The nutritional and anti – nutritional values of two culinary herbs – uziza leaf (*Piper guineense*) and scent leaf (O*cimum gratissium*) popularly used in Nigeria

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ABSTRACT: Uziza (*piper guineense*) and scent (*ocimum gratissium*) leaves were tested for proximate, vitamin and phytochemical compositions. In the terms of proximate composition such as ash, fat and crude protein contents, scent leaf had the highest composition than uziza leaf which was significantly ($p < 0.05$) different from each other. Uziza (248.37 mg/100g and 32.26 mg/100g) leaf also had the highest vitamin C and vitamin E contents than scent (197.35 mg/100g and 31.46 mg/100g) respectively which was significantly ($p < 0.05$) different from each other. Scent leaf had the highest phytochemical contents such as in saponin, phenol, alkaloid, flavonoid and *B* - carotene than uziza leaf which was significantly ($p < 0.05$) different from each other. The leafy vegetables evaluated contained varying amount of the proximate, vitamins and phytochemicals hence the regular use of scent and uziza leaves in our daily diet should be recommended. This could enable derivation of full dose of the required proximate, vitamins and phytochemical compositions and then better therapeutic effects could be also obtained.

Key words: Culinary, herbs, nutritional, anti – nutritional.

INTRODUCTION

Herbs are an ancient source of flavourings, aromatic compounds and medicines (Tapsel *et al*., 2006). The words 'herb' and 'spice' are often used interchangeably. Generally, the leaf of a plant used in cooking may be referred to as a culinary herb and any other part of the plant, often dried as a spice (Ogunlesi *et al*., 2010; Asaolu *et al*., 2012). Many of the aromatic seeds called spices are actually gathered from herbal plants when they have finished flowering (Alaribe, 2008; Nwachukwu *et al*., 2010). Herbs are also bioactives that improve health and could be regarded as one of the first real functional food but have largely become forgotten foods in the modern westernized diet (Craig, 1999; Kitts, 1994). Culinary is the art of cooking. Culinary herbs are those plants whose fresh or dried leaves are used in cooking (Ogunlesi *et al*., 2010; Asaolu *et al*., 2012). One of the benefits of culinary herbs is primarily due to their antioxidant properties. Free radicals are generated in the body as a result of metabolic reactions. Free radicals cause damage in living system resulting in oxidative stress (Alobi *et al*., 2012). Free radical scavengers (antioxidants) which are in culinary herbs have potentials to prevent, decay or ameliorate many of human chronic and ageing diseases such as cancer, diabetes, heart disease, stroke, malaria and rheumatoid arthritis (Ogunlesi *et al*., 2010; Agbaire, 2011). Culinary herbs are as important today as they were in ancient times for enhancing the flavour and taste of our foods as well as serving as a source of dietary medicine (Uhegbu *et al*., 2011). Ignorance concerning the nutritional properties and presence of some phytochemicals are the major reasons for under - utilization of these culinary herbs. The nutritional value and anti - nutritional composition of culinary herbs such as Uziza leaf (*Piper guineense*) and scent leaf (*Ocimum gratissimum*) were not widely known in Nigeria. So many people consume vegetables because of their flavours and taste, and do not concern themselves with their nutritional composition. Research findings from this work will help to sensitize the ignorant masses on the importance and benefits of incorporating these culinary herbs in their diet. Therefore the objectives of this study was to determine and compare the nutritional and anti - nutritional values of these culinary.

MATERIALS AND METHODS

Material: Uziza leaf (*Piper guineense*) and Scent leaf (*Ocimum gratissimum*) were purchased from Ogige market, Nsukka, Nigeria and used for this study.

Preparation of Samples: The leaves were washed thoroughly to remove dirt and prevent microbial contamination and then sundried at a temperature of 30 ^{o}C and further oven dried at a temperature of 105 ^{o}C to obtain a constant moisture content of 11.70 % for uzizu leaf and 10.21 % for scent leaf. After drying the leaves were milled with a mortar and pistil to have powered dry leaf and stored in air tithed container for analysis.

Proximate Analysis: Moisture content, ash, crude fiber, oil, protein and total carbohydrates were determined according to AOAC (1990). Total carbohydrates were obtained by subtraction of contents moisture, ash, crude fiber, oil, protein from 100.

Vitamins Analysis: Vitamin C content was determined using the method described by kirk and sawyer (1998) and Vitamin E content was determined by the spectrophotometric method described by Pearson (1976).

Phytochemical Analysis: *B* - carotene was determined by the method described by Harborne (1993). Saponin was determined by the method of AOAC (1990). Phenol was determined using method described by Oberlease (1973). The gravimetric

method (Haborne, 1993) was used in determination of alkaloid and flavoniod contents.

Statistical Analysis: Statistical analysis all the data were subjected to analysis of variance (ANOVA) using SPSS version 17.0 for windows, SPSS inc. Means were separated using least significant different (LSD).

RESULTS AND DISCUSSION

Proximate composition

The proximate compositions of uziza and scent leaves are shown in Table 1. The uziza leaf contained 11.70 % of moisture higher than 10.21 % for scent leaf which was significantly ($p < 0.05$) different. The moisture content of scent leaf was higher than the report of Asaolu *et al*. (2012). The ash content of the uziza leaf was higher than scent leaf which was significantly ($p < 0.05$) different. The ash content of scent was higher than the report of Asaolu *et al*. (2012). The ash content of uziza (7.73 %) and scent (9.67 %) leaves were also higher than that of Ugu leaf (1.80 %), cassava (1.40 %) and water leaf (1.40%) as reported by (Agbaire, 2011). The higher ash content of uziza and scent leaves is an indication of the level of inorganic elements such as calcium, zinc, magnesium, copper, and potassium in the vegetable (Igile *et al*., 2013). High ash content in the leaves would imply high mineral content, hence very nutritious. But Udousoro and Ekanem (2013) reported that it could be the reverse if it contained toxic metals which also contribute to the ash percentage in leafy vegetables therefore; high ash content is not necessarily a conclusive factor regarding the health benefits of vegetables. However, leafy vegetables with ash content greater than 8.8% are healthful (Udousoro and Ekanem, 2013). From all indication is only uziza (7.73 %) was within 8.80 % safe range for mineral in leaf vegetable while scent leaf were higher. However the mineral content of the leaves could be reduced to safer range during processing of the leafy vegetables. The crude fibre of scent leaf was 11.62 % for scent leaf which was higher than 9.26 % for uziza leaf whereas scent leaf had the highest fat content than uziza leaf which was significantly ($p < 0.05$) different. Scent leaf had higher crude fibre content compared to the report of Asaolu et al. (2012) and Alobi *et al*. (2012). The crude fibre content of scent and uziza were high and consumption of these leaves could aid digestion, absorption of water from the body, bulk stool and prevents constipation (Idris *et al*., 2011; Igile *et al*., 2013). The leaves may therefore be very useful in the control of body weight, reduction of serum cholesterol level, hypertension, diabetes, breast cancer, constipation and protection against colon cancer (Idris *et al*., 2011; Igile *et al*., 2013). Scent leaves had lower fat content compared to the report of Asaolu *et al*. (2012) and Alobi *et al*. (2012). The fat content of scent (2.77 %) was higher than uziza (2.24 %) so uziza could therefore be recommended as part of weight reducing diets since low fat foods are said to reduce the level of cholesterol and obesity. Igile *et al*. (2013) reported that low fat content correlates directly with the low total fatty acid content. As a result, uziza leaf could be more suitable for consumption by people with obesity (Udousoro and Ekanem, 2013). The crude protein content of the scent leaf was higher than uziza leaves which was significantly ($p < 0.05$) different. The protein contents of the leaves make them good sources of plant protein which can supplement animal. However the results in table 1 revealed that the leaves are good of sources of protein. The carbohydrate content of the uziza leaf which was 48.21 % was higher than 40.30 % for scent which was significantly ($p < 0.05$) different. The carbohydrate content of the scent was lower than report of Asaolu *et al*. (2012) and Alobi *et al*. (2012). Since uziza (48.21 %) had the highest carbohydrate content, its consumption could provide the body with fuel and energy that is required for daily activities and exercise (Udousoro and Ekanem, 2013).

Table 1: Proximate composition of uziza and scent leaves

Proximate	Leaves: Uziza (*Piper guinenses*)	Leaves: Scent (*Ocimum gratissium*)
Moisture (%)	11.70^{a}±0.03	10.21^{b}±0.01
Ash (%)	7.73^{b}±0.04	9.67^{a}±0.04
Crude fibre (%)	9.26^{b}±0.03	11.62^{a}±0.02
Fat (%)	2.24^{b}±0.02	2.77^{a}±0.01
Crude protein (%)	16.67^{d}±0.02	20.69^{a}±0.01
Carbohydrate (%)	48.21^{a}±0.00	40.30^{b}±0.04

Values are means + standard deviation of three determinations. Values on the same row with different superscripts are significantly different ($p \leq 0.05$).

Vitamins composition

The vitamin compositions of uziza and scent leaves are shown in Table 2. The vitamin C and vitamin E of the uziza leaf which were 248.37 mg/100g and 32.26 mg/100g was higher than 32.26 mg/100 and 31.46 mg/100 for scent leaf respectively which was significantly ($p < 0.05$) different. Since vitamin C (ascorbic acid) promotes the health of teeth and gums, lungs and bronchia, and joints, aids the purification of blood (Ogunlesi *et al*., 2010), its (ascorbic acid) presence in the leafy vegetables more especially in uziza leaf with the highest vitamin C content suggests that its consumption and use in herbal medicine can prevent common cold and other diseases like prostate cancer (Igile *et al*., 2013).

Table 2: Vitamin contents of uziza and scent leaves.

	Leaves

Parameters	Uziza (*Piper guinenses*)	Scent (*Ocimum gratissium*)
Vitamin C (mg/100)	248.37^{a}±0.04	197.35^{b}±0.03
Vitamin E (mg/100)	32.26^{a}±0.06	31.46^{b}±0.03
B-carotene (ug/g)	35.56^{a}±0.07	18.95^{b}±0.01
Saponin (%)	0.53^{b}±0.01	0.64^{a}±0.011
Phenol (%)	0.25^{b}±0.005	0.38^{a}±0.011
Alkaloid (%)	1.65^{b}±0.01	2.16^{a}±0.01
Flavonoid (%)	0.53^{b}±0.1	1.03^{a}±0.01

Values are means + standard deviation of three determinations. Values on the same row with different superscripts are significantly different (p ≤ 0.05).

Phytochemical analysis

The phytochemical compositions of uziza and scent leaves are shown in Table 3.The *B* - carotene content of the uziza leaf was higher than scent leaves which was significantly ($p < 0.05$) different. High *B* - carotene of uziza leaf suggests that the plant may be useful as an anticancer and anti-ulcer agent, a claim that seem to support the traditional use the leaves for ethno - medical purposes (Igile *et al*., 2013). The saponin and phenol contents of scent leaf which were 0.64 % and 0.38 % was higher than 0.53 % and 0.25 % for uziza leaf respectively which was significantly ($p < 0.05$) different. The phenol content of uziza leaf was low when compared to report of Alobi *et al*. (2012). Igile *et al*. (2013) reported that saponins at low levels less than 10 % are said to be safe and non - toxic, which implies that uziza and scent leaves are safe for human consumption since the leaves had low saponin content compared to standard value. Igile *et al*. (2013) reported that high saponin levels have been associated with gastroenteritsis, manifested by diarrhea and dysentery. The alkaloid content of scent leaf was higher than uziza leaf which was significantly ($p < 0.05$) different. Alkaloids are one of the most efficient therapeutically significant bioactive substances in plants. Scent leaf (1.03 %) had the highest flavonoid content than uziza (0.53 %) leaf which was significantly ($p < 0.05$) different. Scent leaf having the highest content of flavonoid inferred that scent leaf could biological functions such as anti - oxidation (Alobi *et al*., 2012). Flavonoids are potent water soluble antioxidants and free radical scavengers which prevent oxidative cell damage and have strong anticancer and anti-ulcer activity and protection against the different levels of carcinogenesis (Agbaire, 2011; Igile *et al*., 2013).

Table 3: Phytochemical contents of uziza and scent leaves.

Leaves

Values are means + standard deviation of three determinations. Values on the same row with different superscripts are significantly different (p ≤ 0.05).

CONCLUSION

The results obtained show that the important active chemical constituents found in the leaf vegetables which were products of secondary metabolism such as saponin, phenol, alkaloid, flavoinoid, *B* - carotene and better proximate composition were found to be higher in scent leaf than uziza leaf except for the vitamins were uziza leaf was higher than scent. Nevertheless, the regular use of scent and uziza leaves in our daily diet should be recommended. This could enable derivation of full dose of the required proximate, vitamins and phytochemical compositions and better therapeutic effects could be also obtained.

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