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QUALITATIVE AND QUANTITATIVE DETERMINATION OF PHYTOCHEMICAL CONTENT OF *FLUEGGEA LEUCOPYRUS* WILLD

Suresh J. and Saravana Ganthi A.*

PG and Research Department of Botany, Rani Anna Govt. College for women, Tirunelveli, Tamil Nadu.

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***Corresponding Author**
Saravana Ganthi A.
PG and Research Department of Botany, Rani Anna Govt. College for women, Tirunelveli, Tamil Nadu.

ABSTRACT

Plants are the unending source for a number of compound which can maintain the health of human being plant have been the corner stone of pharmacy not only in ancient times but alsoin the area of modern drug discovery. The plant *Flueggea leucopyrus* Willd. is belonging to the family Euphorbiaceae. The plant has been utilized in traditional medicine for the treatment of cough, asthma, bowel complaints and sterilizations, intestinal medicines for loose bowels, gonorrhea, clogging and emotional sickness and kidney stones. In the present work, qualitative and quantitative phytochemical analysis were carried out in leaf, stem and root powder extract of *F. leucopyrus*. The preliminary phytochemical screening of petroleum ether, benzene, chloroform and methanol extract of leaf, stem and root powder extracts shows the presence of chemical compound like alkaloids, flavonoids, protein, carbohydrates, phenol, saponins and tannins. Quantitative estimation of mineral shows significant amount of total calcium, total magnesium, manganese and iron. Total alkaloid and total flavonoid content was comparative more in root samples. The presence of these phytochemicals may contribute medicinal as well as physiological properties to the plant studied in the treatment of different ailments.

KEYWORDS: *Flueggea leucopyrus*, quantitative estimation, preliminary phytochemical screening.

INTRODUCTION

The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents.[1] Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defense mechanism and protect from various diseases. These chemical substances are called secondary metabolites. The most important of these bioactive groups of plants are alkaloids, terpenoids, tannins, saponins and phenolic compounds.[2] Correlation between the phytoconstituents and the bioactivity of plant is desirable to know for the synthesis of compounds with specific activities to treat various health ailments and chronic disease as well.[3] The present study was carried out for qualitative and quantitative phytochemical analysis leaf, stem and root parts of *Flueggea leucopyrus* Willd. using various alcoholic (petroleum ether, benzene, chloroform and methanol) extracts.

The decoction of leaves of *F. leucopyrus* (Vellaipoolaa in Tamil) is used to dress the cancerous wounds. It is used in combination with tobacco. The leaves juice or paste is mixed with tobacco used to destroy worms in sores. The leaf decoction is externally applied to the body for the treatment of wounds of cattle. It is used as popular veterinary medicine. The other uses are sweet, cooling, diuretic, aphrodisiac, tonic and are useful in vitiated conditions of pitta, burning sensation, seminal weakness, general debility, larvicide, paralysis, piscicide and insecticide.

Description: Erect, rigid, much branched shrubs up to 5 m tall; branchlets angular, slender, usually ending in sharp spines. Leaves alternate, obovate to elliptic, up to 2.5 x 1.5 cm, acute or cuneate at base, emarginated at apex. Male flowers in axillary fascicles, greenish yellow; female solitary. Perianth lobes 5. Stamens 5, free. Disc of 5 glands alternating with the stamens. Pistilode 3-fid. Fruits globose, *ca* 5 mm across, 3-celled, white when ripe. Seeds trigonous, smooth, pale brown.

Flowering & Fruiting: May – September.

MATERIALS AND METHODS

The identified plant of *Flueggea leucopyrus* was collected from Sivanthipatti hills near Palayamkottai, Tamil Nadu, South India. Specimen voucher of the plant is kept at the Xavier's College Herbarium (XCH 26586), St. Xavier's College (Autonomous), Palayamkottai, Tirunelveli, Tamil Nadu. The taxonomic features of the plant confirmed with the Flora of Presidency of Madras[4] and The Flora Tamil Nadu Carnatic[5]. The air-dried and powdered plant materials were taken in different amber coloured bottles, extracted (by Soxlet method) in ethanol

and then the solvent were filtered off. The extract thus obtained from the plant was then subjected to qualitative tests.[6,7,8] The percentage of major elements like carbon, nitrogen, phosphorus, potassium, sodium, calcium, magnesium and sulphur was determined by the method of AOAC.[9] The trace elements like zinc, copper, iron, manganese, boron and molybdenum were determined by the standard method.[10] The minerals (N, P, K, Na and Ca) were estimated using Flame Photometer (Spectronics Flame Photometer, India). Alkaloids were determined by using the method of [7]. Flavonoids were determined by the method of Boham and Kocipal-Abyazan[11]. Biochemical estimation for Phenol[12] and Tannin,[13] were carried out. Glycoside and serpentines were carried out on the powdered samples using the standard procedures as given in Anonymous.[9]

Table 1: Preliminary phytochemical analysis of *Flueggea leucopyrus* Willd.

S. No	Extract	Samples	Saponin	Tannin	Alkaloid	Flavones	Amino acids	Protein	Phenol	Steroid	Triterpenoid	Catachin	Anthroquinone	Sugar	Reducing Sugar	Aromatic Acids
1.	Pet.ether (40–60°C)	Leaf	+	-	-	-	-	+	-	+	+	+	-	+	-	+
		Stem	+	+	-	-	-	-	-	+	+	+	-	-	-	+
		Root	+	-	-	+	-	+	+	+	+	-	-	-	-	+
2.	Benzene	Leaf	+	+	-	+	+	+	+	+	+	+	+	-	-	+
		Stem	+	+	+	+	-	+	+	+	+	+	-	-	-	+
		Root	+	+	+	-	-	+	+	+	+	+	-	-	-	+
3.	Chloroform	Leaf	+	+	+	+	-	+	-	-	+	+	+	+	+	+
		Stem	+	+	+	-	-	+	+	+	+	-	-	+	+	+
		Root	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4.	Ethanol	Leaf	+	+	-	+	+	+	+	-	-	+	+	+	+	+
		Stem	+	+	-	+	-	+	+	-	+	+	-	+	-	+
		Root	-	+	-	+	+	+	+	-	+	+	+	+	+	+
5.	Water	Leaf	+	+	-	+	-	-	+	-	-	+	+	+	+	-
		Stem	+	+	-	+	-	+	+	+	+	+	-	+	+	-
		Root	+	+	-	+	-	+	+	+	-	+	+	-	-	-

+ Present; - Absent

Table 2: Quantitative estimation of minerals in *Flueggea leucopyrus* Willd.

S.No	Name of the Parameter	Plant samples		
		Leaves	Stem	Root
1.	Moisture (%)	5.48	5.78	5.49
2.	Organic Carban (%)	11.29	11.58	11.32
3.	Total Nitrogen (%)	1.28	1.21	1.23
4.	Total Phosphorus (%)	0.34	0.25	0.26
5.	Total Potasssium (%)	3.12	3.25	3.29
6.	Total Sodium (%)	0.05	0.12	0.16
7.	Total Calcium (%)	4.29	4.12	4.16
8.	Total Magnesium (%)	4.06	4.26	4.28
9.	Total Sulphur (%)	0.52	0.59	0.61
10.	Total Zinc (ppm)	7.25	7.64	7.68
11.	Total Copper (ppm)	0.65	0.72	0.74
12.	Total Iron (ppm)	80.12	81.26	82.16
13.	Total Manganese (ppm)	51.16	52.06	52.18
14.	Total Boron (ppm)	0.50	0.55	0.54
15.	Total Molybdenum (ppm)	0.02	0.02	0.02

Table 3: Quantitative estimation of phytochemical constituent in *Flueggea leucopyrus* Willd.

S. No.	Phytoconstituent	Plant samples		
		Leaves	Stem	Root
1.	Total Alkaloids (mg kg-1)	2.52	2.48	2.52
2.	Total Flavonoids (mg kg-1)	2.89	2.90	2.92
3.	Tannin (mg kg-1)	0.55	0.52	0.56
4.	Lignin (mg kg-1)	0.31	0.29	0.26
5.	Glycosides (mg/ kg-1)	0.10	0.03	0.03
6.	Serpentines (mg/ kg-1)	0.05	0.02	0.021
7	Phenol (mg/ kg-1)	2.11	3.46	1.94

Gupta, M.C., Mithal, S., Arora, K.L., Tandon, B.N. (1977). Effects of periodic deforming on nutritional status of Ascidia infected preschool children receiving supplementary food. The Lancet, 3: 108- 110

RESULTS AND DISCUSSION

The preliminary phytochemical analysis of this plant showed positive results to the various tests conducted. It confirms the presence of good many secondary metabolites (Table 1). The preliminary phytochemical screening of petroleum ether, benzene, chloroform and methanol extract of leaf, stem and root powder extracts shows the presence of chemical compound like alkaloids, flavonoids, protein, carbohydrates, phenol, saponins and tannins. The petroleum extract root, stem and leaf of *F. leucopyrus* showed the presence of sugar, alkaloids, saponin, tannin and protein, The table 2 and 3shows the results of the quantification of Moisture, Organic Carbon, Total Nitrogen, Total Phosphorus, Total Potassium, Total Sodium, Total Calcium, Total Magnesium, Total Sulphur, Total Zinc, Total Copper, Total Iron, Total Magnesium, Total Boron, Total Molybdenum, Total Alkaloids, Total Flavonoids, Tannin, Lignin, Glycosides and Serpentines in the leaves, stem and root of in *Floggea leucopyrus***.** The maximum percentages (5.78) of moisture content were present in stem compared to leaves and root. In organic carbon content in the *Floggea leucopyrus* stem was 11.58. Quantitative estimation of mineral shows significant amount of total calcium, total magnesium, manganese and iron. Total alkaloid and total flavonoid content was comparative more in root samples.

The flavonoid content of ethanol extract of the plant was found to be 2.92 in root, 2.90 in stem and 2.89 in leaf powder (mg kg^{-1}). Flavonoids are a large group of polyphenolic compounds that have been known for a long time to exert diverse biological effects. Their wide range of biological and pharmacological activities include antioxidant, cytotoxic, anticancer, cardioprotective, hepatoprotective, neuroprotective, antibacterial and antimicrobial properties,[14.15,16,17,18] In the present finding flavonoid has been reported in the selected species. This perhaps justifies the already locally established function of the plant in the treatment and management of general cancer, antioxidant activity and anti-bacterial activity.

The phenolic content in various parts of plant was studied by spectroscopic method. The phenolic content of the plant extract was found to be 3.46 (mg kg^{-1}). Phenols are stimulating, antiseptic, anti-infectious and detoxifying activities.[19,20,21]

The tannin content of the plant was found to be 0.56 (mg kg^{-1}) in root powder. Tannins have important roles such as stable and potent antioxidants.[6] Presence of tannin suggests the ability of the plant to play major role as antidiarrheic and antihemorrhagic agent.[22]

Alkaloids are known to be effective for antihypertensive[23]. The present observation also alkaloid was reported in stem, leaf and root powders supports the use of selected in traditional medicine for treating hypertension. saponins are reported to have antidiabetic, antioxidant, antitumor, anti-inflammatory activity and anti-bacterial effects.[24]

The result of the present study offers supportive evidence that the *Flueggea leucopyrus* possess some active chemical principles which are traditionally used in treatment of boils, purgative, anthelmintic, stimulant etc. It has authenticated the usefulness of the chosen plants for medicinal purposes. These species could also be seen as potential sources of useful drugs due to their rich contents of phytochemicals.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interests regarding the publication of this paper.

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