ABSTRACT

Telfairia occidentalis and Gongronema latifolium commonly known as Ugu and Utazi respectively are green leaves consumed by both man and animals in Nigeria. The qualitative phytochemical analysis of the methanolic extract of these leaves showed the presence of alkaloids, reducing sugars, saponins, tannins, flavonoids and proteins in both leaves while, steroids and phenols are present in large amount in Gongronema latifolium but absent in Telfairia occidentalis. However, the amount of alkaloids was high in Gongronema latifolium but low in Telfairia occidentalis. Phytate was absent in Gongronema latifolium but present in Telfairia occidentalis. The result of the quantitative analysis collaborated evidence for the large amount of flavonoids such as anthocyanin, catechin, epicatechin, rutin and kaemferol. Alkaloid such as ribalimidine was detected as well as oxalate and phenols in large amounts in Gongronema latifolium but not in Telfairia occidentalis. Phytate and spartein were not quantitatively detected in Gongronema latifolium but were recorded in Telfairia occidentalis. Rutin and catechin has the highest concentrations in both leaves, while anthocyanin has the lowest concentration in both leaves. Ribalimidine has concentrations 19.140μg/g in Gongronema latifolium and 1.824 μg/g in Telfairia occidentalis. Thus, this study confirms that the bitter taste of Gongronema latifolium is attributable to the high levels of alkaloids and steroids. The presence of other phytochemicals are responsible for the utility of these leaves as food supplement and as prophylactics.
KEY WORDS: Qualitative, Quantitative, phytochemicals, Gongronema latifolium, Telfairia occidentalis.

INTRODUCTION

Telfairia Occidentalis (Ugu) and Gongronema latifolium (Utazi) are thread like green plants that are usually consumed by people in Nigeria. Telfairia Occidentalis usually has a big fruit with hard cover. The crops are primarily grown as vegetable leaves and used for human consumption and animals as feed. The high level of iron in these leaves Telfairia Occidentalis and Gongronema latifolium seems to provide the basis for their use as a blood bank to convalescent persons (Lubha and Anjali, 2014).

Substances derived from plants have recently being of great interest due to their versatility. These substances in the plants which enhance their usefulness globally are classified as phytochemicals (Nsi and Dyegh, 2004). Medicinal plants are the most rich bio-resource of drugs of traditional systems of medicine, modern medicines, food supplements, pharmaceutical intermediates and chemical entities for synthetic drugs (Ncube et al; 2008).

Green leafy vegetables contain numerous vitamins such as beta carotene, ascorbic acid, riboflavin, folic acid as well as minerals like iron, calcium, phosphorus etc (Lubdha and Anjali, 2014). However, these plants are one of the vegetables or herbaceous plants whose leaves are eaten as supporting food or main dish. Nigeria is endowed with varieties of traditional vegetables and different types are consumed by different ethnic groups for different purposes. These leaves are vital constituent of the human diet supplying the body with minerals, vitamins and certain hormone precursors, in addition to protein and energy due to the presence of some phytochemicals in them (Ezekwe et al; 2013).

These vegetables are harvested at least three months after planting and fed either as processed, semi processed or fresh to man while they are usually offered fresh to livestock such as goats, pigs, cattles, etc.

The leaves of Telfairia Occidentalis commonly known as “Ugu” (Ibo) and Gongronema latifolium also known as “Utazi” are used for soup making and other food preparation in the South Eastern part of Nigeria. While Ugu is tasteless, Utazi has characteristic bitter taste. Some tribes in the Eastern and southern part of Nigeria use the leaf extracts in the treatment and control of headaches, pains, fever, convulsion and respiratory disorders (Iwu et al;1999; Ayandele and Adebiri,2007). The leaf extracts are also known to inhibit the growth of some...
micro organisms (Farnsworth, 1996; Ogbeche et al, 1997; Okerelu and Ani, 2001, and Alinor, 2006).

This present study aims at comparing the qualitative and quantitative phytochemical assessment of the methanolic extracts of *Telferia Occidentalis* and *Gorgonema latifolium* grown in Rivers State.

**MATERIALS AND METHODS**

**Samples collection**

Both *Telfaria occidentalis* and *Gongronema latifolium* leaves were obtained freshly from Choba farm in Obio-Akpo Local Government Area, Rivers State, Nigeria while the authentication was carried out at the Biology laboratory, Ignatius Ajuru University of Education, Port Harcourt.

**Methanolic extracts of the sample**

50g each of the dried powdered leaves was put into two 250ml conical flasks and 100ml of methanol was added to each flask. The mouth of the flasks wrapped round with aluminium foil were covered with cotton wool and allowed to stand for 24 hrs with occasionally shaking as per the method of Evans and Sofowomola (1979).

**PHYTOCHEMICAL ANALYSIS**

The phytochemical parameters of the methanolic extracts were independently and qualitatively analysed for Alkaloids, flavonoids, Phenols, tannins, Saponins, reducing sugars, triterpenoids, steriods and proteins using the methods described by Odebiyi and Ramstard in Jack and Nwachoko (2014).

**Test for Alkaloid**

1cm$^3$ of 1%HCl was added to 3cm$^3$ of the extract of each sample in a separate test tube. The mixture was heated for 20 minutes, cooled and filtered. 2 drops of Wagner’s reagent was added to 1cm$^3$ of the filtrate and observed for reddish-brown precipitate showing the presence of alkaloid.

**Test for Flavonoids**

To 3cm$^3$ of each extract was added 1cm$^3$ of 10% NaOH and observed for yellow colouration indicating the presence of flavonoids.
Test for Phenols
To 2cm$^3$ of the extracts, was added 5ml of distilled water, and heated for 30 minutes, then 1ml of 1% FeCl$_3$ was added followed by 1ml of 1% potassium Ferrocyanide solution. The formation of green-blue colour shows the presence of phenols.

Test for Tanins
1cm$^3$ of freshly prepared 10% KOH was added to 1cm$^3$ of the extracts in MeOH and observed for dirty white precipitate.
2drops of 5% FeCl$_3$ was added to 1cm$^3$ of the methanolic extract and observed for green precipitate.

Test for Triterpenoids
To 5cm$^3$ of the extract was added 2cm$^3$ of CHCl$_3$. This was followed by 3cm$^3$ H$_2$SO$_4$ and observed for reddish-brown interface.

Test for Proteins
To 5cm$^3$ of the extract, 2cm$^3$ of 4% NaOH was added with few drops of 5% CuSO$_4$ solution and observed for pink colouration.

Test for Reducing Compounds
10cm$^3$ of 50% H$_2$SO$_4$ was added to 1cm$^3$ of the extract in a test tube. The mixture was heated in a boiling water bath for 15minutes and 10cm$^3$ of Fehling’s solution was added to it while still boiling and observed for brick red colour.

Test for Saponins
2cm$^3$ of the extract was put into a test tube and vigorously shaken for two minutes and observed for persistent forming.

Test for steroids
5cm$^3$ drops of conc.H$_2$SO$_4$ was added to 1cm$^3$ of the extracts and observed for red colouration.

Quantitative analysis of phytochemicals
20g each of the dried powdered samples were soaked sequentially for 72hrs with ethyl acetate and filtered. The filtrates were concentrated under reduced pressure by using rotary evaporator at a maximum temperature of 45$^0$C to yield 1g crude extracts, which were
subjected to GC analysis for the phytochemical determination using a Buck 530 gas chromatograph equipped with an on-column automatic injector, flame ionization detector and HP 88 capillary column (100m X 0.25µm film thickness).

RESULT

Table 1: Qualitative phytochemical analysis

<table>
<thead>
<tr>
<th>Constituents</th>
<th>Gongronema Latifolium</th>
<th>Telfairia Occidentalis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Reducing sugars</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Saponins</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Phenols</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Triterpenoids</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Proteins</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Steroids</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>Phytate</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

++=Present in large amount
+=Present in small amount
-=Absen

Table 2: Quantitative phytochemical Analysis

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Gongronema Latifolium</th>
<th>Telfairia Occidentalis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conc. in µg/g</td>
<td>Conc. in µg/g</td>
</tr>
<tr>
<td>Oxalate</td>
<td>2.6594</td>
<td>Nd</td>
</tr>
<tr>
<td>Anthocyanin</td>
<td>2.4425</td>
<td>2.722</td>
</tr>
<tr>
<td>Phenol</td>
<td>5.0692</td>
<td>Nd</td>
</tr>
<tr>
<td>Sapogenin</td>
<td>1.726</td>
<td>4.9503</td>
</tr>
<tr>
<td>Ribalimidine</td>
<td>19.140</td>
<td>1.824</td>
</tr>
<tr>
<td>Catechin</td>
<td>64.283</td>
<td>76.78</td>
</tr>
<tr>
<td>Epicatechin</td>
<td>7.7179</td>
<td>34.94</td>
</tr>
<tr>
<td>Rutin</td>
<td>66.19</td>
<td>56.41</td>
</tr>
<tr>
<td>Kaemferol</td>
<td>27.83</td>
<td>41.15</td>
</tr>
<tr>
<td>Phytate</td>
<td>Nd</td>
<td>0.2429</td>
</tr>
<tr>
<td>Spartein</td>
<td>Nd</td>
<td>0.004</td>
</tr>
<tr>
<td>Tannin</td>
<td>Nd</td>
<td>18.716</td>
</tr>
</tbody>
</table>

ND = Not detected.
RESULTS AND DISCUSSIONS

Table 1 summarises the qualitative phytochemical analysis of the methanolic extracts of the leaves of *Telfairia occidentalis* and *Gongronema latifolium*. The empirical result shows the presence of alkaloids, reducing sugars, saponins, tannins, phenols, flavonoids and proteins in both leaves. Furthermore, while alkaloids, phenols, flavonoids and steroids are present in large amounts in *Gongronema latifolium*, the phytochemicals present in large amount in *Telfairia occidentalis* are reducing sugars, flavonoids and proteins. Triterpenoids which are present in *Telfairia occidentalis* are absent in *Gongronema latifolium*. Steroids are present in large amount in *Gongronema latifolium* but absent in *Telfairia occidentalis*.

Examination of the quantitative phytochemical analysis of the extracts (table 2) shows reproducibility of the qualitative results. Rabalimidine which is an alkaloid is present in high concentration of 19.140 µg/g in *Gongronema latifolium* as against 1.824 µg/g in *Telfairia occidentalis*. This high alkaloid content in *Gongronema latifolium* leaf is argued to be responsible for the bitter taste of the leaf (Onyeka and Nwambekwe, 2007). In both leaves, the total flavonoids comprising of anthocyanin, catechin, epicatechin, rutin and kaemferol are quite high, that is, 168.5 µg/g and 212.0 µg/g for *Gongronema latifolium* and *Telfairia occidentalis* respectively. Flavonoids which are polyhydroxylated compounds are known as antioxidants and are also associated with the treatment and control of cardiovascular diseases (Onyeka et al., 2010). It is not surprising therefore that both leaves are often employed in different forms for the treatment of various health challenges. The result further shows that oxalate and phenols which are not detected in *Telfairia occidentalis* are very much present in *Gongronema latifolium*. Oxalates are anti-nutritive in nature and can form non-absorbable insoluble salts with Ca$^{2+}$, Fe$^{2+}$ and Mg$^{2+}$ rendering these minerals unavailable (Philip and Owen, 2014). However, a diet with high oxalate content is prone to increase kidney stone formation and may lead to reduction of Calcium absorption as reported by Holmes and Assimos in (Philip and Owen, 2014).

Phytates were not present in *Gongronema latifolium* but present in small amount of 0.24 µg/g in *Telfairia occidentalis*. Though anti nutritive, phytates have been reported to occur naturally as mixed Potassium, Magnesium and Calcium salts in complex diets (Zhou and Erdman, 1995). It also delays glucose absorption (Philip and Owen, 2014) and decreases plasmatic cholesterol and triglycerides (Katayama, 1997). Saponins which are non toxic have anti diarrhea and anti cancer properties. They are present as sapogenin in both *Gongronema*
Gongronema latifolium and Telfairia occidentalis to the amount of 1.73 μg/g and 4.95 μg/g respectively. Tannins are known for their antimicrobial, anti helminthic and anti diarrhea properties. While Telfairia occidentalis contains about 18.72 μg/g of tannins, Gongronema latifolium does not contain any tannins. It has been reported that leaves containing tannins can be used for the treatment of intestinal disorder (Akindahunsi and Salawu, 2005). Both leaves are consumed as vegetables in diet or as infusion in medicinal preparations since they possess anti anaemic and anti diabetic properties (Akoroda, 1990).

CONCLUSION
Considering the efficacy and levels of phytochemicals present in these leaves under discussion, there is no doubt about their utility as food supplement and also as prophylactics. Efforts should therefore be intensified in educating the public for the need to incorporate these leaves in our meals and as feed to animals.

REFERENCES


