



## Some Indigenous Vegetables, their Medicinal and Economic Importance, Production and Preservation: A Review

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### ABSTRACT

*Vegetables play crucial roles in sustaining human health and healing the body from certain diseases, hence, they contribute to bulk of the nutritional components in the human diets. Investigations were carried out on some indigenous vegetables on their medicinal, economic importance, production and preservation. It was found that most of these vegetables are packed with essential nutrients, minerals and vitamins such that their inclusions in the daily diets to humanity, terrestrial animals and aquatic creatures have been reported to be highly imperative. This work revealed that it is important to establish a healthy level of intake of these vegetables early in life given their health benefits and the fact that eating behaviours track across childhood and into adulthood.*

**Keywords:** *Indigenous, vegetables, nutrients, medicinal, production, preservation.*

### INTRODUCTION

Vegetables serve as indispensable constituents of the human diet supplying the body with minerals, vitamins and certain hormone precursors, in addition to protein and energy (Nation, 2016). The most serious threat to survival of humanity is the increasing gap between population growth and food supply. Meanwhile, recent evidence asserts that low vegetable and fruit intake is one of the five leading behavioural and dietary risk factors for cancer development (WHO, 2015). Much effort has been concentrated on seeds while leafy vegetable sources have been ignored. Several vegetable species abound in Nigeria and most West African countries where they are used partly as condiments or spices in human diets or as supplementary feeds to livestock such as rabbits, poultry, swine and cattle (Healthfacts, 2016). While the amounts of the nutrient constituents in the more commonly used leaf vegetable species in Nigeria have been studied to some extent (Okpala, 2016), the lesser known regional and indigenous species remain virtually neglected. Several vegetables all over the world serve as both green leafy vegetables, condiments, herbs, spices and flavouring (Okpala, 2016). Assuming that nature never offered any kind of vegetation such as vegetables, plants, trees, how could man have survived? Could there have been other alternatives? There are no doubts that vegetables continue to play important roles in survival of man, thus, supplying the body with essential nutrients that are necessary for wellbeing. This forms the basis for this study: The work is limited to review four indigenous vegetables, namely; water leaf, scent leaf, Lagos spinach and fluted pumpkin leaf on their medicinal, economic importance, production and preservation. Researchers continue to emphasize that not only are these vegetables amazingly nutritional, but they are equally protective against chronic and degenerative disorders due to their high antioxidant constituents (Healthfacts, 2016). Underutilizations of these leafy vegetables have to be really put on check and be fully explored. If only everyone from all over the world will make these vegetables a dietary priority, then most ailments and nutritional deficiencies will be tremendously reduced.



## Overview of Vegetables

### Water Leaf (*Talinum triangulare*)

Waterleaf is an edible leafy vegetable that belongs to the *Portulacaceae* family. It was originally from West Africa before spreading to other parts of the world, such as Asia and South America (Nation, 2016). Waterleaf is a herbaceous perennial plant that has its stem above ground. The seed sprouts as a tiny, aqua-coloured plant before growing into a more noticeable plant with larger leaves. Waterleaf is called *Gbure* in Yoruba, *Ebedondon* in Edo, and in English is nicknamed Philippine spinach, sweetheart, flame flower, Florida spinach etc (Nation, 2016). As the name suggests, this green leafy vegetable is referred to as waterleaf due to its high moisture contents of approximately 90.8 % (wb) of the leaf (Okpala, 2016). The leaf is sticky when cut and this is attributed to its high pectin content that supplies the dietary fibre. This tenderness often makes it to appear growing wild as a yearly plant (Nation, 2016). Like grasses in the fields, we match, piss on them and uproot them from our gardens in preference to other plants which we consider more important. But the more we weed them out, the more they grow again, as if in defiance.



Plate 1: Water Leaf (*Talinum triangulare*)

### Scent Leaf (*Ocimum gratissimum*)

Scent leaf (*Ocimum gratissimum*), commonly known as scent leaf or Clove basil, is found in many tropical countries. Botanically called *Ocimum gratissimum*, scent leaf or Basil belongs to the mint family *Lamiaceae*. It is a wonderful plant which is known for its peculiar colour and greatly appreciated for its nutritional and medicinal benefits (Healthfacts, 2016). It is cultivated in Nigeria and known as *Nnchuanwu* by the Igbos, *Efinrin* by the Yorubas and *Daidoya* by the Hausas. The Scent leaves are commonly used in cooking due to its minty aromatic flavour medicinal values. The leaves of the African varieties of *Ocimum gratissimum* are said to contain thymol oil, which has been found to be highly antiseptic and also used to prevent mosquito bite (Chukwuma, 2015). The shape is branched at the top, with a height of about 50-80 cm compared to other similar Scent or even a single species, only scent leaf has a pale green colour (there are also purple). Often we find them growing wild by the roadside. They are also planted in the yard and in the garden.



Plate 2: Scent Leaf (*Ocimum gratissimum*)

### Lagos Spinach (*Celosia Argentea* L.)

*Celosia Argentea* L or Lagos spinach (a.k.a. quail grass, soko, celosia, and feather cockscomb) is a vigorous, broadleaf annual plant crop belonging to the Amaranth family (Amaranthaceae). *C. argentea* is grown successfully in temperate as well as tropical regions. It grows widespread across northern South America, tropical Africa, the West Indies and tropical Asia where it grows as a native or naturalized wildflower, and is cultivated as a nutritious leafy green vegetable (Larry, 2007). It is traditional fare in countries of Central and West Africa, and is one of the leading leafy green vegetables in Nigeria, where it is known as 'sokoyokoto', meaning 'make husbands fat and happy.' It is an edible species of the genus *Celosia* of the Amaranthaceae family, widely grown in home gardens in Nigeria and other parts of West Africa. It is cultivated during the rainy and the dry seasons. The leaves and young shoots are used in soups and stews (Abdulmalik *et al.*, 2016). The crop is produced in Nigeria by resource-poor farmers and in compound gardens where it is intercropped with other arable starchy foods to produce enough food to meet-up their dietary and cash requirements (Akinyemi and Tijani-Eniola, 1997), and to minimize the risk of crop failure.



Plate 3: Lagos Spinach (*Celosia Argentea* L.)



### Fluted Pumpkin (*Telfairia occidentalis*)

*Telfairia occidentalis*, commonly called Fluted pumpkin is a vegetable which belongs to the family Cucurbitaceae. It is a crop of commercial importance grown in West Africa (Nigeria, Ghana and Sierra Leone), being the major producers (Nkang, 2003). The seeds can be eaten whole by boiling and for egusi soup. It is called Ugu in Igbo land, Iroko in Yoruba land and Umeke in Edo. The plant is dioecious, perennial, and drought-tolerant. The young shoots and leaves of the female plant are the main ingredient of Nigerian edika-iko soup (Badifu *et al.*, 1995). It is a creeping vegetative shrub that spreads low across the ground with large lobed leaves, and long twisting tendrils (Horsfall and Spiff, 2005). Common examples of plants in this family are cucumber, watermelon, squash and melon (Oboh, 2005). These are favourites throughout Central and Southern Nigeria (Grubben and Denton, 2004; Schippers, 2002). In Nigeria the two main cultivars are ugu-ala, characterized by succulent, broad leaves, small black seeds, thick stem and slow growth and ugu-elu which have a high growth rate, large brownish seeds with high viability and thin stem with small leaves. The large succulent leaves of ugu-ala make this cultivar a commercial vegetable in high demand, while the fast emergence and high growth rate of 'ugu-elu' is preferred by farmers because of quick returns. The seed is often polyembryonic, which is useful for multiplication and in breeding (Akoroda, 1990).



Plate 4: Fluted Pumpkin (*Telfairia occidentalis*)

### Medicinal and Economic Importance

#### Water Leaf (*Talinum triangulare*)

Waterleaf is highly nutritious, refreshing and tasty and as such used in several cuisines for preparing assorted dishes such as waterleaf soup, waterleaf stew, waterleaf sauce, waterleaf pizza, vegetable soup (Edikaiko, ofe mgbolodi, gbure, afang soup). This sort of vegetable soup is a popular soup among Igbo, Yoruba, Efik and Ibibio communities. *Talinum triangulare* leaves have shown to be effective for treating liver diseases by lowering the concentration of the enzymes in the blood. Ezekwe *et al.* (2013) reported that the leaves are a rich source of bioactive compounds and are essential for supporting the liver and should be part of pregnant women's diet as the vegetable helps to prevent anaemia as well as boost the blood level. Aja *et al.* (2010) found that waterleaf is an excellent source of tannins, alkaloids, saponins and flavonoids, which contain reasonable



proportion of bioactive compounds that are essential for preventing and treating various ailments. Liang *et al.* (2011) reported that waterleaf contains high antioxidant properties and can be suitable for tackling hepatic ailments. Ofusori *et al.* (2008) verified the impact of waterleaf aqueous extract on the cerebrum of Swiss albino mice and recommended the need for regular intake of waterleaf as it supports the neurons of the cerebrum and enhances the cerebral functioning due to the high dietary fibre. Joshua *et al.* (2012) reported that *Talinum triangulare* is essential for managing diabetes mellitus and preventing the onset of cancer and tumour growths. Adewunmi *et al.* (1980) pointed out that waterleaf can be useful for preventing the onset of cardiovascular diseases such as stroke. Mensah *et al.* (2008) reveal that the high dietary fibre in waterleaf provides bulk in the diet thus minimizing the intake of starchy foods. Nworgu *et al.* (2015) evaluated the use of water leaf meal as supplements for soya bean meal and groundnut cake while formulating broilers feeds which showed that waterleaf meal is an ideal protein supplement for broilers especially for broiler finishers without any detrimental effects on their performance.

#### **Scent Leaf (*Ocimum gratissimum*)**

*Ocimum gratissimum* is commonly used in cooking due to its minty aromatic flavour and has been used for the treatment of headache, diarrhoea, wart worms and kidney infections. The leaves of the African varieties of *Ocimum gratissimum* are said to contain thymol oil, which has been found to be highly antiseptic and also used to prevent mosquito bite as well as have anti-diabetic properties and boost the immune system (Chukwuma, 2015). Scent leaves is not only useful as part of the fresh vegetables that is deliciously eaten with chili sauce and chicken or fried fish, but also has benefits for human sexual organs which can overcome the problem of premature ejaculation in men. So also in women, it is rich in anetol and boron compounds, capable of inducing the hormone estrogen (HealthBenefits, 2016). Especially for adults, Scent leaves help to prevent disease and heart problems. Scent leaf is very rich in vitamin A which can cope with various types of eye infections, conjunctivitis, eye soothing stress and also for the prevention of night blindness and other vision problems and also be used to eliminate bad breath (Healthfacts, 2015). The content of the essence in the leaf has a calming effect that cools the stomach and contains an effective antipyretic substance that reduces fever and cures malaria (HealthBenefits, 2016). According to (Ezengige, 2016), an oil known as Eugenol is found in scent leaf which disrupts chemical processes that lead to tissue inflammation. Rubbing the bruised leaves on wounds or sore areas helps relieve pain and is beneficial to patients with respiratory disorders such as cough, catarrh and respiratory allergies. Water extract or juice of leaves has antispasmodic effect and is utilized in the treatment and management of convulsion and seizures (Ezengige, 2016).

#### **Lagos Spinach (*Celosia argentea* L.)**

*Celosia. Argentea* is used primarily as a leafy vegetable. The leaves, shoots and tender stems are eaten as a potherb in sauces or soups, cooked with other vegetables, with a main dish or by itself. The leaves break down easily even when cooked only briefly. The seeds are also edible and have medicinal value (Larry, 2007). Chopped plants have been used as forage for poultry and other livestock. And, the flowers make nice ornamentals, fresh or



dried. Ailments treated with *C. argentea* include: abscesses, colic, cough, diabetes mellitus, diarrhea, dysentery, eczema, eye problems, gonorrhea, infected sores, liver ailments, menstruation problems, muscle troubles, skin eruptions, snakebites, and wounds (Schippers, 2000). It shares features with members of the genus *Amaranthus* such as broad edible leaves with high protein content (1.2-5.9 %), and flowers and seeds produced in dense spikes. Like its cousins the amaranths, the leaves of *C. argentea* are high in protein, vitamins A and C, and are good sources of calcium and iron. It has also been noted that green-leaved varieties generally are more palatable and have higher protein and ascorbic acid (vitamin C) content than red varieties (Omueti, 1980). *C. argentea* is best eaten as a vegetable before it begins flowering. Most sources recommend harvesting 5-7 weeks after sowing for optimal nutritional value. The highest total marketable and edible yields and total crude protein yield, however, occurs at 15 weeks after sowing. After flowering, the new leaves are too small and unappealing to be worth eating (Schippers, 2000).

### **Fluted Pumpkin (*Telfairia occidentalis*)**

Fluted pumpkin (*Telfairia occidentalis*, Hook F.) is one of the most important vegetables grown in Nigeria. It is generally regarded as a leaf and seed vegetable. The leaf has high nutritional, medicinal and industrial values being rich in protein 29%, fat 18%, minerals and vitamins 20% (Ndor *et al.*, 2013). These make the leaves potentially useful as food supplements (Oderinde *et al.*, 1990). It also contains oxalates, saponins, glycosides, flavonoids, alkaloids and resins (Akubue *et al.*, 1980). Aqueous extract of *Telfairia occidentalis* is reported to increase hematological parameters (Alada, 2000). Similarly, the aqueous extract of *Telfairia occidentalis* has been shown to be hepatoprotective against garlic-induced oxidative stress (Olorunfemi *et al.*, 2005) while its ethanolic extract have demonstrated hypoglycaemic properties both in normoglycaemic and alloxan-induced diabetic rats (Nwozo *et al.*, 2004). In folkloric medicine, the fresh leaves are used in the treatment of anemia, sudden attack of convulsion and malaria (Gbile, 1986; Alada, 2000; Ukwuoma and Muanya, 2005). Nwangwa *et al.* (2007) showed that *Telfairia occidentalis* has the potential to regenerate testicular damage and increase spermatogenesis. *Telfairia occidentalis* is high in anti-oxidant and free radical scavenger properties and that may contribute to why many use the leaf extract in oxidative damage conditions such as tonic by women that have just given birth; its high iron content assists in the replenishment of lost blood; being used for treatment of anaemia, chronic fatigue and diabetes (Alada, 2000; Adedapo *et al.*, 2006). Emeka and Obidoa (2009) study reveals that the long term feeding of *T. occidentalis*-supplemented diet caused a significant increase in weight of animals which may be due to its content of rich nutrients. The blood schizontocidal activity of the root extract is comparable to that of chloroquine (Okokon *et al.*, 2007). Antibacterial activity of the leaves was also reported by Odoemena and Onyeneke (1998) while Oluwole *et al.* (2003) reported *Telfairia occidentalis* anti-inflammatory activities. *Telfairia occidentalis* has also be found to protect and ameliorate oxidative brain and liver damage induced by malnutrition in rats (Kayode *et al.*, 2009, 2010). Oboh (2005) reported that both aqueous and ethanolic extracts of *T. occidentalis* leaves protect the liver cells against garlic- induced oxidative damage.



## PRODUCTION

### Water Leaf (*Talinum triangulare*)

The increasing demand for waterleaf due to urbanization has therefore pushed farmers into small and medium scale production of waterleaf (Ndaeyo *et al.*, 2013). *Talinum triangulare*, which is considered a cheap crop and can easily be collected from the wild as vegetable (Opabode and Adebayo, 2005). They are not agronomically demanding and are suitable to many soil types. Adebooye *et al.* (2003) reported that most of the Nigeria's indigenous vegetables are not easily available as farmers now gather them with great drudgery and difficulty from the few stands that are left in the wild. Now, *Talinum* farming has been expanding rapidly in recent years, at an average of 10% of Nigeria's cultivable arable land area of about 71.2 m/ha (Opabode and Adebayo, 2005). Most farmers broadcast large quantity of inorganic fertilizer in waterleaf plots at intervals of 2 to 30 weeks to stimulate growth. This is always aimed at achieving maximum growth and yields (Steward *et al.*, 2005, Dauda *et al.*, 2008). Okhira *et al.* (1987) observed that plant spacing should be done in such a way as not only to ensure that each crop has an equal chance to grow but also to simplify execution of field operation. According to Nya *et al.* (2010), the most single constraints to *Talinum* farming were said to be lack of money for embarking on this farming ventures, seconded by pest including theft which in recent times constitute a bane in the progress of rural farmers. It thrives in humid conditions, in rich compost or acidic well-drained soil under partial shade. But it can also grow under direct sunshine and fully exposed places, on pore sandy soils and in places on elevations. Waterleaf can stand scorching sun, excessive heat and draught. It can be easily propagated from seeds and stems, and is ready to be harvested in less than two months. It spreads so easily from seed and in some places it is classified as agricultural weed.

### Scent Leaf (*Ocimum gratissimum*)

The importance of this vegetable is both as food and as raw materials for industries, which also serves for economic interest. In the past decade the consumption of scent leaf in Nigeria had been on the increase and currently is estimated to about 22-47.58 kg/person/year (Hart *et al.*, 2005). The plant spacing is one of the agronomic factors that determine crop growth and yield. Thus, this plant spacing should be done in a way not only to ensure that each crop has an equal chance to grow, but also allow for all necessary field operations to be implemented (Okhira *et al.*, 1987). The use of inorganic fertilizers improves the yield of scent leaf, increase soil pH, total nutrient contents and nutrient availability, but its use is limited due to scarcity, high cost, nutrient imbalance and soil acidity. The use of organic manure serves as a means of maintaining and increasing soil fertility (Alasiri and Ogunkeye, 1999). Animal manures, when properly and efficiently applied, ensures sustainable crop productivity by immobilizing nutrients that are susceptible to leaching, because the nutrients contained in manures are slowly released and can be stored for a longer period in the soil. This ensures longer residual effects, improved root development and higher crop yields (Abou El Magd *et al.*, 2005). According to Horna and Gruere, (2006), a number of pests and diseases attack these vegetables crop in the field. Mites stem borers, fruit borers and flower borers are the main pests that



attack them. The damage caused can reduce yields and affects the quality and quantity of the produce and also affect the price significantly.

### **Lagos Spinach (*Celosia argentea* L.)**

The crop is predominantly produced in Nigeria by resource-poor farmers and compound gardens where it is intercropped with arable starchy staples to produce enough food to satisfy their dietary and cash requirements (Akinyemi and Tijani-Eniola, 1997), and to minimize the risk of crop failure. The average yield of this crop (7.60 ton ha<sup>-1</sup>) has been limited by obsolete cultural practices employed in its production, such as non-use of manure/fertilizer input among others (FAO, 2004). For commercial production, optimum performance of the crop must be desirable through changes in cultural practices (Sterrett and Savange, 1989) including soil fertilization of the crop, with organic to increase plant growth and crop yield. The use of manure application enhances soil productivity, increases the soil organic carbon content, soil micro-organisms, improves soil crumb structure, the nutrient status of the soil and enhances crop yield (Beckman, 1973). Organic manure is also very cheap and effective as a good source of nitrogen for sustainable crop production, but its availability remains an important issue due to its bulky nature, while inorganic fertilizer is no longer within the reach of poor-resource farmers due to its high cost (Rahman, 2004). *C. argentea* grows rapidly from seed and, depending upon the variety and soil fertility, it can reach a height of 200 cm (Larry, 2007). The use of other technologies such as organic fertilizers from unexploited natural resources would be a better alternative to improve soil fertility and increase crop yield; and over the years one largely overlooked resources available for soil fertility improvement is the use of non-traditional organic materials such as weeds. *C. argentea* germinates very readily; so readily in fact, that when a mature seed-bearing plant is harvested and hauled to the compost pile, seedlings often remerge along the path taken. Bayu *et al.* (2006) reported that the need to reduce the cost of crop fertilization and improved environmental conditions necessitates the utilization of organic manure.

### **Fluted Pumpkin (*Telfairia occidentalis*)**

The production of *Telfairia occidentalis* leaves has been on the increase in Nigeria due to increased awareness of its nutritional value. It has been estimated that approximately 0.5kg of leaves and shoots can be obtained from plants per harvest (Tindall, 1983) and up to 15 harvests can be obtained between 3-4 months. Fluted pumpkin can be propagated only by seeds, but their availability for planting is a major problem and cannot satisfy the widespread interest in the cultivation of the plant (Odiaka and Schippers, 2004).. *Telfairia* is recalcitrant in nature and seed storage is poor (Akoroda, 1986). The female plants are much desired by consumers and producers because of its succulent large leaves and the fact that it produces the pods. However, the male to female plant varies, ranging between 0.17-1.00 cm (Onwueme *et al.*, 1986; NIHORT, 1986; Anyim and Akoroda, 1983). It does well in the heavy rainfall area and late planting does not favour *Telfairia* production because dry season, will not allow extension of the period of crop production (Asiegbu, 1985). The conventional method of propagation is by seed, sown directly at a rate of 30,000–70,000 seeds/ha and spaced at 0.3–1 m × 0.3–1 m. Depending on the soil type,





rainfall and cropping pattern, fluted pumpkin can be planted on the flat, or on ridges or mounds. Fluted pumpkin may be established in June or July so as to be available for profitable sale in the dry season when vegetables are scarce. Odiaka *et al.* (2008) reported the major constraints to Telfairia shoot production were the high cost of quality seeds and water pumps which could be taken care of if agricultural extension and developmental workers will encourage farmers to produce seeds on their own. Possibilities for micropropagation of fluted pumpkin by enhanced axillary shoot formation have been suggested by Balogun *et al.* (2000). It thrives in humid climate and well drained soils and is usually cultivated in garden and family farms around homes.

## PRESERVATION

In Nigeria leafy vegetables are rarely processed, presumably due to the general lack of basic preservation facilities for freezing, canning or dehydration (Mepba *et al.*, 2007). A relatively small quantity of harvested leafy vegetables are however, sun-dried resulting in poor quality products with variable moisture contents and microbial loads thus affecting storage stability. Freezing is generally regarded as the best method of preservation from quality stand-point and for long term preservation of foods (Mepba *et al.*, 2007). For perishable commodities with very high moisture contents, dehydration results in substantial reduction in weight and bulk size with consequent savings in storage and distribution costs. The outstanding preservative method practiced in many homes in Nigeria is sun drying which may/or not combine with blanching and cooking of vegetables in soup preparation have considerable effects on the nutritive value and sensory acceptability of final products (Sobowale, 2010). Kays (1999) indicated that the appearance and colour are the main criteria to be considered to assess. According to Fellows (1990), blanching at 88°C stop all life process, inactivates enzymes, fixes green colour and removes certain harsh flavour common in vegetables. Uzoekwe and Ukhun (2005) also reported that blanching and cooking caused reductions in the Fe and Zn contents of scent leaf (*Ocimum gratissimum*), gnetum vegetable, bitterleaf (*Veronica amygdalina*), bush okro and green pepper (*Piper guineense*) that were used in soup preparation. Addo (1983) observed significantly low level losses (21.3-36.5%) of ascorbic acid in sun-dried than in cooked vegetables. Ajayi and Onayemi (1977) have reported that sun-dried vegetables are generally of poor quality especially as their colour and taste are compromised. Onayemi and Badifu (1987) proved that sun-dried vegetables had inferior colour, texture and acceptability compared to the vegetables dried in the cabinet dryer. A study by Yousif *et al.* (1999) showed significant difference in concentrations of linalool and methylchavicolin in air-dried samples compared to those present in fresh sample vegetables, while that of vacuum- microwave dried sample vegetables showed substantial increase of about 2.5 fold for linalool and 1.5 fold for methylchavicol, compared to that present in air-dried samples. Di Cesare *et al.* (2003) found microwave drying to retain high percentages of characteristic volatile compounds (eucalyptol, linalool, eugenol, and methyleugenol) in basil (*Ocimum basilicum* L.) compared to samples dried by air-drying and freeze-drying with blanching, except freeze-dried unblanched leaves. However, storage structures developed by the Nigerian Stored Products Research Institute over the years such as the evaporative coolers and cooler baskets which could record some temperature drop from the ambient



have been used in extending the shelf-life of fresh fruits and vegetables (Ubani and Okonkwo, 2011). Packing (wrapping) materials also have shown promise in extending shelf life of Nigerian indigenous fresh vegetables. Freezing however has been reported to minimize losses of vitamins and minerals (Baker and Gawish, 1997). The season and time of harvest also play an important role in storage of fruits and vegetables. (Ubani and Okonkwo, 2011) reported that fresh fluted pumpkin leaves can only be kept for 6 days beyond which physiological breakdown of tissues lead to deterioration and total loss. The different methods of processing and preservation can therefore have an effect on the organoleptic properties of vegetables and the overall acceptability by the consumer. Drying is the most common and effective method that increases the shelf life of spicy herbs by inhibiting the growth of microorganisms and preventing the onset of some biochemical reactions that may alter the organoleptic and nutritional characteristics of the dried leaf (Baker and Gawish, 1997). However, drying must be performed carefully in order to preserve the aroma, appearance and nutritional characteristics of the raw herbs as much as possible (Crivelli *et al.*, 2002). The drying may cause losses in volatilities or formation of new volatilities as a result of oxidation reactions and esterification reactions (Diaz-Maroto *et al.*, 2002).

## CONCLUSION

The importance of these vegetables in our lives cannot be over emphasized. Considering their diverse medicinal and economic importance in our health and lives, their production is becoming a lot promising. The freshly harvested vegetable proves to contain all the nutrients needed compared to their preservation. Preservative methods of the vegetables showed a change in their nutritional properties and organoleptic properties like flavour, colour, and taste when prepared.

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