

# Physico-Chemical and Phytochemical Evaluation of Whole Plant of *Waltheria Indica(LINN.)*

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**Abstract:** The objective of the present study was to evaluate the physicochemical, phytochemical constitution, Thin Layer Chromatography of ethanolic extract of whole plant of *Waltheria indica*(Linn.) Various physicochemical parameters such Total ash value, Water soluble ash value, Acid insoluble ash value. Qualitative analysis of Phytochemical constituents' viz. tannins, saponins, flavonoids, steroids, alkaloids, quinones, terpenoids and cardiac glycosides. Thin layer chromatography it revealed the presence of various phytoconstituents like alkaloids, carbohydrates, phytosterols, Saponins, and proteins.

**Keywords:** Physicochemical, Phytochemical, *Waltheria indica*, Total ash value, Water soluble ash value, Acid insoluble ash value, Antioxidant activity, TLC.

## 1. INTRODUCTION

The whole plant used to treat disease such as, anti-inflammatory, analgesic antibacterial, antifungal, rheumatism, antidiarrheal, antimalarial, antiviral, anticonvulsant, anti-anemia, used in asthma and teeth infection and Sedative activities (11-12). *Waltheria indica* contains different chemical groups including alkaloids, flavonoids, sterols, terpenes, cardio glycosides, saponins, anthraquinones and carbohydrates. *Waltheria indica* contains in the leaves and roots. saponins, alkaloids, anthraquinones, flavonoids, tannins, phenols and cardiac glycosides at varied degrees (13).

**TABLE I: Taxonomical classification**

Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Division	Magnoliophyta
Phylum	Tracheophyta
Class	Magnoliopsida
Superorder	Malvales
Family	Malvaceae
Genus	<i>Waltheria</i>
Species	<i>Waltheria indica</i> L.

### Common Names

Tamil : *Shengalipoondu*  
English Name : *Waltheria americana*  
Telugu Name : *Nallu benda*  
Kannada Name : *Ottati gitta*  
Malayalam : *Pavetta*  
Hawaiian : *uhaloa*

## 2. MATERIALS AND METHODS

### *Collection and authentication and processing of plant materials*

**A. Plant Profiles:** The Whole plant of *waltheria indica* were collected from Kilikulam, Tirunelveli District of Tamil Nadu, India. Taxonomic identification was made from Botanical Survey of Medical Plants Unit Siddha, Government of India. Palayamkottai. The whole plant of *waltheria indica* (Linn), were dried under shade, segregated, pulverized by a mechanical grinder and passed through a 40 mesh sieve.

**B. Preparation of Extracts:** The powdered materials were successively extracted with ethanol by hot continuous percolation method in Soxhlet apparatus for 24 hrs. The extracts were concentrated by using a rotary evaporator and subjected to freeze drying in a lyophilizer till dry powder was obtained. The extracts were suspended in 2% tween 80. (15)

**C. Physicochemical Evaluation:** Physicochemical Standards of crude drugs like Total ash, acid insoluble ash, water insoluble ash, alcohol soluble extractive and Ethyl acetate, Petroleum Ether soluble extractive values were determined by using official Methods.

**D. Method of extraction:** The whole plant of *Waltheria indica*/(Linn.) of 2 kg was extracted by using three different (Petroleum ether, Ethyl acetate, Ethanol) solvents in successive hot continuous extraction by using a soxhlet apparatus with temperature 60°C for 24hrs up to coloured extracted becomes colourless.

**E. Preliminary phytochemical investigation:** The extracts obtained during the extraction process were subjected to preliminary phytochemical screening to determine the presence of various phytoconstituents like alkaloids, carbohydrates and glycosides, phytosterols, fixed oils and fats, saponins, phenolic compounds, triterpenes, flavonoids, proteins and aminoacids, gums and mucilage, tannins and volatile oils by using reported methods.

**F. Thin layer chromatography (TLC) of various extracts:** After concentration and drying of each extract in vacuum desiccator, identification of phytoconstituents was carried out by thin layer chromatography using different detecting reagents<sup>12</sup>. The test extract was dissolved by using an appropriate solvent in a concentration of 1 mg/ml and subjected for spotting. Silica gel G (mesh size 60) was used as a stationary phase and two solvent systems were used in mobile phase Ethyl acetate-Methanol-Water (75:13.5:10) and Toluene-Ethyl acetate (93:7). Spots were detected by using KOH (for glycosides), Dragendorff's reagent (for alkaloids), UV light (for flavonoids) and vanillin-sulphuric acid (for saponins and volatile oils) as detecting reagents. The Rf values were also noted.

## 3. RESULTS AND DISCUSSION

**TABLE II: PHYSICAL PARAMETERS OF WHOLE PLANT OF WALTHERIA INDICA(LINN)**

S.No.	Parameters	Determined value(%w/w)
1	<b>Extractive values</b>	
	Alcohol soluble Extractives	5.50
	Ethyl acetate	2.95
	Petroleum Ether	3.74
2	<b>Loss of ash</b>	
	Total Ash value	11.47
	Acid insoluble Ash	8.35
	Water insoluble Ash	4.92
3	Loss of drying	4.22

**TABLE III: PRELIMINARY PHYTOCHEMICAL SCREENING OF WHOLE PLANT EXTRACTS OF *WALTHERIA INDICA*(LINN)**

Plants and extracts used		Extracts		
		Pet. ether	Ethyl acetate	Ethanol
1	<b>Carbohydrates and glycosides</b>			
	Molisch's test	+	-	+
	Fehling test	-	-	+
	Benedict's test	-	+	+
	Legal's test	+	-	+
2	<b>Alkaloids</b>			
	Dragendorff's	+	-	+
	Wagner's	-	-	+
	Hager's	-	+	+
	Mayer's	-	+	+
3	<b>Phenolic compounds and tannins</b>			
	Ferric chloride test	+	-	+
	Bromine water	-	+	+
	Lead acetate test	-	-	+
4	<b>Fixed oils and fats</b>			
	Saponification test	+	-	+
5	<b>Phytosterols</b>			
	Salkowski test	+	-	+
	Liebermann-Burchard's test	+	+	-
6	<b>Tannins</b>	-	-	+
7	<b>Proteins and Aminoacids</b>		+	-
	Biuret Test	+	-	+
	Xanthoproteins Test	-	-	+
	Lead Acetate	-	+	+
8	<b>Flavonoids</b>		-	+
10	<b>Gums and mucilages</b>	+	-	-

**TABLE IV: THIN LAYER CHROMATOGRAPHY OF WHOLE PLANT EXTRACTS OF *WALTHERIA INDICA*(LINN)**

Solvent system used	Detecting reagent	Observation	Inference	Pet. Ether	Ethyl acetate	Ethanol
Ethyl acetate:	KOH	Red	Anthraquinone	-	-	-
Methanol:	Dragendorff's reagent	Orange-red	Alkaloid	+	+	+
Water (75:13.5:10)	UV light	Yellow/Green /Orange/Blue	Flavonoid	-	-	-
	Vanillin sulphuric acid	Blue	Saponin	-	-	-
Toluene: Ethyl acetate (93:7)	Vanillin sulphuric acid	Red/Yellow/ Brown/Blue green	Essential oil	-	-	-

**TABLE V: R<sub>f</sub> VALUES OF WHOLE PLANT EXTRACTS OF *WALThERIA INDICA*(LINN)**

Solvent used	System	Dectecting agent	Observation	R <sub>f</sub> values		
				Pet. Ether	Ethyl acetate	Ethanol
Ethyl acetate: Methanol: Water (75:13.5:10)		Dragendroff's reagent	Orange-red	0.26	0.54	0.62
				0.34	0.46	0.71
				0.53	0.65	0.92

#### 4. DISCUSSION

This study on physical and phytochemical screening of whole plant of *Waltheria indica*, proposed a set of these parameters may enable those who handle this plant to maintain its quality control and also helpful for the future identification and authentication of the plant in the herbal industry. The physical standards, such as loss on drying, ash values, extractive values will be useful to identify the authenticity of the drug even from the crushed or powdered plant materials. It will serve as a standard data for the quality control of the preparations containing this plant in the future. The information obtained from the ash values and extractive values are useful during the time of collection and also during extraction process. Using these standards, the plant can be differentiated from other related species. The curative properties of medicinal plants are perhaps due to the presence of various secondary metabolites such as alkaloids, flavonoids, glycosides, saponins, sterols *etc.*

#### 5. CONCLUSION

Preliminary screening tests may be useful in the detection of the bioactive principles and subsequently may lead to the drug discovery and development. Further, these tests facilitate their quantitative estimation and qualitative separation of pharmacologically active chemical compounds. Phytochemical study was also useful to isolate the pharmacologically active principles present in the drug. Thus, as folk medicine *Waltheria indica* has many uses as a multipurpose medicinal agent so further clinical trials should be performed to prove its efficacy. Because of their wide utilization, the plant deserves special research attention of these uses and compounds.

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