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# Preliminary Phytochemical, Nutritional and Toxicological Studies of Leaves and Stems of *Hyptis suaveolens*

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**Abstract:** Phytochemical and Proximate analysis of leaves and stems of *Hyptis suaveolens* was carried out. Phytochemical analysis of leaves and stems showed that the plant is rich in Phytochemicals. Leaves had flavonoids 1.90±0.14%, Alkaloids 2.80±0.28%, Tannins 5.50±0.074%, Saponins 6.10±0.42%, while stems had Flavonoids 0.30±0.14%, Alkaloids 1.60±0.00%, Tannins 0.23±0.07%, Saponins 10.50±0.79%. Cyanogenic glycoside contents were found to be 44.18±1.39 mg 100 $g^{-1}$ for leaves and 52.04±1.39 mg 100 $g^{-1}$ for stems. Proximate analysis of leaves gave protein 10.24±0.01%, fat 2.0±0.0%, Fibre 5.63±0.53%, Ash 11.40±0.57% and carbohydrates 55.72±0.64%, while proximate analysis of stem gave protein 8.75±0.00%, Fat 2.0±0.0, Fibre 17.35±1.63%, Ash 9.58±0.3% and Carbohydrates 38.13±0.53. Calcium oxalate crystals occurred in all the taxa studied, these crystals, which are in aggregates occurred mostly within the ground tissue of the leaves, stems and roots of all the taxa, investigated. The result of this study, when combined with the gross morphology, could aid field workers in resolving the confusion in the identification of *Hyptis Suaveolens, which* is an economically important plant. These findings suggest the need to further investigate the medicinal and nutritional potentials of *Hyptis Suaveolens.*

**Key words:** *Hyptis suaveolens*, leaves, plants proximate analysis

## INTRODUCTION

*Hyptis Suaveolens.* Poit also known as Bush tea is a strongly aromatic plant that grows mainly in roadsides, waste places and cultivated lands across the region from Senegal to Southern parts of Nigeria. It has close morphological features with *ocimum* species (Dalziel, 1937).

It is also used as an antihelminthic (Oliver, 1960). The leaves are used as insectifuge because of its strong aroma especially against mosquitoes (Personal Communication).

Leaf sap of *H. suaveolens* with lemon juice added is taken in Sierra Leone for stomach ache and the leaf is applied around the head for head ache or topically to maturate boils (Dalziel, 1937). A leaf poultice is applied to cancers and tumours in the Americas (Hartwell, 1969). The very strong aromatic mint/thyme-like smell leads to use of the plant as an insectifuge. As its English name bush tea implies, *H suaveolens* serves in West Africa as an acceptable substitute in infusion for tea. It. is carminative, sudorific lactogenic, anti-catarrhal and anti-parasitic (Dalziel, 1937). In this and other respects, the plant resembles *O. gratissimum* in usage, but whereas species of the latter are cultivated, *H. suaveolens* is not, even though it has a reputation for benign attributes.

## MATERIALS AND METHODS

Leaves and stems of *Hyptis suaveolens* t were collected from roadsides around Golden Guinea Breweries Plc, Umuahia, Nigeria. The plant was botanically identified by Prof. H.O. Edeoga of the Botany Unit of Michael Okpara University of Agriculture, Umudike and a voucher specimen was deposited in the Department of Biochemistry of Michael Okpara University of Agriculture, Umudike.

**Proximate analysis:** Crude protein contents were determined by furnace incineration using the methods of James (1995).

Crude fibre determination was done using the Wendee method as described by Pearson (1976). Fat contents were determined using continuous solvent extraction method (Pearson, 1976) carbohydrates were determined by difference.

**Phytochemical and anti -nutrient studies:** Alkaloids were estimated by alkaline precipitation gravimetric method as described by Harbourne (1973). Tannins were determined using Folin-Deins Spectrophotometric method as described by Hang and Lantzch (1983). Flavonoids were determined using acidification and ethyl acetate extraction as described by Harbourne (1973).

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Saponins were estimated using the method of Harbourne (1984). Cyanogenic glycosides were estimated using the alkaline titration method as described by AOAC (1990).

**Histochemical staining:** Some specimens from transverse sections and epidermal peels were subjected to the process of histochemical staining. Histochemical staining for calcium oxalate crystals was done following the method of Silver and Price (1969) with slight modifications, such as reducing the staining period from 3 min to 1 min. Slides with specimens were placed on glass rods over a sink about 200cm below a 60 watts lamp. The specimens were flooded with 1:1 mixture of 5% silver nitrate and 30% hydrogen peroxide at 6-10 min interval. The nitrate ion precipitates the calcium oxalate crystals. The flooding was done for 30 min. The specimens were stained with 0.5% safranin in 50% alcohol for a minute. After rinsing in distilled water, specimens were made permanent by mounting in Canada balsam with xylene. Slides were dried on a hot plate at 30°C.

## RESULTS

The histochemical studies on the epidermal and vegetative tissues showed calcium oxalate crystals and starch grains to be present in all the taxa investigated. Calcium oxalate crystals were observed in the upper epidermis of hybrid A and D and *H. suaveolens*. These crystals were also seen on the lower epidermis of hybrids B and C. However, irregular aggregates of crystals were present except in hybrid B where the presence of a raphide was observed.

Crystals were also observed mostly within the ground tissue of the mid-rib in all taxa studied. These crystal aggregates were located mostly within the central parenchyma cells of the stem of *H. suaveolens*.

## DISCUSSION

Results of proximate analysis (Table 1) show that the leaves had a higher, protein ash and carbohydrate contents than the stem of *Hyptis suaveolens*. The stem had a higher fibre content than the leaves. Crude protein contents of the leaves (10.24±0.01) compare well with that reported for *Ocimum gratissimum* (9.98±0.09) by other workers (Nwachukwu and Ijeh 2000). Ash content (13.55±0.001%) and lipid content (3.5±0.003) reported for *Ocimum gratiisimum* by Nwachukwu and Ijeh, 2000 is slightly higher than that obtained for *Hyptis suaveolens* (Ash 11.40±0.57) and (lipid 2.0±0.0%) in our study. The high ash contents suggests that plant as a rich source of minerals. There is no record of use of the plant as foods. Our finding however show that it is rich nutritionally.

Table 1: Proximate composition of leaves and stems of *Hyptis suaveolens*

| Component | Leaves (% Composition) | Stem (% Composition) |
|---|---|---|
| Moisture | 83.75±1.49 | 85.51±0.60 |
| Dry Matter | 16.25±1.49 | 14.51±0.62 |
| Protein (N x 6.25) | 10.24±0.01 | 8.75±0.00 |
| Lipid | 2.0±0.00 | 2.0±0.00 |
| Fibre 5.63±0.53 | 17.35±1.63 | |
| Ash 11.40±0.57 | 9.58±0.31 | |
| Carbohydrate (by difference) | 70.73±1.14 | 62.32±1.94 |

Results are means of duplicate estimation

Table 2: Phytochemical and anti nutrient composition of stems of *Hyptis suaveolens*

| Component | Leaves (% Composition) | Stem (% Composition) |
|---|---|---|
| Flavonoids | 1.90±0.14 | 0.30±0.14 |
| Alkaloids | 2.80±0.28 | 1.60±0.00 |
| Tannins | 5.50±0.07 | 0.23±0.07 |
| Saponins | 6.10±0.42 | 10.50±0.79 |
| Cyanogemic Glycosides | 44.18±1.09mg 100 $g^{-1}$ | 52.04±1.39 mg 100 $g^{-1}$ |

Results of phytochemical analysis show that the leaves are richer in flavonoids, Alkaloids and Tannins than the stem. The stem however had a higher content of saponins. Cyanogenic glycoside content of the stem (52.04±1.39mg.100g) is higher than that of leaves (44.18±1.39mg 100 $g^{-1}$). Flavonoids (1.90±0.14%), Alkaloids (1.90±0.14) and Tannin (5.50±0.14%) contents are higher than that reported for *Ocimum gratissimum* by Ijeh *et al.* (2004), (Alkaloid 1.23±0.001%, Flavonoids 0.34±0.028%, Tannins 0.42±0.003%).

The presence of crystals within the ground tissue of leaves, stems and roots suggest that these crystals might have a storage and supportive functions, supporting evidence from other workers such as Edeoga and Ogbebor (1999); Edeoga and Okoli (1995) and Francheschi and Horner (1980).

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