oil seeds where cooking method occupied greater percentage (49%) fermentation 16%, roasting 11%, steaming 15%, others/pressing 15% as shown in figure (8).

As medicine, each plant species has its own technique for preparing it to fulfill the demands of various diseases and health issues; the recipes can be mixed with a few others. The oral interview indicated that the most often used technique of preparation in the research locations for all illnesses except skin disorders was decoction of the plant in water. A few are given as an extraction, infusion, or chewed. Most informants recommended water as a good solvent; however, alcohol or sorghum water were rarely utilized, and many may be consumed as stew/ soup.

➢ *Species Growth Habitat*

Of the 19 plant species identified, vine/trailers/climber/ticket made up of 45% of the identified population, shrubs 36%, herbs 11% and trees 11%. This is

represented in table (3). The plants which were accessible in market are 48% while the remaining was from garden (16%) or forest (19%).

The most common side effects associated with the use of plant species as food and herbal recipes are nausea (25%), vomiting (25%), others (19%), and none (31%), depending on the respondent's individual body to food and medicine, as shown in table (5).

V. DISCUSSION

This study has unveiled the essential roles of the selected plants under the category 'underutilized grains and oil seeds' based on their ethnobotanical importance. According to Kochhar, S. L. (2016), Ethnobotany simply means studying plants utilized by prehistoric communities in various regions of the world, as well as the interaction between plants and people; plants in this category have a wide range of functions, which include; As food, Lima bean, Sword bean, Bambara groundnut, Jack bean, Yam bean have been used by man for food and has recorded, remarkably only few plants are commonly cultivated, amounting to a few hundred species and just three (wheat, rice and maize) account for 90% of global food production(ethnobotany-plant-food.html). The majority of the plants in this research are theoretically edible but are being used locally by indigenous people as healthy sources of food; many of these small crops might possibly be produced more broadly, providing a huge benefit to a much larger number of people. Worldwide, plants have historically been used extensively in the treatment of human illness and trauma (Principe, 1991). They have been used as a source of medicines in modern medicine, either as pure compounds or as models for the synthesis of new drugs, or as starting materials for the partial synthesis of useful molecules (Hansel, 1972). Folklore knowledge from many cultures is a valuable resource for identifying plants with therapeutic characteristics (Balandrin *et al*., 1993). Hence the nineteen plants belonging to different families mentioned by the respondents are in one way or the other medicinally/therapeutic important be it the seeds, fruit, stem, bark, or the whole plant are employed in treatment of human defect such as skin disorders, throat problems, stomach disorders, STDs, foot and mouth disease, and lots more as identified by the respondents. This is in line with the findings of Gbile and Adesina from 1986, who stated in their work at the time that "this work has supported the previous findings based on the findings, and herbs have generally served as a repository of healing materials and have been acknowledged to be safe generally without or with minimal side effects."

There exist several methods to include underutilized grains and oil seeds into the human diet. Examples include boiled and roasted Bambara nuts, peanut butter, African locust beans, bean soup, bean cakes and pudding, Dawadawa, and so on. Grain proteins are sufficient in essential amino acids and an excellent source of other minerals like calcium and phosphorus, claims Adeyeba (2014).

In beautification and purification of the environment, many of these plants are employed for aesthetic purposes, Architecturally, clusters of some of these plants are utilized to construct walls to create a sense of enclosure and to define boundaries e.g., *Jatropha curcas*, create canopies for other plants e.g., *Canivalia gladiate*, *C. ensiformis*, *Phaseolus lunatus*. And also serves as snake repellent as mentioned by one of the informants, and in beautification, *Hibiscus sabdarifa* (red type) are used because of its color.

Because their seeds contain protein, grain legumes and oil seeds are candidates to supply the growing need for plant protein for food and feed. Concerns over farming's long-term viability have been raised by the highly specialized and species-reliant nature of crop production worldwide (Tilman et al., 2002). Legumes' importance in animal nutrition have been acknowledged both locally and globally as a significant source of plant protein as well as other health advantages; *P. lunatus*, *C.gladiata*, *C. ensiformis*, *Pachyrhizus erosus*, *Sphenostylis stenocarpa*, *Hibiscus cannabinus* Seeds, *H. sabdarifa* seeds, *Cajanu cajan* are important legumes for human consumption and most importantly animal feed this is in conformity to De Ron (2015).

Even though the species are different, there are many types that have the ability to produce oil, therefore grains and oil seeds are likely to play an increasing part in future food/oil supply. According to the respondents, diverse seeds are raw materials for oil production since they are high in lipids and can provide the majority of the population's oil and fat needs. Cotton seed, Kenaf seed, castor seed, Roselle seed, and African oil bean, Mellon are the most common conventional edible vegetable oils and fats produced globally through traditional and industrial procedures.

In Nigeria, traditional methods of producing oil are very important, especially for rural communities who have easy access to unprocessed oil. Family or group activities are the necessary abilities for this traditional processing, which is often environmentally favorable (Odey, 1993). The absence of effective conservation measures for local oilseeds before, during, and after processing affects the quality and amount of oil produced locally (*international journal of agronomy*). Various investigations have showed that different locations in different parts of the world contain a significant quantity of indigenous ethnobotanical knowledge (Tesfaye and Zemede, 2009). For plants in the underutilized grains and oil seed category, respondents were asked for their local names; these names were then recorded using standard texts along with the corresponding botanical names. Due to their lack of consistency and uniformity, local names are not directly indicated for scientific descriptions of plants (Singh, 2008); yet, they can be seen as a useful method for gathering relevant plant data for this kind of survey. The ethnobotanical surveys carried out in various African countries have documented some of the plants found in the research (Ayodele, 2015; Adekunle, 2008; Idowu et al., 2010, Soladoye *et al*., 2010; Ogbole and Ajayeioba, 2010; Oni, 2010).

This study has shown vividly that native/local people utilized plant in various ways especially as food and medicine. The knowledge about underutilized grains and oil seeds was based on structured semi-questionnaires and oral interaction with few farmers and traders in local areas and with civil servants and students that has little background information or read about the plants which does not give room for proper documentation on the identification, taxonomy, anatomy and ethnobotanical survey of the plants.

The underutilized grains and oil seeds encountered were diverse and distributed across seven (7) families with a total of 19 plants species. These plants are common before in some parts of the study area, some are scarce now and some are not even available at all only their names reflected in the eulogy of such community or village and are only available in research institute and even not all; has many only have documented information on them but practically. Their seeds are not available in their stores and the plant are nowhere to be found on the field owning to annual national strike action embarked by the worker of this institute. Out of the plants encountered, it was observed that the Fabaceae and Mimosaceae family have the highest number of edible plants followed by Malvaceae and Pedaliacea having the oily properties. Literature has revealed that most food recipes, oil produced, animal feeds and synthetic drugs that have been used in the past have negative effect that were grave consequent in some cases, as many of the plants in this survey contain many anti-nutritional factors (Olapade *et al*.,2002). For this reason, it is imperative for ethnobotanists, food/feed scientist, oil producers, pharmacognosy's to do more analysis on the 19 plants mentioned in this work.

VI. CONCLUSION

The taxonomic survey and Ethnobotanical study have documented selected plant of grains and oilseeds with underutilized attributes. These plants are highly advantageous because they are cheap, readily available (not all) and could be used as a tool to fighting hunger and poverty in local area and as remedy to cure different diseases, provide raw materials and as well as aesthetic values. Orphan grains and oilseeds are domesticated crops/plants having valuable qualities that are less important than major world crops owing to usage and supply limits. They do, however, serve an important role in many developing nations, providing food security and nutrition to consumers as well as money to resource-poor farmers.

They have been generally ignored by both scholars and business due to their poor economic value in the worldwide market. Orphan grains and oil seeds are more suited to harsh soil and climatic conditions than the major legume crops, with strong resistance to abiotic environmental challenges such as drought. They can also create chemicals of therapeutic value as a stress reaction.

As a result, underutilized grains and oil seeds are a possible source of essential features for introduction into main crops to help withstand the challenges associated with global climate change. Many of these previously unstudied crops are currently being researched using modern large-scale genomics approaches, with the first breakthroughs reported in the genomics field. However, more resources and personnel are required to unlock and apply the potential of underutilized grains and oilseeds in the future.

RECOMMENDATIONS

Several strategic aspects must be considered if we are to successfully promote underutilized grains and oil seeds while ensuring that benefits are distributed evenly among community members. As a result, I propose that more research needs to be done on the processing of underutilized legumes; that value addition needs to be accomplished through appropriate packaging; that appropriate processing facilities need to be improved; that improved product quality and safety are required; and that combining grains and cereals can result in improved nutritional quality.

Focusing on local values, indigenous knowledge, and uses: This strategy strengthens the relationship between variety and sustainable uses, which is vital when assessing marketability.

Recognizing underused grains and oil seed species as a public benefit to ensure the continuous availability and accessibility of plant genetic resources to current and future generations.

Using market-oriented tactics to analyze and improve demand; this strategy will establish sustainable markets and limit the danger of overestimation of economic potential. Inter-disciplinary work: As noted in (LEISA Magazine, March 2004), such an approach is necessary if the potential of underused species--including nutritional, economic, and social aspects--are to be explored at all levels.

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ISSN No:-2456-2165

LIST OF FIGURES

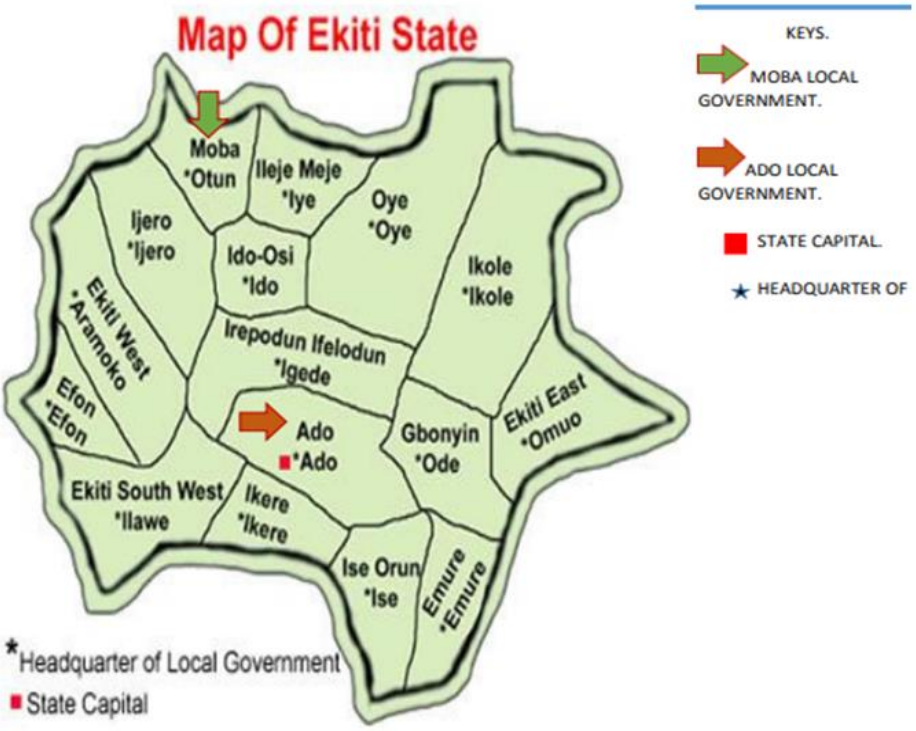

Figure 1: Map of Ekiti state showing the selected local government in which the town visited are located.

Sources: myweather2.google/Nigerian/tribunenewspaper/ekitistate.map

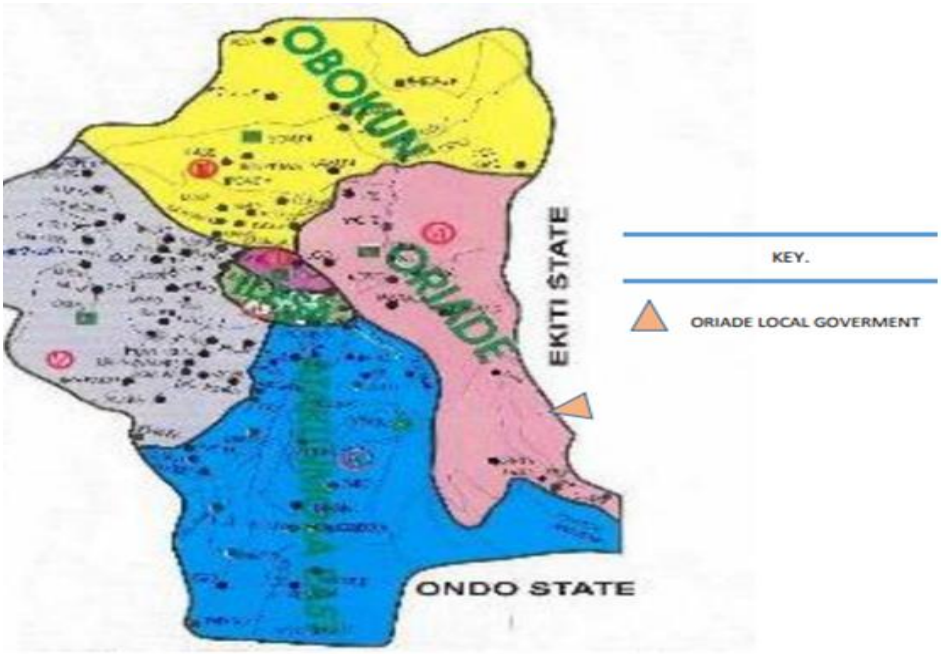

Figure 2: map of Osun state showing the selected local government in which the town visited are located.

Sources: https://en.m.wikipedia/osunstate/oriadelocalgoverment.org

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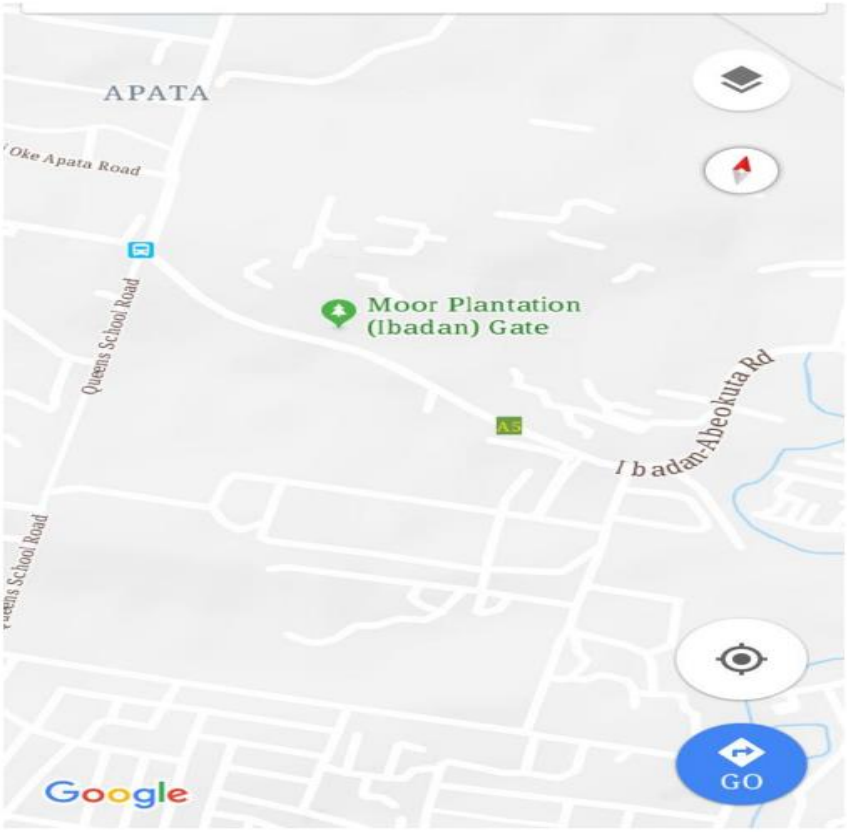

Figure 3: map of Apata area in Ibadan

Sources: googlemap.net

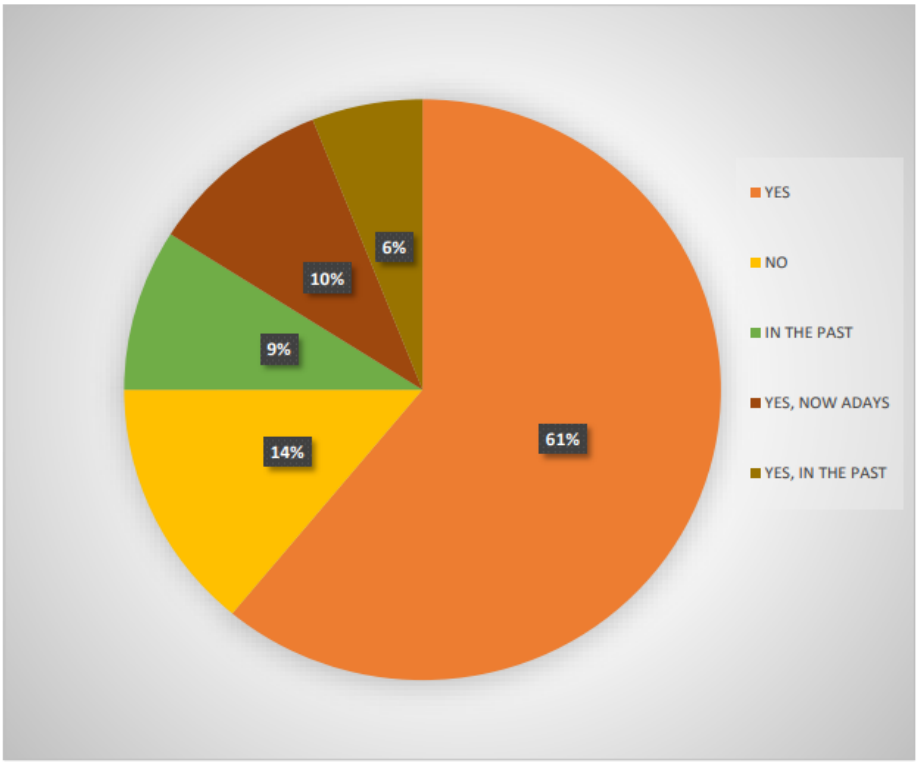

Figure 4. Pie chart showing usefulness any of the plant species as food and for how long.

ISSN No:-2456-2165

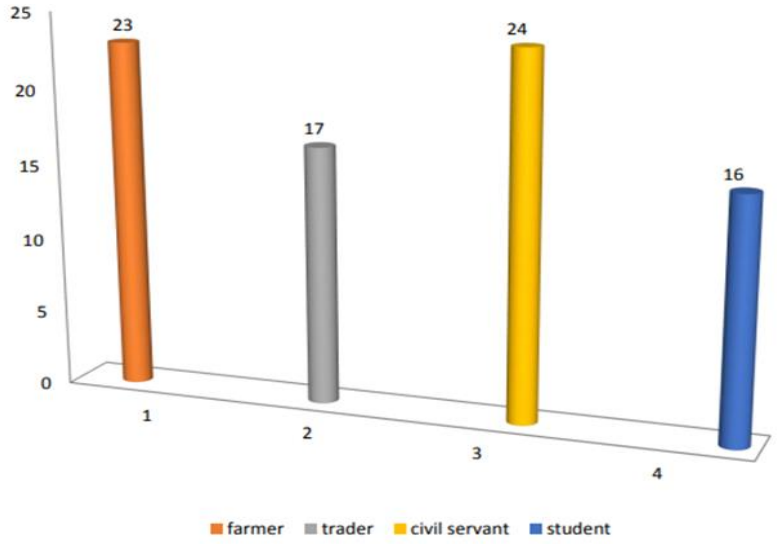

Figure 5: Bar chart showing the occupation of the respondent.

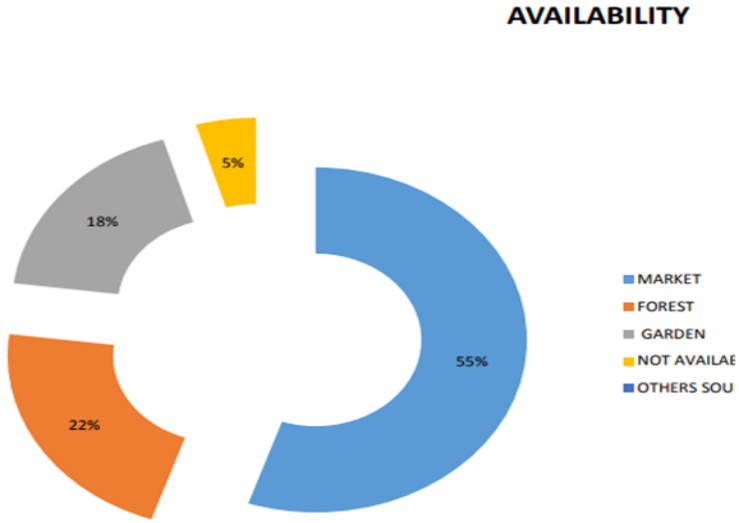

Figure 6: Graphical representation showing the percentage of the plant availability

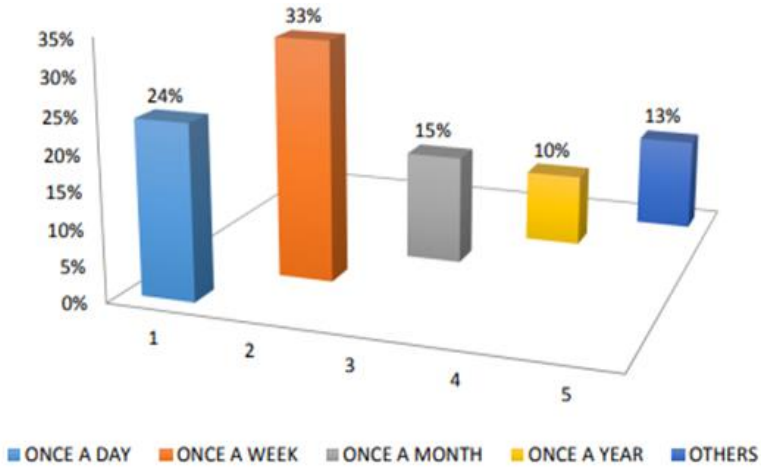

Figure 7: Rate of consumption

ISSN No:-2456-2165

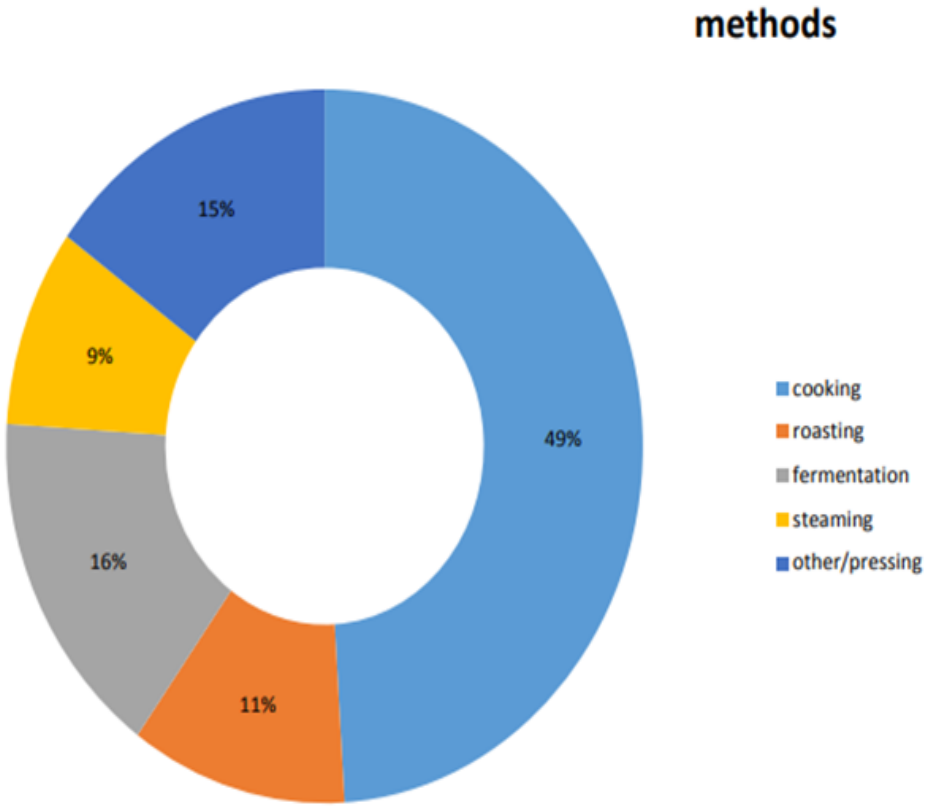

Figure 8: Method of preparation.

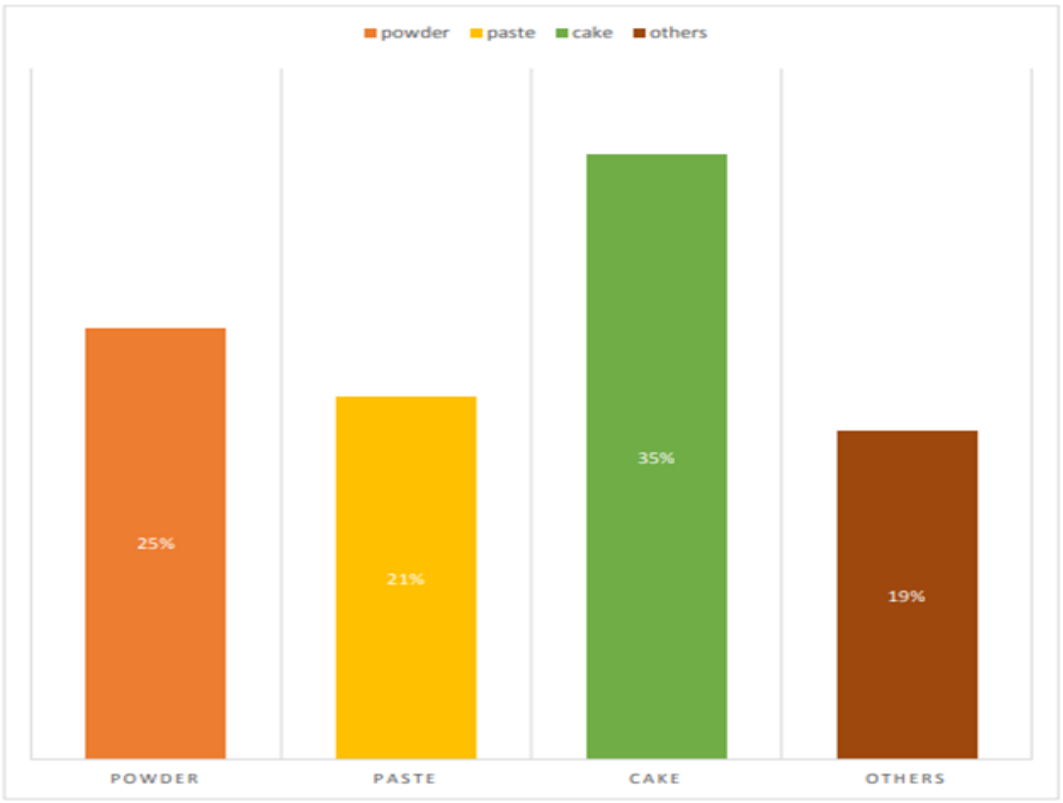

Figure 9: Form of final/semi-final food product

ISSN No:-2456-2165

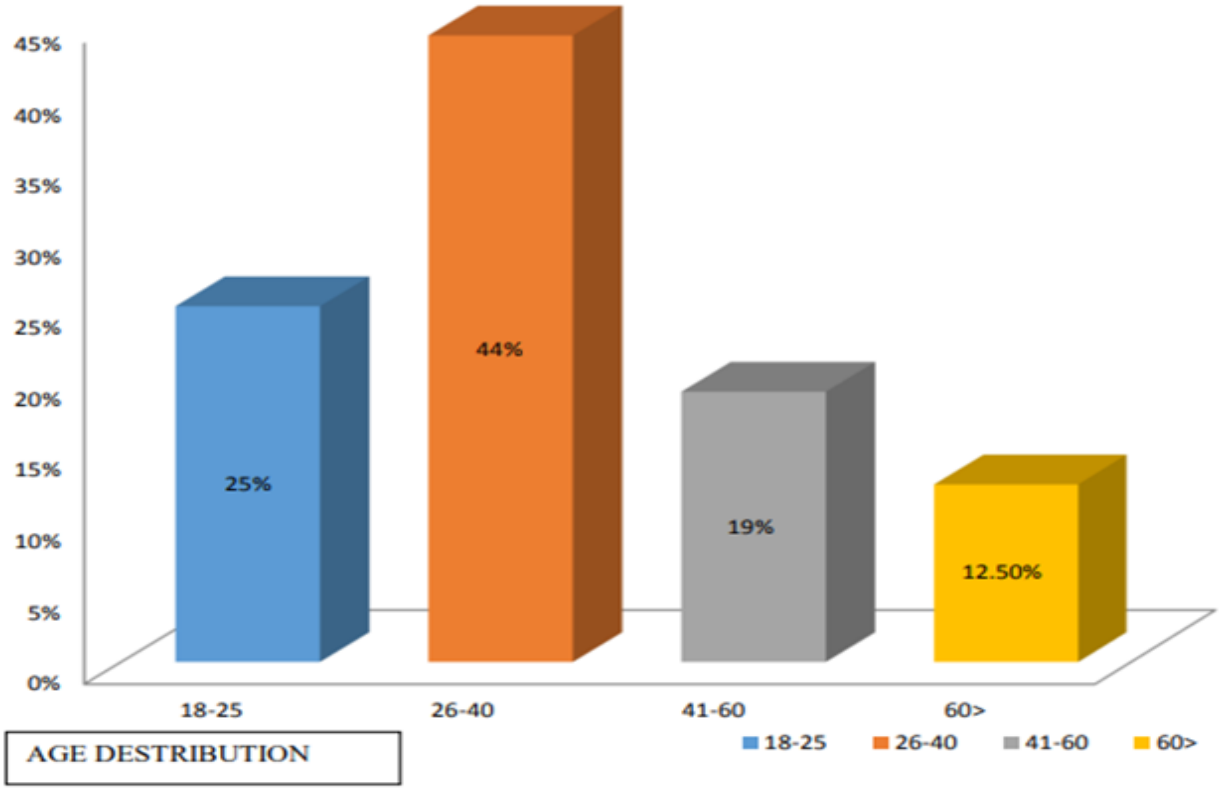

Figure 10: Chart showing the age bracket giving 26-30 as the modal age.

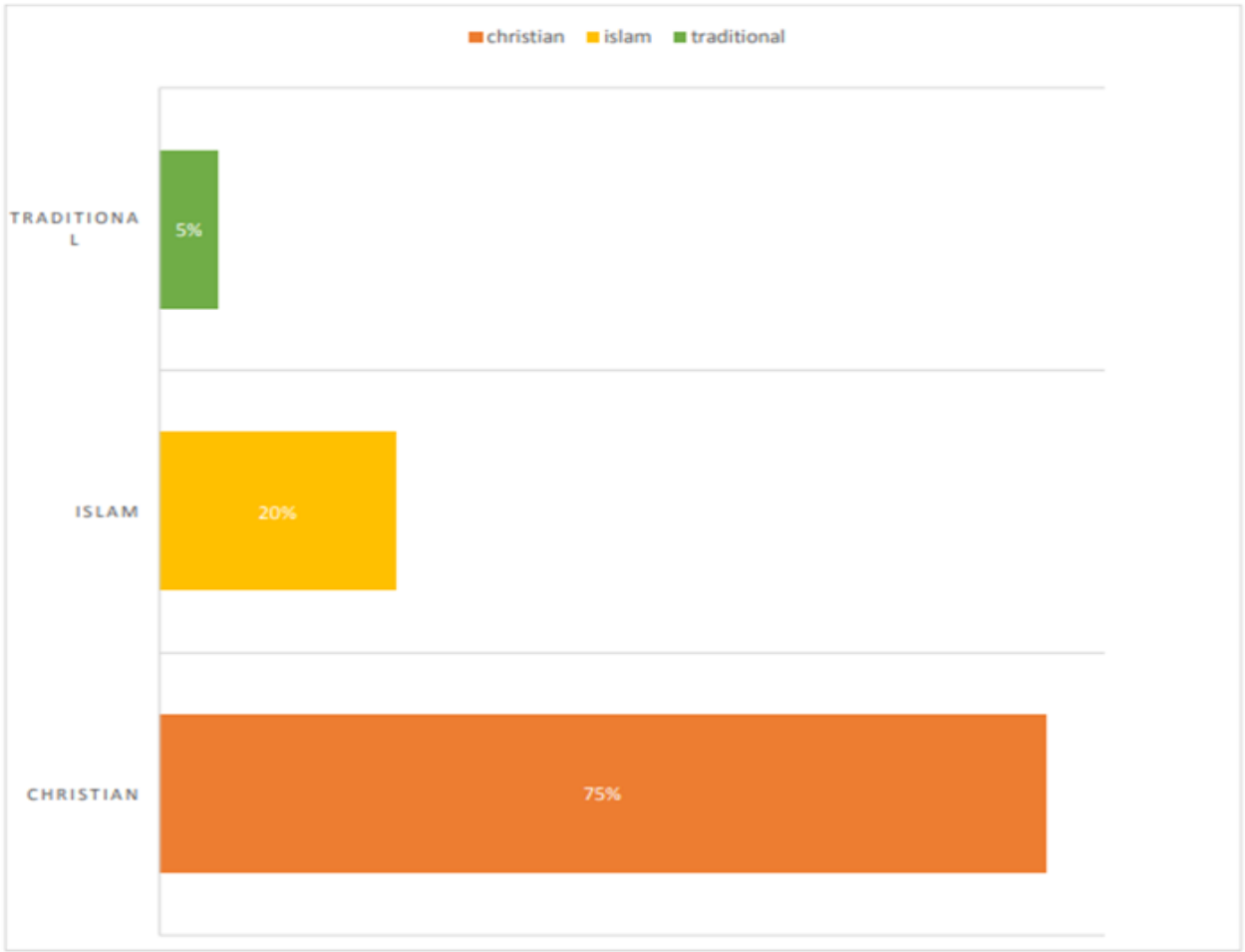

Figure 11: Religion of the respondent.

ISSN No:-2456-2165

LIST OF PLATES

Plate 1:- Lima bean stand

Plate 2:-Harvested pods

Plate 3:-Seeds

Plate 4: ***C. gladiate*** plant with the pods.

Plate 5: ***C. gladiate*** seeds.

Plate 6: Banbara groundnut plant.

Plate 7: Banbara groundnut seeds

Plate 8: *C. enciformis* stand.

Plate 9: *C. enciformis* Seeds.

ISSN No:-2456-2165

Plate 10: *P. vulgaris* Stand.

Plate 11: *P. vulgaris* Seeds.

Plate 12: *S. stenocarpa* Stand

Plate 13: *S. stenocarpa* Seeds.

Plate 14: *S. stenocarpa Tuber*

Plate 15: Seed of *Cajanus cajan*

Plate 16: Foliage with fruit of *C. cajan*

Plate 17: *Lablab purpureus* Stand

Plate 18: *Lablab purpureus* Seeds

ISSN No:-2456-2165

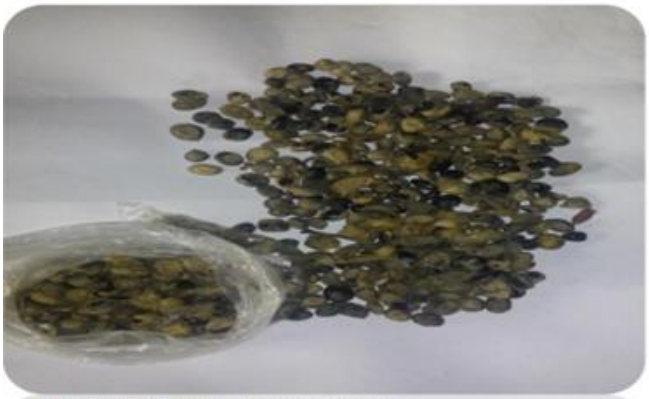

Plate 19: *Parkia biglobosa* Seeds

Plate 20: *Parkia biglobosa* Tree.

Plate 21: *Citrullus colocynthis* plant.

Plate 22: *Citrullus colocynthis* Seeds

Plate 23: *P. macrophylla* shell

Plate 24: *P. macrophylla* Seeds.

Plate 25: *H. cannabinus* plant.

ISSN No:-2456-2165

Plate 26: *H. sabdariffa* white

Plate 27: *H. sabdariffa* red

Plate 28: *H. sabdariffa* fruit

Plate 29: *G. herbaceum* Stand

Plate 30: *J. curcas* stands, flowers and fruit.

Plate 31: *S. indicum* Stands.

Plate 32: *M. oleifera* Plant

Plate 33: *R. communis* plant.

ISSN No:-2456-2165

LIST OF TABLES

Table 1. **Enumeration of plants.**

Common/English Name	Botanical name	Family	Local/vernacular name	Habitat/form	Part use as food/medicine	Method of preparation to food/medicine	Final forms	Health benefit	Side effect
Lima Bean	*Phaseolus lunatus*	Fabaceae	Pakala(Ekiti)	Vine (twinners)	Seeds, young stems	Cooking, roasting	Powder, paste, cake,	Lower blood sugar	Nausea
Sword Bean	*Canivalia gladiate*	Fabaceae	Pondodo(yoruba)	Vine (vigorus climber)	Seeds, stem,leaf.	Cooking,steaming.	Powder, cake,	Lower blood sugar	Vomiting, Dizziness.
Bambara groundnut	*vigna subterranea*	Fabaceae	Boro (Yoruba), Ukpa (igbo)	Herb	Seeds	Cooking, steaming And Boiling.	Powder, paste, cake.	Lower cholesterol.	None.
Jack bean	*Canivalia ensiformis*	Fabaceae	Sese unla	Vine (twiner)	Seeds and young stems	Cooking with changing of water intently	Bean meal, powder, cake.	Reduces diabetes effect.	Fever, diarrhea
Kidney bean	*Phasseolus vulgaris*	Fabaceae	Sese pupa	Vine (runners)	Seeds and the stem	Cooking, steaming.	Paste, powder, bean meal.	Prevent constipation.	Nausea.
Yam bean	*Pachyizus erosus*	Fabaceae	Jicama	Vine(trailers)	Seeds and tuber	Cooking	Yam flour, bean meal.	Use as insecticide	poisionous
African yam bean	*Sphenostylis stenocarpa*	Fabaceae	Pempo, sese, giliabadan	Vine (climber)	Seeds and tuber	Cooking, steaming, roasting.	Cake, powder, yam meal	Treatment of diabetes	Nausea
African locust bean	*Pakia biglobosa*	Mimosaceae	Iru/nere	Tree	Seeds/ the whole plant	Steaming, fermentation	Seasoning, soup.	Use against diarrhea	None
Melon	*Citrullus colocynthis*	Curcurbitaceae	Egunsi/Bara	Vine	Seeds/fruit and leaves	Cooking	Powder, paste.	Skin disease	None
African oil bean	*Pentaclenthra macrophylla*	Mimosaceae	Ugba(Igbo), Aapara (Yoruba)	Tree	Seeds, fruit,	Fermentation, cooking	Powder , soup,	Fight infertility	None
Kenaf	*Hibiscus cannabinus*	Malvaceae	Kenaf	Shrub	Seeds	Pressing	Oil	Skin rashes	None
Rossel	*Hibiscus*	Malvaceae	Isapa/sobo	Shrub	Seeds/fruit	Pressing/	Oil, sobo	Detoxification	None
Cotton	*Gossypium arboretum*	Malvaceae	Owu	Shrub	Seeds, leaves.	Pressing, blending	Oil, soup	Use against fever	None
Wild cassava	*Jatropha curcas*	Ephobiaceae	Lapalapa/Botuje	Shrub	Seed, leaves, steam, latex	Pressing for oil, fermentation for biogas	Oil, biogas	skin problem	Nausea
Sesame	*Sesema indicum*	Pedaliaceae	Morogbo	Herb	Seeds, leaves and root.	Pressing, cooking,	Oil, soup	To stop constipation	None
Moringa	*Moringa olifera*	Moringaceae	Ewele	Shrub/small tree	Whole plant, seed for oil.	Pressing	Oil, powder.	Servers as detoxifier	None
Pigeon pea	*Cajanus cajan*	Fabaceae	Otili	Shrub	Seeds, young stem.	Cooking, steaming.	Powder, paste, cake.	Supply blood	
Castor plant	*Ricinus communius*	Euphorbiaceae	Iiara	Shrub	Seeds	Pressing	Oil		None
Lablab	*Lablab purpureous*	fabaceae	Werepe	Vine	Seed, leaves, root	Roasting, cooking,	Powder, cake,	Lower blood sugar	Skin hitching

ISSN No:-2456-2165

Table 2: Species distribution according to family

Family	Number of species	% Frequency
Cucurbitaceae	1	5
Euphorbiacea	2	11
Fabaceae	9	47
Malvaceae	3	16
Mimosacae	2	11
Moringaceae	1	5
Pedaliaceae	1	5
Total	19	100

Table 3: Plant habitat and their frequency.

Plant habitat	Frequency	% Frequency
Tree	2	11
Herb	2	11
Shrub	7	36
Vine	8	42
Total	19	100

Table 4: (A) Place and (B) Source of knowledge formation

PLACE(A)	FREQUENCY	% FREQUENCY	SOURCE(B)	FREQUENCY	%FREQUENCY
Child hood	23	29	parent	44	55
Teen age	25	31	Guardian	16	20
Adult	32	40	friend	2	3
			School	9	11
			Others	9	11
Total	80	100	Total	80	100

Table 5: Side effect when used as food/medicine

Side effect	Frequency	% Frequency
Nausea	20	25
Vomiting	20	25
Others	15	19
None	25	31
Total	80	100

ISSN No:-2456-2165

APPENDIX.

FEDERAL UNIVERSITY OF AGRICULTURE, ABEOKUTA

COLLEGE OF BIOLOGICAL SCIENCES

DEPARTMENT OF PURE AND APPLIED BOTANY

QUESTIONNAIRE

Dear respondent,

I am a student in the department of Pure and Applied Botany of the aforementioned named institution carrying out a Taxonomic Survey and Ethnobotanical study on some Underutilized Grains and Oil Seeds in selected town/ villages of three southwest state of Nigeria; Osun, Oyo, and Ekiti State.

Information based on your knowledge of Ethnobotanical use of underutilized grains and oil seeds will be highly appreciated; and information given will be strictly used for scientific documentation only.

SECTION 1: DEMOGRAPHIC INFORMATION

Sex **Male** ☐ **Female** ☐

Ages (years) **18-25** ☐ **26-40** ☐

41-60 ☐ **>60** ☐

Religion **Christianity** ☐ **Islam** ☐ **Traditional** ☐

Nationalty **Nigerian** ☐ **Non-nigeria** ☐

Occupation **Farmer** ☐ **Trader** ☐ **Civil Servant** ☐ **Student** ☐

ISSN No:-2456-2165

SECTION TWO: PERSONAL EXPERIENCE

Place/source of formation of the traditional knowledge on underutilized grains and oil seeds

PLACE OF BIRTH;

Childhood place: _____

Teen age _____

Adult place _____

SOURCE;

Parents ☐ **Guardians** ☐ **Friends** ☐ **School** ☐

Others_____.

Categories of plant: Underutilized Grains ☐ **Oil Seeds** ☐

Do you use any as food? Yes ☐ **No** ☐ **In the past** ☐ **nowadays** ☐

Which one(s)

_____,_____,_____,_____.

Underutilized grains and oil seeds mentioned:

Folk name; Yoruba: _____**s**

Igbo: _____

Others: _____

In what period of the year do you collect these plant/plant products? _____.

During the collection period, how often do you eat it? Once a day ☐ **Once in a week** ☐

Once a month ☐ **Once a year** ☐ **I've never eaten it, only heard about it** ☐

Availability of underutilized grains and oil seeds: Market ☐ **Forest** ☐

Around house/garden ☐ **Not available** ☐

METHOD OF PROCESSING INTO FOOD/ OIL (FOOD INGREDIENTS)

What part of the plant is used? Seeds ☐ **Leaves** ☐ **Underground stem** ☐

Stem ☐ **Others**_____.

How do you prepare it? **Cooking** ☐ **roasting** ☐ **fermentation** ☐
steaming ☐ **Others** _____.

What is the form of the semi-final or final food/food ingredient?

Powder ☐ **Paste** ☐ **Cake** ☐ **Others** _____

Is the structure or composition of the final processed food or food ingredient altered because of the process by which the food has been prepared? Yes ☐ **No** ☐

If Yes, what does this change? **Taste** ☐ **Colour** ☐ **Others** _____

Any challenge(s) during cooking? **Takes more time** ☐

Others_____

TASTE

What does it taste like? **Sweet** ☐ **Bitter** ☐ **Sour** ☐

Others_____.

SECTION 3: FUNCTIONAL USES (MEDICINAL)

Do you use any of the mentioned underutilized grains and oil seeds for medicinal uses?

Yes ☐ **No** ☐

If yes, give instance(s): _____.

ISSN No:-2456-2165

Does the used underutilized grain and oil seeds have any beneficial effect on your health?

Yes ☐ **No** ☐

If Yes, describe these effect in details: _____.

Do they have any adverse effects? Yes ☐ **No** ☐

If Yes, which of the following? Nausea ☐ **Vomiting** ☐

others_____.

Do you think they have any impact on your life and your health? Yes ☐ **No** ☐

Does these plant relieve any disease? Yes ☐ **No** ☐

If Yes, which ones(s)?_____, _____, _____.