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PHYTOCHEMICAL ASSAY OF LEAF AND ROOT OF METHANOL EXTRACTS OF *THAUMATOCOCCUS DANIELLI*

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ABSTRACT

Phytochemicals are the active components in most plants that contribute to their protective activity. This study quantitatively determined the phytochemical composition of dried leaves and roots of *Thaumatococcus danielli*. Phytochemical analysis using GC-FID (BUCK M910) revealed that kaempferol was higher in leaf (18.75ug/g) than in root (9.55ug/g), oxalate was higher in leaf (1.2ug/g) than in root (0.84ug/g), anthocyanin (2.49ug/g) higher in leaf than in root (1.37ug/g), saponin (14.33ug/g) higher in leaf than in root (14.00), phenol was higher in leaf (6.66ug/g) than in root (3.96ug/g). While tannin was higher in root (10.39ug/g) than in leaf (8.93ug/g), Lunamarine was higher in root (2.08uu/g) than in leaves (1.98ug/g) and ribalinidine was higher in root (4.76ug/g) than in leaf (3.09ug/g). Qualitative analysis revealed significantly presence of flavonoid (++), saponin (++) and tannin (++) in both leaf and root extracts. Alkaloids, proteins and cardiac glycosides were found in trace amounts (+) while terpenoids, resins and steroids were not found (-) in both extracts and these account for the plant's medicinal value as antidote against venoms, stings and bites and sedative for treating insanity.

KEY WORDS: *Thaumatococcus danielli* (leaf, root), Phytochemicals

INTRODUCTION

The active components in most plants that contribute to their protective effects are the phytochemicals, vitamins and minerals (Okwu, D.E. and Ekeke, O. 2003). Plants are being used for numerous beneficial effects in nutrition and therapeutics (protective and medicinal) by mankind (Assareh *et al*., 2010). Beneficial effects result from the mix of secondary metabolites that are capable of generating physiological actions within the body. *Thaumatococcus danielli* is a multipurpose, monocotyledonous tropical plant found in the rainforest region of West Africa particularly Nigeria and Ghana (Yeboah *et al*., 2003; Ojekale *et al*., 2007).

In Nigeria, the leaves of this plant are used among different ethnic groups for packaging and preservation of cooked foods such as meat, rice, beans, maize meal and beans cake etc. A sweet protein, Thaumatin, which is the source of natural sweetener, is found in the fruit of this plant, *Thaumatococcus danielli* (Arowosege and Labode, 2006).

The fruit of this plant is used as laxative and due to its non-caloric value it has also been shown to be very ideal in the management of diabetes mellitus while the use of seed in emesis for pulmonary disorder, the leaf sap as antidote against venoms, stings and bites (Emudainohwo *et al*., 2015) and the root and leaf sap as sedative for treating insanity (Shalom *et al*., 2014) informs this research to evaluate the bioactive compounds (phytochemicals) it contains.

Objectives of study

It is to determine the qualitative and quantitative phytochemical compositions of root and leaf of methanol extracts of *Thaumatococcus danielli*.

Materials and methods

Collection of plant materials

Fresh leaves and roots of *Thaumatococcus danielli* were collected from the bush, identified in Plant Science and Biotechnology Department of Federal University of Technology Owerri, Imo State, Nigeria. The roots and leaves (samples) were shade-dried at room temperature to a constant weight, ground to powder, packed into polythene bags and stored for subsequent uses.

Sample extraction

About 200g of each powdered sample (leaves and roots) was macerated in 1L of methanol at room temperature for 72hrs, filtered with Whatmann No. 1 filter paper and the filtrate was transferred into a rotary evaporator at 40 – 42°C. Each residue obtained was further dried in a water bath at 37 – 40°C. The crude extracts were stored in a refrigerator at 4°C.

Qualitative and quantitative phytochemical analysis

Qualitative analysis was carried out using the method of Trease and Evans and Harbone (1998) to identify the different phytochemicals, while phytochemical quantification was performed on a BUCK M910 GC equipped with flame ionization detector.

RESULT

Table 1: Result of qualitative phytochemical screening

Parameters	Leaf	Root
Alkaloids	+	+
Flavonoids	++	++
Steroids	-	-
Tannins	++	++
Resins	-	-
Proteins	+	+
Saponins	++	++
Cardiac glycosides	+	+
Terpenoids	-	-

(+) trace amount
(++) significantly present
(-) absence

Table 2: Result of quantitative phytochemical analysis using GC-FID

Phytochemicals	Leaf ug/g	Root ug/g
Phytate	0.23	0.29
Epidcatechin	1.80	1.87
Oxalate	1.20	0.84
Anthocyanin	2.49	1.37
Tannin	8.93	10.39
Phenol	6.66	3.96
Lunamarine	1.98	2.08
Ribalinidine	3.09	4.76
Catechin	5.51	5.67
Rutin	11.25	11.35
Kaempferol	18.57	9.55
Saponin	14.33	14.00
Spartein	0.0002	0.0002

DISCUSSION

Phytochemicals such as flavonoids and phenols in line with other antioxidants, functions within the body by mopping up free radicals and metallic ions. Flavonoids and phenols are the largest group of phytochemicals that account for antioxidants activity in plants or plant material (Gupta *et al*., 2012). These antioxidants are capable of slowing or preventing the oxidation of other molecules. The uncontrolled production of free radicals is associated with the onset of numerous diseases like cancer, rheumatoid arthritis, as well as in the degenerative process associated with aging, including Parkinson's and Alzheimer's diseases (Ali *et al*., 2008; Di Matteo and Esposito 2003).

Phytochemical analysis revealed high level of flavonoids in both leaves and roots of which kaempferol concentration was much higher in leaves than in roots. Tannin was higher in roots than in leaves, while phenol was higher in leaves than in roots. The level of phytate and oxalate in both samples were very low, but saponin was significantly present in both leaves and roots. Lunamarine and Ribalinidine were higher in roots than in leaves and this account for its medicinal value.

CONCLUSION

The phytochemical analysis of this plant showed significant concentrations of flavonoids, a powerful antioxidant in conjuction with other phytochemicals which have physiological role in mopping up free radicals. Thus the plant could also be used in the prevention and management of degenerative diseases such as diabetes mellitus and cardiovascular disorders.

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