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Original Article

Phytoconstituents and Proximate Composition of Clerodendrum Colebrookianum Walp.: A Widely Used Anti High Blood Pressure Medicinal Food Plant in Eastern Himalayas

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ABSTRACT

*Clerodendrum colebrookianum*Walp.is a medicinal food plant widely used in the North East India. The herb is used as vegetable as well as medicine to control high blood pressure. Minerals and Proximate compositions in a food is vital for the proper growth and development of a healthy body and secondary metabolites included in diet act as a nutraceuticals thus help in fighting various health problems. The present study was carried out to discourse the Phytoconstituents, Proximate composition and Minerals of the nutraceutical herb, *Clerodendrum colebrookianum*. Methanol extract of sample was subjected to GCMS to profile the Phyoconstituents while Standard methods including AOAC was followed to study proximate and minerals of the sample under studied. Moisture content was 77.90%, carbohydrate 4.28%, 2.36% crude protein, 4.21% crude fibre and 0.35% crude fat respectively. The minerals concentrations are 0.215mg of Fe/g, 0.105mg/g of Mn, 0.0425mg of Cu/g, 0.056mg Zn/g, 2.55mg of Mangnesium/g, 4.3mg of Na/g and 24.5mg of K per gram of sample. A total of eleven compounds are recorded to be useful for high blood pressure problem and as many as other twenty useful phytoconstutuents were recorded from the sample including antioxidant, anti-uric acid formation, anti-tumour, bioabiability of zinc etc. The present study advocates the traditional knowledge on the use of *Clerodendrum colebrookianum* as a remedy for high blood pressure problem.

Key words: *Clerodendrum colebrookianum*, North East India, Nutraceutical Herb, Phytoconstituents, Proximate, Minerals.

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INTRODUCTION

Let food be your medicine, once said, Hippocrates[1]. Galen- "the father of observational medicine" believed that the fundamentals of good medicine lay in diet. And, such medicinal food concepts still observable in the indigenous food system practices among indigenous people in various pockets of the world. In the word of Etkin & Ross[2], wild plants that are retained in local food cultures are inseparable from traditional therapeutic systems. And, Pieroni and Price[3] remarked that it is difficult to draw a line between food and medicine; food may be medicine and medicine may be food. And, In remote rural Villages, Wild edible plants are integral source of food, medicine, shelter and livelihood. Many of wild edible vegetables have medicinal property and can be used to treat common ailments; these are easily available, cheap and also excellent source of nutrients like proteins, carbohydrates, iron, essential minerals and other secondary metabolites. And, regular uses of these vegetables act as an alternative source of medicinal drugs along with nutritional benefits[4]. There is a vast cornucopia of herbs and foods which stimulate support and nourish our body system. Some have been used by different traditional systems of several countries and are now being evaluated by modern research[5]. Medicinal and aromatic plants represent an inexhaustible source of life saving drugs for the majority of the world's population[6]. The beneficial remedial effects of plant materials are mainly due to the mixture of substances called secondary metabolites of plants[7].

Hypertension is one of the major chronic diseases, which affect people around the world. One approach to control hypertension is by using diet containing an adequate amount of phytochemicals; increased intake of phytochemicals is associated with decreased mortality rate from cardiovascular diseases, stroke and injuries secondary to hypertension[8]. Hypertension or high blood pressure accounts 9.4 million deaths all over the world every year[9]; The use of plant origin natural compounds as cardio protective and antihypertensive agents rich in a variety of secondary metabolites such as flavonoids, alkaloids, tannins and terpenoids are helpful[10]. And many have turned their attention to the use of herbal medicines for hypertension treatment in country like Thailand[10].

And, *Clerodendrum colebrookianium* Walp.(fig.1.), a medicinal food plants widely used among Indigenous people of North East India as medicinal food to lower down the high blood pressure. Some workers have reported the traditional uses of this herb in high blood pressure related practices from the eastern Himalayan regions of India[11-13]. With the above backdrops, the present research has been designed to study the proximate composition, phytoconstituents and minerals present in *C.colebrookianum*.

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MATERIAL AND METHODS

Plant material

Clerodendrum colebrookianum Walp.; a Verbanaceae family is a shrub of about 15 ft. high with disagreeable smell. Bark shining light grey; Leaves: 3.5-10 by 2.5-8.5 in., broad, ovate, acute, entire, membraneous, almost glabrous; lateral nerves 6-9 on either half; base shallow cordate; petiole 0.5-6.5 in. long with cluter of glands near the apex. Flower is white in broad terminal compact, corymb biform compound cymes; bract caduceus. Calyx: pubescent, often bearing a few glands; calyx: teeth short; Corolla: tube slender, 1-1.25 in. long; style exerted; Fruit: Bluish green to deep green when fully ripe, glossy, 0.3 in. across, globose, compressed above, of 4 duprels seated on an accrescent cup-shaped calyx about 0.4 in. Across[14]. The material was collected from Kitchen garden of Mrs Oki Paron of Pasighat Town of East Siang District of Arunachal Pradesh, India.

Preparation of extract for GCMS

The shoot was washed thoroughly in distilled water and dried in shade till the weight did not changed further and pulverized into powder using a mechanical grinder. 500g of plant powder was soaked in ethanol (Merck) for 72 hours with intermittent shaking then filtered through Whatmann No. 41 filter paper and concentrated extract was obtained by using water bath.

Proximate and minerals studies

The shoot was washed thoroughly in distilled water and dried in shade till the weight did not changed further and pulverized into powder using a mechanical grinder, the powder was used in proximate analysis. For moisture study, fresh collected sample was used before drying. The Association of Official Analytical Chemists (AOAC, 1990) were used for the determination of ash, crude lipid, crude fibre, carbohydrate and mineral. Ash was determined in silica crucibles by incination in a muffle furnace at 550^{0}C for 5 hrs. Crude lipid was extracted by continuous soxlet methods (AOAC, 1990) with petroleum ether (b.p 40-60^{0}C). Crude fiber was estimated by acid-base digestion with 1.25% H_2SO_4 and 1.25% NaOH solution. Nitrogen was estimated by Kjeldelmethod with steam distillation and titrated with standard 0.01 M HCL solution. Crude protein was estimated by multiplying the sample per cent Nitrogen content by a factor 6.25. (% protein = % Nitrogen X 6.26). Carbohydrate was estimated by Anthrone Method with an ultraviolet-visible (UV-Vis) spectrophotometer (Lamda-25, Perkin Elmer, Cambridge UK). Minerals were analysed from solution obtained when 1.0g of the samples were digested with concentrated 10ml nitric acid and kept overnight and heated till fumes of HNO_3 and allowed to cool and add 4ml concentrated perchloric acid and heated again till clear solution is obtained and filtered into 100ml ml standard flask and made to mark with distilled water and analysed in atomic absorption spectrophotometer (Buck scientific model 200A).

GC-MS analysis environment

Gas-Chromatography Mass Spectrometry (GC-MS) analysis of the ethanol extracts of C. colebrrokianium carried out in Shimadzu GCMS-QP-2010 plus system. RTx-5 Sil MS column (30 m X 0.25 mm id X 0.25 film thickness) was used for the analysis. The operating conditions of the column were as follows: Oven temperature program from 80°C to 210°C at 4°C/min withhold time of 2 min and from 210°C to 300°C at 15°C/min withhold time of 5 min, and the final temperature was kept for 20 min. The injector temperature was maintained at 270°C, the volume of injected sample was 0.3µl; pressure 85.4kPa, total flow 76.8mL/min, column flow 1.21 mL/min, linear velocity 40.5 cm/sec, purge flow 3.0 mL/min, split ratio: 60.0; ion source temperature 230°C; scan mass range of m/z 40-600 and interface line temperature 280°C. The identification of compounds was performed by comparing their mass spectra with data from NIST 11 (National Institute of Standards and Technology, US) and WILEY 8.

RESULTS AND DISCUSSION

A total of forty four phytoconstituents were recorded form the shoot sample of *C.colebrookianum*; out of which most of the phytoconstituents are useful compounds for a healthy growth and development. 14.56% of peak area was 2,2-DIDEUTERO-TRANS-1,3-DIHYDROXY-CYCLOPENTANE, it is Catechol-O-Methyl-transferase-inhibitor, glucosyl-transferase-inhibitor, reverse ranscriptase inhibitor*; another 14.02% peak area was 9,12-OCTADECADIENOIC ACID (Z,Z)- it Inhibit Production of Uric Acid, Increase Zinc Bioavailibility* and Hepatoprotective [16]; 10.46% peak area was PENTADECANOIC ACID and it Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*; 4.17% was Squalene, it is Monooxygenase-inhibitor*, antioxidant, antitumour[17], it also Hepatoprotective, Hypolipidemic, hypoglycemic[16]. 2,3-DIHYDRO-3,5-DIHYDROXY-6-METHYL-4H-PYRAN-4-ONE with 1.56%; which is Catechol-O-Methyl-transferase-inhibitor, 11B-HSD-inhibitor, 5-HETE-INHIBITOR, Hepatoprotective*; 8.06% of peak area was dl-.alpha.-Tocopherol, it is Antioxidant, 5-alpha- reductase-inhibitor, Tocopherol synergist, increase alpha-mannosidase activity* Antihypertension[17]; 5.08% was (2E)-3,7,11,15-TETRAMETH YL-2-HEXADECEN-1-OL; it is Anticancer, Antidote(emetine), endocroneprotective, endocrine tonic*; 1.14% peak was 9,12-OCTADECADIENAL, DIMETHYL ACETAL,it is Hepatoprotective[16;]. 2.03% peak area was Octadecanoic acid, it Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*Hypocholoresterolemic[16]; 4.83% was Stigmasterol, it also Antihypercholesterolemic, Antioxidant, antitumour[18,19]; 0.29% was OCTADECANOIC ACID, ETHYL ESTER, it Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*, Hypocholeterolemic[16]; 0.32% pear area was 14-.BETA.-H-PREGNA , it is Hepatoprotective, Histidine kinase-inhibitor, Hypercholesterolemic, hypoglycemic, hypolipemic, increase T helper*; 0.72% peak area was gamma.-Tocopherol, it is Antioxidant, Tocopherol synergist, PPAR-Gamma-Antagonist*, Cardioprotective[16]; 2.10% peak area was 5-Hydroxymethyl furfural, it is Aromatic[15]; 1.04% peak area was 3-[N'-(3H-Indol-3-ylmethylene)-hydrazino]-5-methyl-[1,2,4]triazol-4-ylamine, it is Neurostimulant, Antitumor (Nasopharynx), Nephroprotective, Neurostimulant*; 0.08% peak area was 1,2-BENZENEDICARBOXYLIC ACID, DIETHYL ESTER, it Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*; 0.32% peak area was .alpha.-Terpineol, it is 5-alpha reductase-inhibitor, HIF1 alpha-inhibitor*; 0.12% peak area was TETRADECANOIC ACID, it Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*; 0.18% peak area was 3-Chloropropionic acid, heptadecyl ester, it inhibit Production of Uric Acid, Increase Zinc*; 3.82% peak area was 2,6,10-TRIMETHYL,14-ETHYLENE-14-PENTADECNE, it is Antiproliferative[16]; 0.91% peak area was 3,7,11,15-TETRAMETHYLHEXADEC-2-EN-1-OL, it is Endoanesthetic, endoprotective*; 1.82% peak area was 2-HEXADECEN-1-OL, 3,7,11,15-TETRAMETHYL-, [R-[R*,R*-(E)]], it is 5-Alpha-Reductase-Inhibitor, Benzodiazepine-Receptor Agonist, Endothelium-Derived Relaxing Factor Promoter*; 2.00% peak area was HEXADECANOIC ACID, ETHYL ESTER, it Inhibit Production of Uric Acid, Increase Zinc*; 2.24% peak area was ETHYL (9Z,12Z)-9,12-OCTADECADIENOATE, it Increase zinc bioavaiablilty*; 1.14% peak area was (R)-(-)-14-Methyl-8-hexadecyn-1-ol, it is Catechol-O-Methyl-Transferase-Inhibir, Free-Radical Scavenging, HIV-RT-Inhibitor, Radioprotective*; 0.75% peak area was 10-UNDECEN-1-AL, 2-METHYL, it is Catechol-O-Methyl transferase inhibitor,

Figure 1: *Clerodendrum colebrookianium* Walp.

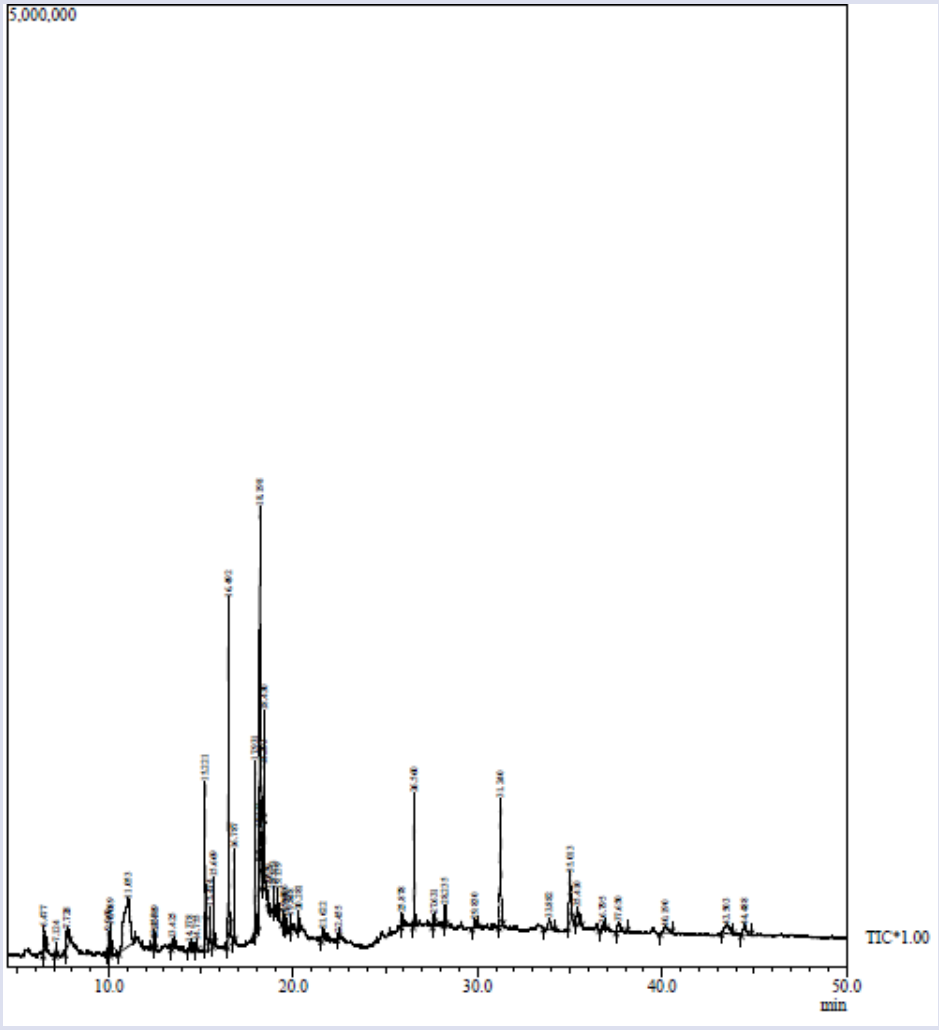

Figure 2: Chromtogram of *C. colebrookianum.*

Table 1: Compound table.

Peak	R. time	Area	Area %	Compound name
1	6.477	590693	1.56	2,3-DIHYDRO-3,5-DIHYDROXY-6-METHYL-4H-PYRAN-4-ONE
2	7.124	97225	0.26	1-DODECENE
3	795253	795253	2.10	5-Hydroxymethylfurfural
4	9.960	165693	0.44	1-TRIDECENE
5	10.089	391550	1.04	:3-[N'-(3H-Indol-3-ylmethylene)-hydrazino]-5-methyl-[1,2,4]triazol-4-ylamine
6	11.053	5506326	14.56	:2,2-DIDEUTERO-TRANS-1,3-DIHYDROXY-CYCLOPENTANE
7	12.453	29341	0.08	1,2-BENZENEDICARBOXYLIC ACID, DIETHYL ESTER
8	12.489	63315	0.17	1-HEXADECENE
9	13.425	120208	0.32	.alpha.-Terpineol
10	14.378	46366	0.12	TETRADECANOIC ACID
11	14.755	68890	0.18	3-Chloropropionic acid, heptadecyl ester
12	15.221	1444503	3.82	2,6,10-TRIMETHYL,14-ETHYLENE-14-PENTADECNE
13	15.474	345089	0.91	3,7,11,15-TETRAMETHYLHEXADEC-2-EN-1-OL
14	15.669	689193	1.82	2-HEXADECEN-1-OL, 3,7,11,15-TETRAMETHYL-, [R-[R*,R*-(E)]]-
15	16.492	3957134	10.46	PENTADECANOIC ACID
16	16.787	757965	2.00	HEXADECANOIC ACID, ETHYL ESTER
17	17.931	1921800	5.08	(2E)-3,7,11,15-TETRAMETH YL-2-HEXADECEN-1-OL
18	18.133	534632	1.41	CYCLODECENE
19	18.198	5301217	14.02	9,12-OCTADECADIENOIC ACID (Z,Z)-
20	18.393	767186	2.03	Octadecanoic acid
21	18.430	846091	2.24	ETHYL (9Z,12Z)-9,12-OCTADECADIENOATE
22	18.659	109775	0.29	OCTADECANOIC ACID, ETHYL ESTER
23	18.953	431547	1.14	(R)-(-)-14-Methyl-8-hexadecyn-1-ol
24	19.159	430293	1.14	9,12-OCTADECADIENAL, DIMETHYL ACETAL
25	19.496	283923	0.75	10-UNDECEN-1-AL, 2-METHYL-
26	19.596	119959	0.32	14-.BETA.-H-PREGNA
27	19.848	152281	0.40	1-(1-HEPTADECYNYL)CYCLOPENTANOL
28	20.281	267469	0.71	5-(3,3-DIMETHYL-2-OXIRANYL)-3-METHYL-1-PENTANOL
29	21.622	349688	0.92	CYCLOOCTANEPENTANOIC ACID, 1-NITRO-.BETA.,2-DIOXO-, METHYL ESTER
30	22.455	88747	0.23	TETRADECANAL
31	25.878	158580	0.42	Isolongifolene, 4,5,9,10-dehydro-
32	26.560	1577068	4.17	Squalene
33	27.631	148541	0.39	Nonane, 3-methyl-5-propyl-
34	28.235	339316	0.90	Tripropylsilyloxycyclobutane
35	29.830	271666	0.72	.gamma.-Tocopherol
36	31.240	3046976	8.06	dl-.alpha.-Tocopherol
37	33.882	486505	1.29	26,27-DINORCHOLESTA-5,22-DIEN-3-OL, (3.BETA.,22E)-
38	35.013	1826911	4.83	Stigmasterol
39	35.410	644578	1.70	.gamma.-Sitosterol
40	36.795	131660	0.35	Phytol, acetate
41	37.650	538888	1.42	6.beta.Bicyclo[4.3.0]nonane, 5.beta.-iodomethyl-1.beta.-isopropenyl-4.alpha.,5.alpha.-dimethyl-,
42	40.190	544847	1.44	2,4A,8,8-TETRAMETHYL-DECAHYDRO-CYCLOPROPA[D]NAPHTHA-LENE
43	43.503	894709	2.37	Phytol, acetate
44	44.488	541688	1.43	Oxirane, hexadecyl-
		37825285	100.00	

Table 2: Useful Compound table.

Peak	Area %	Compound name	Important of compound
1	1.56	2,3-DIHYDRO-3,5-DIHYDROXY-6-METHYL-4H-PYRAN-4-ONE	Catechol-O-Methyl-transferase-inhibitor, 11B-HSD-inhibitor, 5-HETE-INHIBITOR, Anti-HIV-integrase, antidote(heavy metals)Hormone balancing, Hepatoprotective*
2	2.10	5-Hydroxymethyl furfural	Aromatic [15]
3	1.04	3-[N'-(3H-Indol-3-ylmethylene)-hydrazino]-5-methyl-[1,2,4]triazol-4-ylamine	Neurostimulant, Antitumor (Nasopharynx), Nephroprotective, Neurostimulant*
4	14.56	2,2-DIDEUTERO-TRANS-1,3-DIHYDROXY-CYCLOPENTANE	Catechol-O-Methyl-transferase-inhibitor, reverse ranscriptase inhibitor, transdermal*
5	0.08	1,2-BENZENEDICARBOXYLIC ACID, DIETHYL ESTER	Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*
6	0.32	.alpha.-Terpineol	5-alpha reductase-inhibitor, HIF1 alpha-inhibitor, IkappaB-alpha-phosphorylarion-inhibitor, TNF-alpha inhibitor*
7	0.12	TETRADECANOIC ACID	Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*
8	0.18	3-Chloropropionic acid, heptadecyl ester	Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*
9	3.82	2,6,10-TRIMETHYL,14-ETHYLENE-14-PENTADECNE	Antiproliferative[16]
10	0.91	3,7,11,15-TETRAMETHYLHEXADEC-2-EN-1-OL	Endoanesthetic, endoprotective, endothelium derived relaxing factor promoter, endocrine tonic*
11	1.82	2-HEXADECEN-1-OL, 3,7,11,15-TETRAMETHYL-, [R-[R*,R*-(E)]]-	Respirasedative, 5-Alpha-Reductase-Inhibitor, Benzodiazepine-Receptor Agonist*.
12	10.46	PENTADECANOIC ACID	Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*
13	2.00	HEXADECANOIC ACID, ETHYL ESTER	Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*
14	5.08	(2E)-3,7,11,15-TETRAMETHYL-2-HEXADECEN-1-OL	Anticancer()Esophagus, Antidote(emetine), endoanesthetic, endocroneprotective*
15	14.02	9,12-OCTADECADIENOIC ACID (Z,Z)-	Inhibit Production of Uric Acid, Increase Zinc Bioavailibility*; Hepatoprotective[16]
16	2.03	Octadecanoic acid	Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*Hypocholoresterolemic[16]
17	2.24	ETHYL (9Z,12Z)-9,12-OCTADECADIENOATE	Increase zinc bioavaiablilty
18	0.29	OCTADECANOIC ACID, ETHYL ESTER	Increase Aromatic Amino Acid Decarboxylase Activity, Inhibit Production of Uric Acid, Increase Zinc*, Hypocholeterolemic[16] .
18	1.14	(R)-(-)-14-Methyl-8-hexadecyn-1-ol	Catechol-O-Methyl-Transferase-Inhibitor, 5-Alpha-Reductase-Inhibitor, Free-Radical Scavenging*.
19	1.14	9,12-OCTADECADIENAL, DIMETHYL ACETAL	Hepatoprotective[16].
20	0.75	10-UNDECEN-1-AL, 2-METHYL-	Catechol-O-Methyl transferase inhibitor, detoxicant (alcohol) antidote(aluminum)*
21	0.32	14-.BETA.-H-PREGNA	Hepatoprotective, Hypercholesterolemic, hypoglycemic, hypolipemic, increase T helper*
22	4.17	Squalene	Monooxygenase-inhibitor*, antioxidant, antitumour[17]; Hepatoprotective, Hypolipidemic, hypoglycemic[16].
23	0.72	.gamma.-Tocopherol	Antioxidant, Tocopherol synergist, PPAR-Gamma-Antagonist*, Cardioprotective[16].
24	8.06	dl-.alpha.-Tocopherol	Antioxidant, 5-alpha- reductase-inhibitor, Tocopherol synergist, TNF-alpha inhibitor* Antihypertension[18].
25	4.83	Stigmasterol	Antihypercholesterolemic, Antioxidant, antitumour[19,20].
26	1.70	.gamma.-Sitosterol	PPAR –Gamma-Antagonist*(protection against obesity and related diseases such as type 2 diabetes[21].
27	1.44	2,4A,8,8-TETRAMETHYL-DECAHYDRO-CYCLOPROPA[D]NAPHTHALENE	Antimcrobial [22].
28	2.37	Phytol, acetate	Fragrance in cosmetic industry[23].
29	1.43	Oxirane, hexadecyl-	Antimicrobial[24].

* Dr.Duke's Phytochemical and Ethnobotanical Databases.

Table 3: Proximate composition of *C. colebrookianum*.

Fresh weight basis; g/100g; n=3.						
Sample name	Moisture (%)	Carbohydrate (%)	Total ash (%)	Crude protein (%)	Crude fibre (%)	Crude fat (%)
C.colebrookianum	77.90 ± 0.08	4.28 ± 1.08	11.15 ± 0.63	2.36 ± 0.04	4.21.05 ± 1.03	0.35 ± 0.03

Table 4: Mineral composition.

Sample	Concentration of Element (mg/g)						
	Fe	Mn	Cu	Zn	Mg	Na	K
C. colebrookianum	0.215	0.105	0.0425	0.056	2.25	3.07	16.7

TNF-alpha-inhibitor, HIF-alpha inhibitor, detoxicant (alcohol) antidote(aluminum)*; 1.70% peak area was .gamma.-Sitosterol, it is PPAR –Gamma-Antagonist*(protection against obesity and related diseases such as type 2 diabetes[20]; 1.44% peak area was 2,4A,8,8-TETRAMETHYL-DECAHYDR CYCLOPROPA[D]NAPHTHALENE, it is Antimcrobial [21];. 2.37% peak area was Phytol, acetate, it is a Fragrance[22]; 1.43% peak area was Oxirane, hexadecyl, whihx is an Antimicrobial [24];

The proximate composition of Clerodendrum colebrookianum is recorded moisture as 77.90%, 4.28% carbohydrate, 2.36% crude protein, 4.21% crude fibre and 0.35% crude fat. The minerals concentrations are 0.215mg of Fe/g, 0.105mg/g of Mn, 0.0425mg of Cu/g, 0.056mg Zn/g, 2.55mg of Mangnesium/g, 4.3mg of Na/g and 24.5mg of K per gram of sample.

DISCUSSION

Minerals and Proximate compositions in a food is vital for the proper growth and development of a healthy body and secondary metabolites included in diet act as a nutraceuticals thus help in fighting various health problems. Minerals contents and Proximate composition of *Clerodendrum colebrookianum* was recorded to be adequate for a healthy growth and development of a body and the secondary metabolite constituents was recorded to contain at least eleven compounds that are reported to be useful for high blood pressure problem. In addition, as many as twenty useful phytoconstutuents were recorded from the sample including antioxidant, anti uric acid formation, anti-tumour, help in zinc bioabiability and aromatic. The present study advocates the traditional knowledge on the use of *Clerodendrum colebrookianum* as a remedy for high blood pressure problem.

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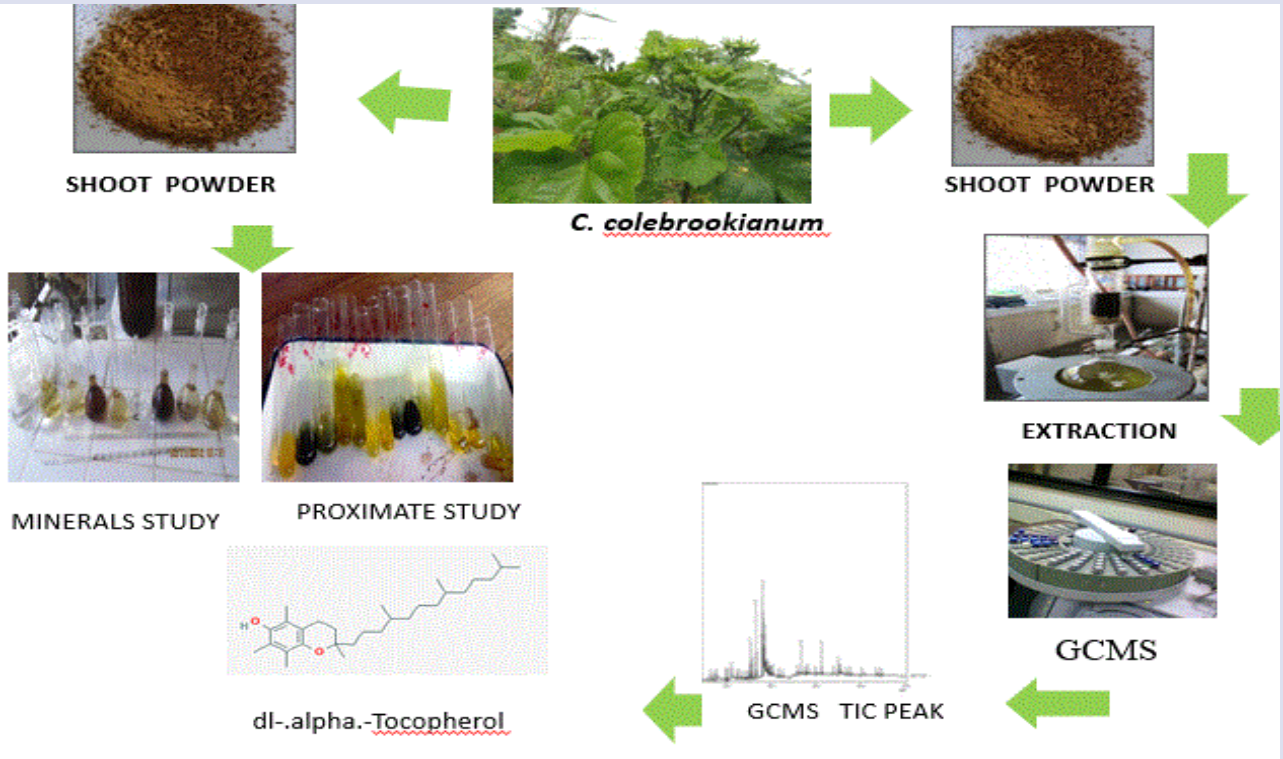
GRAPHICAL ABSTRACT



SUMMARY

- *Clerodendrum colebrookianum*Walp.is a medicinal food plant widely used for high blood pressure.
- Phytoconstituents and proximate were discoursed in the present study.
- Moisture content was recorded as 77.90%, carbohydrate as 4.28%, crude protein as 2.36%, crude fibre as 4.21% and crude fat as 0.35% respectively. The minerals concentrations as 0.215mg of Fe/g, 0.105mg/g of Mn, 0.0425mg of Cu/g, 0.056mg Zn/g, 2.55mg of Mangnesium/g, 4.3mg of Na/g and 24.5mg of K per gram of sample.
- A total of eleven compounds are recorded to be useful for high blood pressure problem and as many as other twenty useful phytoconstututuents were recorded from the sample including antioxidant, anti-uric acid formation, anti-tumour, bioabiability of zinc etc.
- The present study advocates the traditional knowledge on the use of *Clerodendrum colebrookianum* as a remedy for high blood pressure problem.

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