COMPARATIVE STUDIES OF THE PHYTOCHEMICAL SCREENING AND PROXIMATE POTENTIALS OF THE METHANOLIC EXTRACTS OF *CYMBOPOGON ATTRACTUS* AND *OCIMUM GRATISSIMUM* LEAVES GROWN IN NIGERIA

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ABSTRACT

The phytochemical composition and proximate potentials of cymbopogon attractus and ocimum gratissimum were investigated. The proximate analysis in % showed that ocimum gratissimum had the highest amount of moisture content, ash content, crude protein and carbohydrate of 81.62, 3.03, 5.58 and 8.87 respectively while cymbopogon attractus had the lowest amount of moisture content, ash content, crude protein and carbohydrate with 76.98, 1.69, 2.87 and 8.27 respectively. Though cymbopogon attractus recorded 1.38 and 8.84 for both ether extract and crude fibre while ocimum gratissimum had 0.79 and 3.80 for ether extract and crude fibre respectively.The phytochemical analysis of the plants showed that the two plants contained alkaloid, tannins, saponins, flavonoids, phlobatanin and anthraquinone. While, cardiac glycoside,triterpenoids and reducing compound were found in cymbogopon attractus but absent in ocimum gratssimum. However, the study also revealed that steroid was present in ocimum gratissimum but absent in cymbopogon attractus while protein was not found in both plants. The presence of these phytochemicals account for their medicinal potential as well as their utility as prophylactics. This study showed the presence of steroids in ocimum gratissimum which accounts for its irritative ability in the mouth when rawly eaten while the presence of cardiac glycoside and triterpenoids in cymbopogon attractus are responsible for its sour taste.

Key words*: Proximate, plant extract, phytochemicals, cymbopogon attractus and ocimum gratissimum*

INTRODUCTION

Plant parts such as leaves, roots and bark are used for therapeutic purposes and as well serve as precursors for the synthesis of useful drugs due to their ethnomedical importance in nature. The medicinal potentials of these plants could be traceable to the bioactive phytochemical constituents that are responsible for the physiological action on the human body (Fagbohum et al, 2012). Plants such as

ocimum gratissimum (scent leaf) *cymbopogon attractus*, (lemon grass) *V.amydalina* (Bitter leaf) and *Azadirachita indica* (Dogonyaro) are known to be used traditionally to ameliorate symptoms of illnesses or ailments such as cold, stomach disorder, sever and cough. Plants with high medicinal value play vital roles in the health of individuals and the society generally (Udochukwu et al, 2015).

Cymbopogon attractus is an aromatic perennial tall grass with rhizomes and densely tufted fibrous root (Joshua et al, 2012). The plant is a native herb from India and is cultivated in other tropical and subtropical countries (Figueirinha et al, 2008). It is of the poaceae family and its stem is reddish brown in colour and is attached to the bulb by stalk. The entire plant is attached to the soil by fibrous root (Burkill, 1996). *Ocimum gratissimum* is an herbaceous shrub notably found in tropical countries such as Nigeria, India, North and South America, Brazil and Mexico where it is known commonly as ulfavaca-cravo, altavaca (Brenan, 1996). The local names are Effinrin, Erumaba (Yoruba), Daidoyatagida (Hausa), Heuri (Ogoni), Nchanwu (Igbo) and Menthescuvage (French). The plant belongs to the family lamiaceae. Many biological active substances have been isolated and elucidated in *cymbopogon attractus* and *ocimum gratissimum*. The most important is the tea which has diuretic properties that can help in urinating difficulties, water retention as well as digestion (Stehmann and Brandaw, 1996). Earlier reports here also shows the smooth muscle contacting and antimutagenic activity (Orajobi, 1986) as well as its anti-diarrhoeal effects in experimental animals (Offiah and Chikwendu, 1999), high antivirate indices against HIV-1 and HIV-2 (Ayisi and Nyadedzor, 2003) and gastro-protective properties (Akah et al, 2007). It's essential oil mosquito repellant, insecticidal property as its main component is engenol which is efficient in inhibiting. Haemonchus contortus (Pessoa et al, 2002 and Hussien et al, 2011). Despite their scientific and medicinal values, comparative analysis of their phylochemical and proximate potentials have not been fully investigated. This present study therefore investigated the phytochemical and proximate constituents of *ocimum gratissimum* and *cymbopogon attractus* comparatively.

MATERIALS AND METHODS

- **Plants collection and identification**

The fresh plant leaves (scent leaf and lemon grass leave) used in this study were collected in November, 2015 from Bunu farm, in Tai LGA, Rivers State, Nigeria. The plant specimens were identified by a plant taxonomist in the department of Biology, Ignatius Ajuru University of Education, Port Harcourt, Rivers State, Nigeria.

- **Processing of plant materials**

The fresh leaves of each plant (sample) were washed with clean water for 2-3 times, sliced and then spread on a dried clean nylon under the room temperature. The samples (leaves of the different plants) were milled and sieved. The powdery samples were partitioned in two parts and labeled before extraction and analysis. Some of the dried samples were extracted with methanol using soxhlet extractor

method. The mathanolic extracts were used for the phytochemical screening qualitatively.

- **Phytochemical screening**

The qualitative determination of phytochemical constituents of the methanolic extracts of *cymbopogon attractus* and *ocimum gratissimum* leaves was carried out using the method described by Jack and Nna, (2015) as follows:

- **Test for alkaloid**

1cm^3 of 1% HCl was added to 3cm^3 of the extract in a test tube. The mixture was heated for 20 minutes and filtered. 2 drops of Wagner's reagent was added to 1cm^3 of the filtrated and observed formation f reddish brown precipitate indicates the presence of alkaloids.

- **Test for saponin**

2cm^3 of the extract was put into a test tube and vigorously shaken for 2 minutes and observed persisted foaming indicates saponins

- **Test for tannins**

1cm^3 of freshly prepared 10% KOH was added to 3cm^3 of the extract in MeOH and observed dirty white precipitate indicates presence of tannins. 2 drops of 5% $FeCl_3$ added to 1cm^3 of the methanolic extract and observed. Formation of green precipitate shows tannins.

- **Test for flavonoids**

To 3cm^3 of extract, 1cm^3 of 10% NaOH was added and yellow colouration indicates the presence of flavonoid.

- **Test for steroid**

To 5cm^3 of dilute H_2SO_4, add 1cm^3 of the extract. A red colouration observed shows the presence of steroid.

- **Test for triterpenoids**

5cm^3 of the extract was put into a test tube and 2cm^3 of $CHcl_3$ was added followed by 3cm^3 of H_2SO_4. Reddish brown colouration shows the presence of triterpenoid.

- **Test for proteins**

5cm^3 of the extract was added to 2cm^3 of 40% NaOH and 2 drops of 5% of $CuSO_4$. Pink colouration shows the presence of protein.

- **Cardiac glycoside**

2cm^3 of the sample was dissolved in 2ML of glacial acetic acid. One milliliter of ferric chloride was added to it also. Reddish brown colour was observed which indicate the presence of cardenoids glycoside.

- **Test for reducing compounds**

2cm^3 of the extract added to 5cm^3 of Fehling solution and heat for 5 minutes. Brick-red colour indicate reducing compound present.

- **Test for phlobatanin**

To 2cm^3 of the extract add 5cm^3 of 1% HCl. Red colouration shows phlobatanin present.

- **Test for anthraquinones**

2cm^3 of the extract shakes with 10ml of benzene. A violet couration shows anthraquinone present.

- **For proximate analysis**

Proximate analysis of each sample was performed according to AOAC (1984). Proximate analysis are performed to know the % moisture content, % ash content, % crude fibre, % fat content, % crude protein % other extract and % total carbohydrate. Proximate analysis constitutes the classes of food present in the sample.

RESULTS AND DISCUSSION

The phytochemical and proximate constituents were carried out on the methanolic extract of *cymbopogon attractus* and *ocimum gratissimum* leaves. The results obtained are presented in the tables below:

Table 1. *Qualitative analysis of the phytochemical component of the methanolic extract of cymbopogon attractus and ocimum gratissimum leaves*

Chemical constituents	Cymbopogon attractus	Ocimum gratissimum
Alkaloid	+	+
Tannins	+	+
Saponins	+	+
Flavonoid	+	+
Steroid	-	+
Triterpenoids	+	-
Protein	-	-
Cardiac glycoside	+	-
Reducing compound	+	-
Phlobatanin	+	+
Anthraquinone	+	+

Table 2. *Chemical composition of cymbopogon attractus and ocimum gratissimum leaves*

Proximate composition	Cymbopogon attractus	Ocimum gratissimum
Moisture content	76.98	81.62
Ash content	1,69	3.03
Ether extract	1.38	0.79
Crude fibre	8.84	3.80
Crude protein	2.87	5.58
Carbohydrate	8.27	8.87

The table 1 (phytochemical screening) shows the presence of alkaloids, saponins, tannis, flavonoids, phlobatanin and anthraquinone in both samples and the absence of triterpenoids, and protein both samples. However, reducing compound and glycoside were present in *cymbopogon attractus* but absence in *ocimum gratissimum* while steroid was present in *ocimum gratissimum* but absent in *cymbopogon attractus*.

The presence of these chemicals in the leave extracts accounts for their traditional usage for the treatment of various ailments. The samples are rich in alkaloid, saponin, flavonoid, anthraquinone and phlobatain. Flavonoids are polyphenolic compounds that are biologically active against liver toxins,

microorganisms, inflammation, tamor and free radicals (Okwu, 2004). The presence of flavonoids in the samples could be responsible for their use by traditional healers to treat diabetes since flavonoid inhibit the growth of cataracts in diabetic patients (Okwu and Omodamiro, 2005).

Saponins are natural glycosides that act as hypoglycemic, antifungal and serum cholesterol lowering agents in animals (Sapna et al, 2009). They are essential elements in ensuring hormonal balance and synthesis of sex hormones (Okwu, 2003). The presence of saponin in the samples could be responsible for their uses as a local condiment. Alkaloids are chemicals which help plant to repel some predators. Its present in the sample could attribute to the use of the leaves as an insect repellant such as mosquitoes in the local areas. Tannins are bitter polyphenolic compounds that hasten the healing of wounds. They also possess anti-diuretic and anti-diarrhea properties (Okwu, 2004). The presence of tannis in the leave extracts might be responsible for their uses for treatment of gastrointestinal disorder, stomach upset by herbalists. However, condensed tannins can inhibit herbivore digestion by binding to consumed proteins, thereby making it indigestible for animals. This could be the reason why animals do not graze on this plants (Deoga et al, 2006). Indeed, to neutralize this effect, it is pertinent for humans to cook the leaves before consumption. Cardiac glycoside serve as defence mechanism against cardiovascular diseases (Schneide, and Wolfing, 2004). The presence of cardiac glycoside in cymbopogon attractus thus explains its therapeutic effect against cardiovascular and digestive problems by herbalists than *ocimum gratissimum*. Steroid was present in *ocimum gratissimum* shows its importance in pharmacy due to their relationship with such compounds such as sex hormones (Okwu, 2001) and promote immune function in the skin and also reduces inflammation (Bell, 2008). Fagbohum et al (2012) reported the presence of steroids in leea guineensis and *ocimum gratissimum L.*

Phlobatanin was detected in the both samples. The report of this work is similar to the findings of Iniaghe et al (2009) and Fagbohum et al (2012) who reported the presence of phcobatanin in A. hispida and A. racemosa as well as leea guineensis. This compound inhibit the growth of many microorganisms like fungi, yeast, bacteria and viruses (Scalber, 1991) Anthraquinone is an antioxidant that justifies the use of the samples for the treatment of diarrhea, respiratory tract infection, fever and stomach upset.

The proximate analysis result shows a fairly highly moisture content of *ocimum gratissimum* than *cymbopogon attractus* indicate that *ocimum gratissimum* leaves may be susceptible to microbial growth than *cymbopogon attractus*. The crude protein and carbohydrate content of *ocimum gratissimum* recorded a value of 5.56% and 8.87% respectively as against 2.87% and 8.27% for protein and carbohydrate contents in *cymbopogon attractus* respectively. This shows that *ocimum gratissimum* is a very good source of energy than *cymbopogon attractus* which could be attributed to its usage as condiment for soup.

The ash content is a reflection of the amount of mineral elements present in the samples. Thus, the plants contained a good amount of minerals the results shows that *O. gratissimum* ash content is higher than *C. attractus* (Table 2). The fibre content values show a high fibre level in *cymbopogon attractus* than *ocimum*

gratissimum (8.84% and 3.80%) respectively. This shows that both leaves are good sources of crude fibre when consumed because adeqaue intake of dietary fibre can lower the serium cholesterol level, heart disease, hypertension, constipation, diabetes and breast cancer (Ishida et al, 2000).

CONCLUSION

This study showed evidence that both plants are good sources of food to man and have immensely contributed to the medical field. The both plants used in this study were found to contain vital constituents needed to fight against various kinds of infection in humans.

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