

Full Length Research Paper

Ethno-medicinal and culinary uses of *Moringa oleifera* Lam. in Nigeria

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Moringa oleifera is a highly valued ethno-medicinal plant in many countries of the tropics and subtropics. It is a multipurpose plant grown and used in many countries including Nigeria. This study was an attempt to assess knowledge-base of the usefulness and document current utilization of *M. oleifera* in Nigeria. Data were collected between August and November, 2011 from 280 respondents across Nigeria through the use of a structured interview schedule. Majority (98.9%) of the respondents indicated that they had used or seen people using *Moringa* plants for food and medicinal purposes. Most Nigerians were aware of the *Moringa* plant and used it for various medicinal and food purposes, especially the leaves. Specifically, the leaf was used as vegetable in preparing soup, as salad and for making tea; medicinal uses of the leaves included curing of fever (78.7%), treatment of ear infections (71.8%), lowering of blood sugar (diabetes mellitus) (65.2%) and blood pressure (64.7%). There was evidence that the stem and root of *Moringa* plants also have ethno-medicinal values.

Key words: *Moringa oleifera*, traditional medicine, food values, emerging crop, Nigeria.

INTRODUCTION

Moringa oleifera is the most widely cultivated species of a monogeneric family, the Moringaceae, which is native to the sub-Himalayan tracts of India, Pakistan, Bangladesh and Afghanistan. This rapidly-growing tree (also known as the horseradish tree, drumstick tree, or Ben oil tree), was utilized by the ancient Romans, Greeks and Egyptians; it is now widely cultivated and has become naturalized in many locations in the tropics (Fahey, 2005). *Moringa* grows naturally at elevations of up to 1,000 m above sea level.

It also grows well on hillsides, but is more frequently found growing on pastureland or in river basins. It is a fast growing tree and has been found to grow to 6 to 7 m in one year in areas receiving less than 400 mm mean annual rainfall (Odee, 1998).

Moringa is a perennial softwood tree with timber of low quality, but which for centuries has been advocated for

traditional medicinal and industrial uses. It is already an important crop in India, Ethiopia, the Philippines and the Sudan, and has been grown in West, East and South Africa, tropical Asia, Latin America, the Caribbean, Florida and the Pacific Islands. All parts of the *Moringa* tree are edible and have long been consumed by humans (Fahey, 2005).

Moringa possesses many valuable properties which make it of great scientific interest. These include the high protein content of the leaves, twigs and stems, the high protein and oil contents of the seeds, the large number of unique polypeptides in seeds that can bind to many moieties, and the presence of growth factors in the leaves. Equally important is the fact that few parts of the tree contain any toxins that might decrease its potential as a source of food for animals or humans (Foidl et al., 2001).

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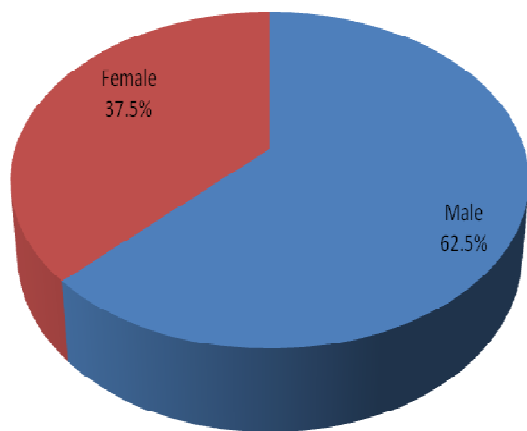


Figure 1. Sex of the respondents.

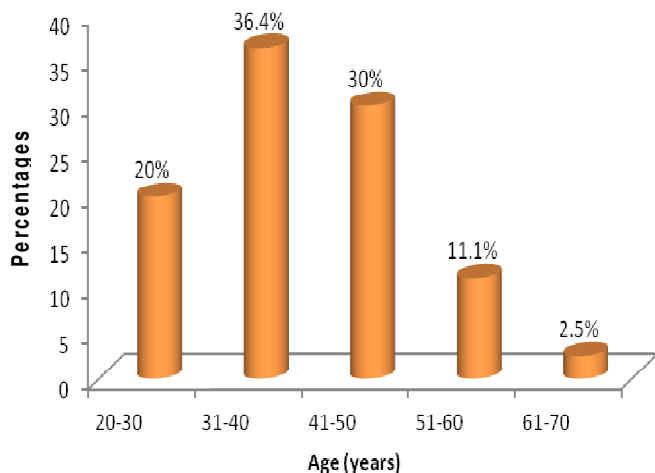


Figure 2. Age of the respondents.

According to Fuglie (1999), the many uses for *Moringa* include alley cropping (biomass production), animal forage (leaves and treated seed-cake), biogas (from leaves), domestic cleaning agent (crushed leaves), blue dye (wood), fencing (living trees), fertilizer (seed-cake), foliar nutrient (juice expressed from the leaves), green manure (from leaves), gum (from tree trunks), honey and sugar cane juice-clarifier (powdered seeds), honey (flower nectar), medicine (all plant parts), ornamental plantings, biopesticide (soil incorporation of leaves to prevent seedling damping off), pulp (wood), rope (bark), tannin for tanning hides (bark and gum), and water purification (powdered seeds). *Moringa* seed oil (yield 30 to 40% by weight), also known as Ben oil, is a sweet non-sticking, non-drying oil that resists rancidity. It has been used in salads, for fine machine lubrication, and in the manufacture of perfume and hair care products (Tsaknis, 1999).

In the West, one of the best known uses for *Moringa* is the use of powdered seeds to flocculate contaminants

and purify drinking water Jahn (1988) but the seeds are also eaten green, roasted, powdered and steeped for tea or used in curries (Berger et al., 1984, Gassenschmidt et al., 1995; Olsen, 1987). The tree has in recent times been advocated as an outstanding indigenous source of highly digestible protein, Ca, Fe, Vitamin C, and carotenoids suitable for utilization in many of the developing regions of the world where undernourishment is a major concern. *Moringa* has so many potential uses, as such, there is the need to ascertain and document the actual utilization in Nigeria. Information obtained will be important empirical data for advocacy and policy formulation to boost cultivation and increase utilization of *M. oleifera* products in Nigeria.

MATERIALS AND METHODS

This study was carried out in Nigeria. Nigeria is divided into five agricultural zones, namely: North West, North East, North Central, South West, and South East zones, for the purpose of establishing farming system research (Shaib et al., 1997). These five zones cover the agro-ecological environments of Nigeria which has 36 states and the Federal Capital Territory.

A multistage random sampling technique was used in selecting the respondents. In the first stage, 14 states namely Borno, Kano, Adamawa, Kebbi, Kaduna, Niger, Nassarawa, Abuja, Kogi, Benue, Kwara, Oyo, Enugu and Anambra states were randomly selected from the five agro-ecological zones in Nigeria. From each of the states selected, four town/village communities were purposively selected, because of the presence of *Moringa* in the town/village communities. From each of the town/village communities, five persons were randomly selected, making a total of 20 persons per state. In all, a total of 280 respondents constituted the sample size.

Data for the study were collected from the respondents through the use of a structured interview schedule. The instrument was validated before they were administered to the respondents. Data were collected between August and November, 2011. Frequency, percentage and charts were used to elucidate data.

RESULTS AND DISCUSSION

Personal characteristic of the respondents

Figure 1 shows that majority (62.5%) of the respondents were males while the remaining 37.5% were females. Figure 2 shows that reasonable proportions (36.4%) of the respondents were between ages 31 and 40 years, while 30.0% were within 41 to 50 years. About 20% of the respondents were within 20 to 30 years of age. Figure 4 reveals that a sizeable proportion of the respondents (46.1%) were farmers, while 15.4 and 11.8% were missionaries and civil servants, respectively. About 10, 7 and 5% were students, traders, business men/women and artisans, respectively.

This implies that diverse categories of people were sampled to know their opinion about this special plant. Figure 5 further shows that majority (98.9%) of the respondents indicated that they had used or seen people using *Moringa* plant parts. This implies that the respondents

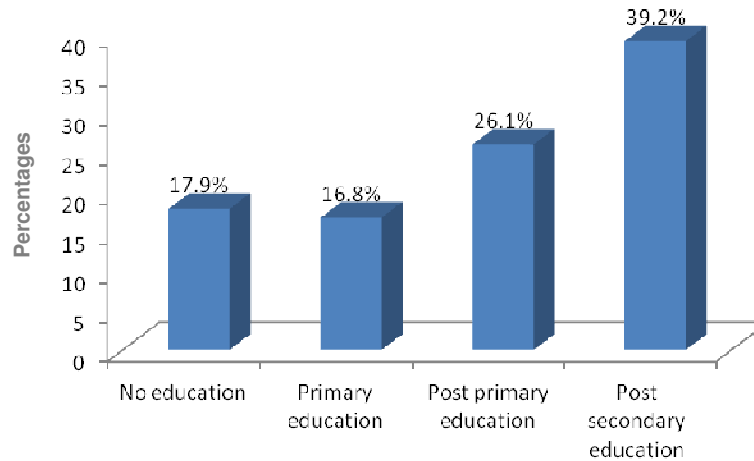


Figure 3. Educational background of the respondents.

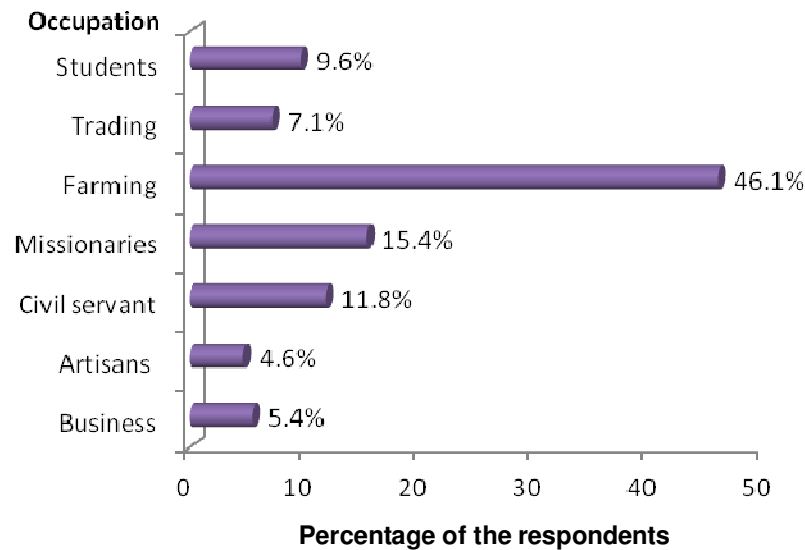


Figure 4. Major occupation of the respondents.

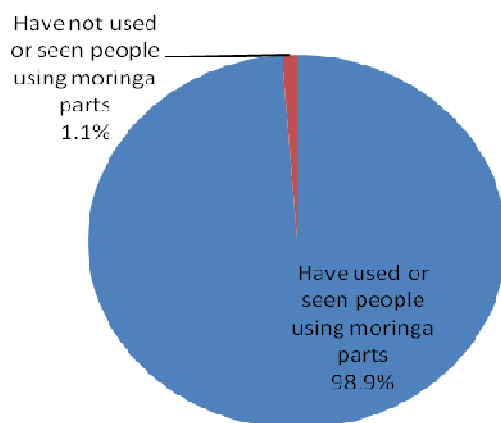


Figure 5. Distribution of respondent on the basis of utilization of the plant.

respondents would be able to respond appropriately to the questionnaire on the utilization of *Moringa* in Nigeria; thus, information deduced from the empirical data collected were reliable, which was the set objective of the study. Except about 18% of the respondents that didn't go to school, most of the respondents were educated (Figure 3).

Culinary uses of *M. oleifera*

Data in Table 1 reveal that majority (95.7%) of the respondents affirmed that *M. oleifera* was used as vegetable in preparing soup. The plant part commonly used for preparing vegetable soup was the leaves (98.1%); although very few (1.9%) respondents acknowledged that

Table 1. Percentage distribution of respondents according to the uses of *M. oleifera* as food.

Use	As food		Part used		
	Yes (%)	No (%)	Leaves (%)	Stem (%)	Root (%)
Used as tea	71.1	28.9	97.0	2.5	0.5
<i>M. oleifera</i> is taken as vegetable in soup	95.7	4.3	98.1	1.9	0.0
Fresh raw leaves chewed as snack	57.9	42.1	95.1	1.9	0.0
Leaves are used with groundnut paste to prepare salad	79.9	20.1	99.0	1.0	0.0
Used as a spice	61.0	39.0	91.3	3.3	5.4

Table 2. Percentage distribution of respondents according to the uses of *M. oleifera* as domestic cleansing agent.

Uses	As domestic cleansing agent		Part used		
	Yes (%)	No (%)	Leaves (%)	Stem (%)	Root (%)
Washing cooking utensils	18.4	81.6	72.7	20.5	6.8
Purification of dirty water for drinking	32.1	67.9	62.5	22.0	15.5
Purification of fish ponds	24.6	75.4	71.9	19.3	8.8
Flocculation of contaminants	23.5	76.5	68.5	20.4	11.1

Moringa stem is used in preparing vegetable soup. About 97.9% of the respondents confirmed that *Moringa* leaves were used with groundnut paste to prepare salad. Table 1 further shows that 71.1% of the respondents acknowledged the use of *Moringa* plant for herbal tea. However, 97% of the respondents asserted that the leaves are the component utilized as tea. Similarly, about 61% of the respondent reported the use of the plant as a spice, but 91.3% of the respondent used *Moringa* leaves as a spice. Data in Table 1 further shows that fresh raw leaves of *Moringa* were chewed as snacks (57.9%). This study substantiates earlier findings of Nnam (2009). In her study, she reported that *Moringa* leaves were eaten as vegetable in soup, porridge and in complementary baby food. The leaves of *Moringa* are widely eaten like rape or spinach in many rural and urban communities in Zimbabwe. Besides the leaves, the young pods are eaten as a vegetable. The leaves are known to have high content of protein, minerals and vitamins. The leaves of *Moringa* are an excellent source of the sulphur containing amino acids, methionine and cystine (Price, 2007).

Uses of *M. oleifera* as domestics cleansing agent

Data in Table 2 reveal that majority (81.6%) of the respondents did not use *Moringa* for washing cooking utensils. Also, majority (67.5, 71.9 and 76.5%) of the respondents did not use *Moringa* for purifying dirty water for drinking, purify fish ponds and to flocculate contaminants, respectively. This implies that *Moringa* is not yet commonly used as a domestic cleansing agent in Nigeria. The few respondents that indicated that *Moringa* could be used as domestic cleansing agent, reported that the leaf is the plant part used.

Medicinal uses of *M. oleifera*

Data on Table 3 shows that majority (78.7%) of the respondents used *Moringa* for the treatment of typhoid and malaria; the plant part mostly used was the leaves (83.0%). About 12 and 5% used the stems and the roots, respectively for this purpose. About 75.4% of the people sampled used the plant to treat ear infection. However, 18.9 and 5.7% used the stem and the root, respectively for the treatment of ear infection. Also, majority (66.9%) of the respondents used *Moringa* to cure eye infection, and 62.6% of the respondent essentially used the leaves while 29.4% of the people used the root.

Other medicinal uses indicated by the respondents included treatment of high blood pressure (64.7%), lowering of blood sugar (diabetes mellitus) (65.2%), treatment of common cold (cough and catarrh) (55.1%), cure of male impotency (53.70%) and treatment of skin diseases/infections (53.2%). The parts of the plants that were mostly used for these purposes were the leaves. This study is in agreement with the earlier findings of Price (2000) and Fahey (2005) that *Moringa* is efficacious for the treatment of diabetes, high blood pressure, fevers, sores and skin infections.

This study is also in support of Mughal et al. (1999) that *Moringa* has numerous medicinal uses, which have long been recognized in the Ayurvedic and Unani systems of medicine. A study conducted by Kasolo et al. (2010) on phytochemicals and uses of *M. oleifera* leaves in Ugandan rural communities established that the leaves are used for treatment of twenty-four medical conditions such as diabetes mellitus, malaria/fever, hypertensive, syphilis and skin disease. *Moringa* has been used in South Asia, in the treatment of inflammation and infectious

Table 3. Percentage distribution of respondent according to the medicinal uses of *M. oleifera*.

Use	Medicinal uses		Part used		
	Yes (%)	No (%)	Leaves (%)	Stem (%)	Root (%)
Treat ear infection	71.8	28.2	75.4	18.9	5.7
Treat eye infection	66.9	33.1	62.6	29.4	8.0
Treat tooth ache	48.0	52.0	47.9	28.2	23.9
As purgative	43.8	56.2	80.2	10.4	9.4
Treatment of common cold cough and catarrh	55.1	44.9	85.6	12.1	2.3
The viral load of HIV positive patients can be kept low	46.6	53.4	83.9	13.6	2.5
As a worm expeller	39.6	60.4	76.7	10.0	12.2
To cure male impotency	53.7	46.3	68.5	12.0	19.4
Blood sugar (diabetes mellitus) can be lowered	65.2	3.8	82.3	14.6	3.1
Improved lactation in newly delivered mothers	40.7	59.3	88.7	7.2	4.1
Lowering high blood pressure	64.7	35.3	80.0	17.5	1.9
Effectively treat Indigestion	40.8	59.2	87.9	8.1	4.0
Treat snake bite poison	42.1	57.9	41.8	20.4	36.7
To cure skin diseases/infection	53.2	46.8	43.9	36.6	18.7
To treat fevers (typhoid and malaria)	78.7	21.3	83.0	12.0	5.0
As an immune booster	44.2	55.8	89.0	5.0	6.0
Reversal of malnutrition in both children and adults	39.9	60.1	86.4	10.2	3.4
To control diarrhea	39.8	60.2	74.7	20.2	5.1
To cure sore throat	29.9	73.1	83.0	12.0	5.0

infectious diseases along with cardiovascular, gastrointestinal, hematological and hepatorenal disorders (Siddhuraju and Becker, 2003; Morimitsu et al., 2000). Nitrile, mustard oil glycosides and thiocarbamate glycosides have been isolated from *Moringa* leaves, which were found to be responsible for the blood pressure lowering effect (Faizi et al., 1994).

It is noteworthy that the arrays of ethno-medicinal uses of *Moringa* in Nigeria as documented in this survey are substantiated by the recent review of Farooq et al. (2012). The review affirms our findings of traditional uses of *Moringa* plant for healing of various ailments by Nigerians as found elsewhere.

The potential of the leaf extract for treating Newcastle disease of poultry in Nigeria has also been reported (Eze et al., 2012). From the aforementioned findings, *M. oleifera* is not just a food supplement queuing behind most diet supplements being paraded in recent times; it has been used for both prophylactic and therapeutic treatments in Nigeria.

Conclusion

Evidences from this survey suggested an age-long importance of *Moringa* plant for ethno-medicine and for food in Nigeria. A number of medicinal properties have been ascribed to various parts of this highly esteemed tree. These findings suggest that appropriate Nigerian government agency should initiate the commercial

cultivation of *Moringa* as an emerging plantation crop of socio-economic importance. Thereafter, mechanism for industrialization of the crop should be put in place. The multipurpose nature of the plant supports the fact that it is often referred to as a “wonder-tree”.

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