



Pharmacognosy and phytochemistry of roots of *Homonia retusa*

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Article History

Received: 14.05.2023

Accepted: 11.07.2023

Published: 30.07.2023

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Abstract: The necessary for the importance of the pharmacognostic analysis of roots extracts of *Homonia retusa* are discussed in the current research. *Homonia retusa* roots various extracts like petroleum ether, chloroform, alcohol and aqueous was analysed for organoleptic characteristics, macroscopic, powder microscopic, physicochemical, phytochemical and fluorescence analysis. The physicochemical evaluation shows, loss on drying 1.5 % w/w, total ash value 2.5% w/w, acid insoluble ash value 1.25%w/w and extractive value of petroleum ether extract shows 3.2% w/w, chloroform extract was 0.8% w/w, ethanol extract was 8.2%w/w, aqueous extracts was found to be 12.2%w/w. Phytochemical analysis confirms carbohydrates, phenols, flavonoids, and tannins. These are just a few of the parameters that need to be evaluated for a pharmacognostic study of *Homonia retusa* roots.

Keywords: *Homonia retusa*, pharmacognostic study, physicochemical analysis, phytochemical study, and fluorescence analysis.

INTRODUCTION

Man has a constant thirst for knowledge; he has done a lot of exploring, but there is still much to learn. Perhaps this is something that will be revealed to future generations who will continue to investigate the creations of their creator in far-off places and make numerous discoveries for their enjoyment and convenience.¹ A list of traditional plant usage can be made for today's needs, for adaptation, or for continued survival. According to the World Health Organisation, a medical plant is any plant that has compounds that can be used for therapeutic purposes or that serve as precursors for the creation of potent pharmaceuticals.² About 75 to 80 percent of the global population, mostly in underdeveloped nations, still relies heavily on herbal medicine for primary healthcare.³ A common sight along riverbanks in Asian nations is the small genus of shrubs known as *Homonoia*, which is a member of the Euphorbiaceae family.⁴

Homonia retusa is an evergreen shrub that grows up to 3 metres tall. Juvenile branches are grabrescent, dark pinkish, and feature lepidots. The leaves are obcordate in shape with a base that is cuneate, serrate, rounded- retuse, and piculate at the apex. They are coriaceous, glabrescent on both sides, with orbicular glands and few scales beneath. subsessile to petiolate, and up to 3 mm long. Axillary spikes with an inflorescence of lance-shaped bracteoles and a length of up to 1 cm. Three oblong to lanceolate, concave, membranous, 3.0 x 2.0 mm, hairy on the exterior tepals; dense, globular clusters of stamens; globose, pointed staminate blooms measuring 6 mm in diameter. pink anthers, Three connate, basally papillose, and apically recurved styles are present on sessile, reddish-brown, glabrescent pistillate blooms.⁵

Material and Methods

Plant material collection, identification, and authentication

Homonia retusa roots were collected. After drying in the shade, it turns into a coarse powder. The plant material that had been obtained was acknowledged and confirmed by scientist (Dr.) K Madhavachetty, M.Sc., M. Ed., M.Phil., PhD, PGDPD, assistant professor Department of Botany, Tirupathi, India.

Morphological and microscopical features

Homonia retusa roots were evaluated by looking at their surface, texture, fracture, and other properties as well as organoleptic parameters such size, colour, aroma, and taste. Roots of *Homonia retusa* were coarsely ground up and viewed under a microscope. The powder was macerated with chloralhydrate and then dyed with phloroglucinol and HCl and mounted with glycerine. The numerous cellular characteristics and inclusions were captured in photos using a photomicroscope.⁶

Physicochemical parameters

The WHO and pharmacopoeas recommendations were followed when a physicochemical examination of *Homonia retusa* roots was conducted. These specifications include total ash, acid-insoluble ash, water-soluble ash, extractive values that are alcohol- and water-soluble, as well as total ash.^{7,8,9}

Preparations of extracts

Powdered roots were extracted using varying concentrations of polarity in pet ether, chloroform, ethanol, and water to create various extracts. In a Soxhlet apparatus, 50g of the pulverized plant material were successively extracted with petroleum ether (40 - 60°), chloroform, and ethanol. The process of maceration was used to extract the water. Each time, the marc was dried under 50°C before being extracted with the following solvent. The extracts were filtered using Whatmann filter paper, and the solvent was

allowed to evaporate at room temperature before precise weight measurements were made. Drug that had been air dried was utilised to determine the extractive value (%).

Preliminary phytochemical screening

Preliminary qualitative phytochemical screening of root extract from *Homonia retusa* was carried out using conventional techniques to ascertain the presence or absence of major primary and secondary metabolites like carbohydrates, protein, alkaloids, steroids, phenol, glycosides, terpenoids, and flavonoids, among others.^{10,11,12}

Fluorescent analysis

The root powder and extracts of *Homonia retusa* were processed using a variety of solvents and reagents to produce distinct fluorescence characteristics, which were then observed in the visible light, short UV (254 nm), and long UV (366 nm) spectrums.¹³

Result and Discussion

Morphology of *Homonia retusa*

Water with a wedge, A plant called croton grows next to rocky regions and stream bottoms. Leaves are alternate, 2-4 x 1-2 cm, oblong to spatulate, toothed along the border, and blunt to flat at the tip. leaf stalks are 3mm long. Flower spikes can reach a length of 1 cm. Tepals 3, becoming hairless, 2.5 mm; anthers 0.2 mm; male, 4 mm broad. Tepals 6-8, linear, 2 mm, acute; ovary 3-lobed; styles 3 mm, recurved; female flowers 3 mm in diameter. Capsule width is roughly 3.5 mm.



a. Whole plant



b. Leaves and flowers

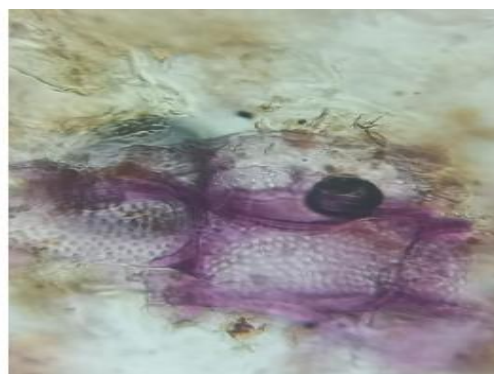
Fig 1: morphology of *Homonia retusa* plant.

Microscopic characteristic of powder *Homonia retusa* root.

In this powdered root material were stained and viewed under the microscope [Magnification 45X] Pink color was taken up by cells with lignin content. With the help of a polarised light microscope, calcium oxalate crystals were viewed. The powder characters are listed below in fig 2.



A. Cork



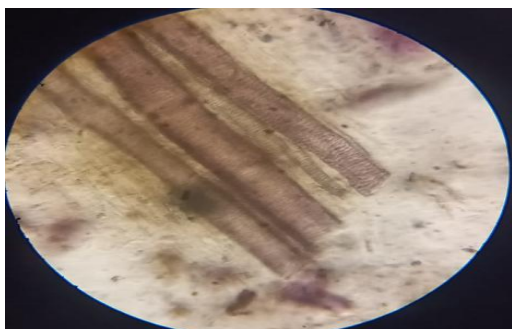
B. Pitted xylem



C. Xylem embedded with medullary rays.



D. Phloem fibers



E. Vessels



F. Xylem portion



G. Calciumoxalate crystals



H. Brownish matters

Fig 2: A-H: Powder microscopy of *Homonia retusa* root.

DETERMINATION OF PHYSICOCHEMICAL

According to the procedure outlined in Pharmacopoeias, the physical and chemical constants of the *Homonia retusa* root were determined for loss of drying, Ash value, and Extractive value. The results are shown in Table1 and 2.

Table 1: Physicochemical constants of *Homonia retusa* root.

Sl no	Parameters	Percentage yield (% w/w)
1.	Loss on Drying	1.5%
2.	Water insoluble Ash	1.5%
3.	Acid soluble Ash	1.25%
4.	Total Ash	2.5%
5.	Sulphated ash	1%

Table 2: Yield of extracts produced by repeated root extraction of *Homonia retusa*

Plant name	Different Extract	Extract colour	Yield (% w/w)
<i>Homonia retusa</i> root	Petroleum ether	Green	3.2% w/w
	Chloroform	Light green	0.8 w/w
	Ethanol	Brown	8.2% w/w
	Water	Dark brown	12.2% w/w

FLUORESCENCE ANALYSIS

The selected plant is made into fine powder and treated with required chemical reagents and observed under visible and ultraviolet rays and shows the following results as in table below.

Table 3: Fluorescence analysis of powder roots of *Homonia retusa*

S.No.	TREATMENT	DAY LIGHT	SHORT UV (254 nm)	LONG UV (366 nm)
1.	Powder	green	yellow	Greenish yellow
2.	Powder+ Water	yellow	yellow	cream
3.	Powder+1N HCl	Slight yellow	Slight yellow	white
4.	Powder+1N H ₂ SO ₄	Yellow	Yellowish green	Creamy white
5.	Powder+1N HNO ₃	Dull yellow	Dull yellow	white
6.	Powder+Acetic acid	Yellowish brown	Yellowish green	white
7.	Powder+1N NaOH	Reddish brown	Deep green	Deep brown
8.	Powder+1N Alc.NaOH	Reddish brown	Deep green	Deep brown
9.	Powder+1N KOH	pale yellow	yellow	white
10.	Powder+1N Alc.KOH	pale yellow	Yellowish green	white
11.	Powder+Ammonia	Orange yellow	Yellowish green	Pale yellow
12.	Powder+Iodine	Reddish brown	Dark green	Reddish brown
13.	Powder+FeCl ₃	Greenish red	green	Dark brown
14.	Powder+alcohol	Dull yellow	Dull yellow	white

Table 4: Study of the fluorescence of different *Homonia retusa* root extracts

SL NO	EXTRACTS	DAYLIGHT	UV LIGHT	
			SHORT 254 nm	LONG 365 nm
1	Petroleum ether	Pale green	Pale green	red
2	Chloroform	Pale green	green	Bluish green
3	Ethanol	Greenish brown	green	Bluish green
4	Water	brown	green	green

PRELIMINARY PHYTOCHEMICAL SCREENING

To determine the existence of various secondary metabolites, preliminary phytochemical analyses of extracts were evaluated. In contrast, ethanol and aqueous extracts showed the presence of flavonoids, carbohydrates, saponins, proteins, alkaloids, phenols, steroids, and tannins. Petroleum ether and chloroform extracts showed the presence of steroids.

Table 5: Preliminary phytochemical testing of several *Homonioa retusa* extracts

Chemical tests	<i>Homonioa retusa</i> root extracts			
	Pet ether	chloroform	ethanol	water
Proteins & Amino acids	-	-	-	-
Carbohydrates	+	+	-	-
Steroids	+	+	-	-
Phenols	-	-	-	-
Saponins	-	-	-	+
Flavonoids	-	-	+	+
Alkaloids	-	-	+	-
Tannins	-	-	-	-
Glycosides	-	+	-	-
Cardiac glycosides	-	-	-	-
Anthracene glycosides	-	-	-	-
Reducing sugar	-	+	+	+
fats	-	-	-	-

CONCLUSION

In the current study, the crude extracts of *Homonioa retusa* roots were screened for phytochemicals, physiochemical parameters, and pharmacognostic characterization. The chosen roots' authenticity and purity were verified through macro- and microscopical examination. Physical-chemical tests including ash value, acid insoluble ash value, and extractive value were carried out as part of the standard method.

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