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Proximate and Phytochemical Constituents of Ocimum Gratissimum

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ABSTRACT

The tree basil is an aromatic perennial plant and the leaves were being used for medicinal purposes in south west of Nigeria. The proximate analysis and the phytochemical constituents were carried out using standard reference methods. The moisture content was found to be 10.30%+0.01, ash content 2.45%¬+0.02, fat 2.78%+0.01, protein 16.51%+0.10, crude fibre 9.07%+0.01 and carbohydrate 58.89%. The phytochemical constituents indicated alkaloid11.43%+0.10, phenol 7.50%+0.10, tannin 10.90%+0.01, flavonoid 8.20%+0.01 and saponin 12.87%+0.10. The presence of high secondary metabolites in the leaves are good indication that if the plant is subjected to further research and characterization, bioactive compounds with strong biological activities may be isolated and novel compounds may also be discovered.

Keywords: Tree basil, proximate composition, alkaloids, tannin, saponin, flavonoid, phenol, characterization.

INTRODUCTION

Tree basil which botanical name Ocimum gratissimum L. (Lamiaceae) is a small shrub commonly known as “scent leaf,” “tea bush” or “fever plant.” It is called “Efirin” (Yoruba) in south west part of Nigeria. In West Africa, O. gratissimum is commonly found around village huts and gardens [1] and cultivated for medicinal and culinary purposes. The leaves have strong aromatic odor and are popularly used to flavor soup and spice meat. It is used in traditional medicine in the treatment of diarrhea,[1],[2] as a febrifuge and component of anti-malaria remedies,[3], mosquito/insect repellant, stomachic and general tonic, antiseptic, in wound dressing, skin infections, conjunctivitis and bronchitis. An infusion of the leaves, called ‘Ocimum tea,’ is dispensed as a remedy for fever and diaphoresis [1]. The roots are used as sedative for children [4]. Extract of the crushed leaves is an excellent remedy for cough. A lot of research work has been conducted on the plant but the plant leaf in my locality has not been investigated for its proximate and phytochemical properties because environmental conditions do have impact on the plant and this necessitates this research work.

METHODOLOGY

PROXIMATE ANALYSIS

Standard methods of the [5] were used to determine the moisture content, crude protein, crude fat, total ash and crude fiber content. Moisture content was determined by heating five grams of the sample to a constant weight in a crucible placed in an oven maintained at 105oC. The dry matter was used in the determination of the other parameters. Crude protein (% total nitrogen ×6.25) was determined by the Kjeldahl method, using five grams; crude fat was obtained by exhaustively extracting five grams of the sample in a soxhlet apparatus using petroleum ether (boiling point range 40-60oC) as the extractant. Ash was determined by the incineration of six grams placed in a muffle furnace maintained at 550oC for five hours .Crude fibre was obtained by digesting four grams of sample with H2SO4 and NaOH and incinerating the residue in a muffle furnace maintained at 550oC for five hours. Total carbohydrate was obtained by difference. Each analysis was carried out in triplicate and Anova statistical method was used for the statistical analysis

PHYTOCHEMICAL ANALYSIS

(a)Tannin determination Finely grounded sample was weighed (0.2g) into a 50ml sample bottle. Ten of 70% aqueous acetone was added and properly covered. The bottle was put in an ice bath shaker and shaken for 2hours at 300oC .The solution was then centrifuge and the supernatant stored in ice, 0.2ml of the solution was pipetted into the test tube and 0.8ml of distilled water was added. Standard tannin acid solution was prepared from a

0.5mg/ml of the stock and the solution made up to 1ml with distilled water, 0.5ml of Folinciocateau reagent was added to the sample and standard followed by 2.5ml of 20% Na2CO3 the solution was then vortexed and allow to incubate for 40minutes at room temperature, its absorbance was read at 725nm against a reagent blank concentration of the same solution from a standard tannic acid curve prepared[6].

(b) Saponin determination

The spectrophotometric method of [7]. Two gram of the finely grinded sample was weighed into a 250ml beaker and 100ml of Isobutyl alcohol was added. Shaker was used to shake the mixture for 5hours to ensure uniform mixing. The mixture was filtered using No 1 Whatman filter paper into 100ml beaker containing 20ml of 40% saturated solution of magnesium carbonate. The mixture obtained again was filtered using No 1 Whatman filter paper to obtain a clean colourless solution. One (1ml) was added into 50ml volumetric flask using pipette, 2ml of 5% iron (iii) chloride (FeCl3) solution was added and made up to the mark with distill water. It was allowed to stand for 30min for the color to develop. The absorbance was read against the blank at 380nm.

$$\textbf{Saponin}= \frac{Absorbance of sample \times concentration of stadard}{Absorbance of stan dard} \quad \textbf{(1)}$$

(c) Alkaloid determination

Five gram of the sample was weighed into a 250ml beaker and 200ml of 10% acetic acid in ethanol was added and allowed to stand for 4minutes, this was filtered and extract was concentrated on a water bath to one quarter of the original volume. Concentrated ammonium hydroxide added drop wise to the extract until the precipitation was completed. The whole solution was allowed to settle and the precipitate was collected and washed with dilute ammonium hydroxide and then filtered. The residue was alkaloid which was dried and weighed [8].

$$\%\ \text{alkaloid}= \frac{W_3 - W_2}{W_1} \times 100\% \quad \ldots\ldots\ldots\ldots\ldots \textbf{(2)}$$

Where: W1 =initial weight of sample, W2 =weight of the extract, W3 = final weight of the residue

(d) Total Flavonoid Determination

Ten gram of the sample was extracted repeatedly with 100ml of 80% aqueous methanol at room temperature. The whole solution was filtered using Whatman filter paper No. 42 (125mm). The filtrate was transferred into crucible and evaporated into dryness over water bath and weighed to a constant weight [9].

(e) Determination of Phenol

The fat free sample was boiled with 50ml of ether for the extraction of the phenolic component for fifteen minutes. Five ml of the extract was pipette into a 50ml flask and then 10ml of distilled water was added. Two milliliter of ammonium hydroxide solution and 5 ml of amyl alcohol were added to the sample and made up to the mark. It was left to react for 30 minutes for colour development; the absorbance was measured at 550nm.

RESULTS AND DISCUSSION

Table 1: Result of the proximate analysis of the ocimum gratissimum

Parameters	(%) proximate composition
Moisture	10.30 ±0.01
Ash	2.45 ± 0.02
Fat	2.78 ± 0.01
Protein	16.51 ± 0.40
Crude fiber	9.07 ±0.27
Carbohydrate	58.89 ±4.49

The result of proximate composition (Table 1) shows that the moisture content of the sample was (10.30±0.01). This is expected since the sample has been subjected to drying for five days to reduce the moisture content. High moisture content is an index of spoilage, the protein content was (16.51 ±0.40), the high protein content buttressed the use of the plant leaf as flavor soup and spice meat, also the crude fibre was (9.07±0.27), the fat content was (2.78±0.01) which showed that the plant leaf contained little oil and the carbohydrate content by difference was (58.89 ± 4.49). The result of phytochemical analysis in percentages (table 2) shows that tree basil has high content of alkaloid (11.43±0.09), phenol (7.50±0.06), tannin (10.90±0.06), flavonoid (8.20±0.06) and saponin (12.87 ±0.19). The phytochemical test of ocimum gratissimum showed that the plant leaves are very rich in secondary metabolites and were present in different concentrations.[7] [10].

Table 2: result of the phytochemical analysis of the ocimum gratissimum

Parameters (%)	phytochemical
Alkaloid	11.43 ±0.09
Phenol	7.50 ±0.06
Tannin	10.90 ± 0.06
Flavonoid	8.20 ±0.06
Saponin	12.87 ±0.19

CONCLUSION

From the result of proximate analysis, it is quite interesting that ocimum gratissimum has more protein content, crude fiber and also the presence of high content of alkaloid, phenol, tannin, flavonoid and saponin is an indication that if further research can be done on the sample, novel bioactive compounds can be derived from it after isolating the compounds and characterizing them using various spectroscopic techniques.

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