



## Preliminary phytochemical analysis and Comparative Study of Conventional Extraction and Microwave Assisted Extraction of *Homonia retusa* root.

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### ABSTRACT:

Microwave extraction is more preferable compared to normal extraction. Shorter processing time, less solvents, a higher extraction rate, and better results with less loss are all benefits of microwave aided extraction. Phytoconstituents are less likely to deteriorate and oxidise. *Homonia retusa* roots were extracted utilising a series of solvents in the current investigation, including petroleum ether, chloroform, ethanol, and water. Similarly powdered root drug was extracted using microwave assisted extraction. Parameters like time required and %yield are compared and concluded that there is increase in the yield with less time in microwave assisted extraction compared to conventional method. Roots of *Homonia retusa* were extracted by two methods and found microwave extraction method was more efficient with increase % yield or equal yield with less time compared to conventional method.

Keywords: Microwave assisted, Conventional, phytochemical, extracts.

### INTRODUCTION

One of the crucial processes to fully recovering the desired chemical constituent is extraction. For the extraction of bioactive chemicals from plants, several intensification techniques, such as ultrasonic waves, supercritical fluids, or microwaves, have been used to boost production and quality.<sup>1</sup> The drawback of traditional extraction techniques like Soxhlet is that they take a long time to extract compounds with lower yields and need for vast amounts of solvent. Advanced, unconventional extraction techniques became the focus of research to address these problems. These include extractions using supercritical fluid, ultrasonic, and microwave technology.<sup>2</sup> Microwave radiation disrupts hydrogen bonds during the MAE extraction process and causes dissolved ions to move. As a result, the extraction of target chemicals is made easier and the solvent's ability to penetrate the matrix is increased.<sup>3</sup> Despite some limitations associated with MAE, such as the requirement of an additional clean-up step to remove solvent from sample matrices and the restriction to the application of polar solvents only in the system, the method has potential to be developed further and possibly scaled up. Vacuum microwave-assisted extraction (VMAE), nitrogen-protected microwave-assisted extraction (NPMAE), ultrasonic microwave-assisted extraction (UMAE), and dynamic microwave-assisted extraction (DMAE) are a few of the modified MAE techniques that have been developed.<sup>4</sup>

*Homonoia retusa* Muell is commonly known as water croton belong to family Euphorbiaceae. It is a dioecious shrub that can grow up to 3 metres tall. It has stout, woody branchlets, obovate to oblanceolate leaves that are 2-4 cm long and 1-2 cm wide. Its flowers appear in axillary spikes, and its capsules and seeds are 3.5 mm across and globose.

The shrub is pasanabheda drug and used in ayurveda.<sup>5</sup>

### METHODS AND MATERIAL

**Collection and identification of plant material:** Powder of *Homonia retusa* roots were collected, identified and authenticated by Dr.K. Madhava Chetty, Plant taxonomist, Assistant professor, Department of Botany, Tirupathi, India.

*Extraction of plant material*<sup>6</sup>**Table 1:** Procedure for extraction by Conventional and Microwave assisted method of *Homonia retusa* roots.

Sl. No	Solvent	<i>Homonia retusa</i> root					
		Conventional Extraction		Microwave Assisted Extraction			
		Qty of the drug	Time (Hrs)	Qty of drug	frequency	Irradiation power	Time (Mins)
1	Pet.ether	5grams	24	5 grams	2450MHz	800W	10
2	Chloroform		24				15
3	Alcohol		24				15
4	Water		24				15

**Preliminary phytochemical screening of plant extracts:** The various extracts prepared by Conventional and MAE were subjected to various phytochemical tests to determine the presence of various Phyto-constituents and compared.<sup>7</sup>

**RESULTS**

Powder of *Homonia retusa* roots have been subjected to the extraction process by conventional method as well as microwave assisted extraction and the % yield and color and consistency were compared and tabulated (Table 2). Both extracts are subjected to preliminary phytochemical screening and the results are given below (Table 3)

**Table 2:** Comparative study of Conventional extraction and Microwave assisted extraction of *Homonia retusa* roots.

Sl. No	Solvent	<i>Homonia retusa</i> root					
		Conventional Extraction			Microwave Assisted Extraction		
		Colorand Consistency	%yield W/W	Time (Hrs)	Colorand Consistency	%yield W/W	Time (Mins)
1	Pet.ether	Green and semisolid	1.2	24	Green Semisolid	2.2	10
2	Chloroform	Light green and semisolid	0.8	24	Light green semisolid	1.4	15
3	Alcohol	GreenishBrown semisolid	8.2	24	Greenish Brown semisolid	8.2	15
4	Water	Dark brown semisolid	12.2	24	Dark brown semisolid	59.4	15

**Table 3:** Preliminary phytochemical Screening of *Homonia retusa* root extract

Sl. no	Chemical Constituents	Conventional Extraction	Microwave Assisted Extraction
1	Carbohydrates	+	+
2	Cardiac Glycosides	+	+
3	Alkaloids	-	-
4	Steroid	+	+
5	Protein	-	-
6	Amino acids	-	-
7	Saponins	+	+
8	Flavonoids	+	+
9	Tannins	+	+
10	Phenolics compound	+	+

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## DISCUSSION

Both extraction methods yielded the same results in terms of colour and consistency. In microwave assisted extraction, a greater yield was obtained. The yield of water extract was significantly higher using the MAE approach than with conventional extraction as in table 2 and it took much less time. Microwave-assisted extraction produced better results. The preliminary screening of both the extracts revealed the presence of carbohydrates, steroids, flavonoids, saponins, tannins and phenolic compounds.

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## CONCLUSION

The conclusion that the microwave assisted method outperforms the conventional method can be drawn from the results of a comparison between the two methods of extraction. This demonstrates that the extraction process using microwave aided extraction yields a higher percentage than the traditional method. In order to assess whether the procedure has been completed, extra research must be done.

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## REFERENCE

1. Parthasarathi S, Ezhilarasi PN, Jena BS, Anandha ramakrishnan C. A comparative study on conventional and microwave-assisted extraction for microencapsulation of Garcinia fruit extract. *Food and Bioproducts Processing*. 2013 Apr 1;91(2):103-10.
2. El Maaiden E, Bouzroud S, Nasser B, Moustaid K, El Mouttaqi A, Ibourki M, Boukcim H, Hirich A, Kouisni L, El Kharrassi Y. A comparative study between conventional and advanced extraction techniques: Pharmaceutical and cosmetic properties of plant extracts. *Molecules*. 2022 Mar 23;27(7):2074.
3. Michalak I, Tuhy L, Chojnacka K. Seaweed extract by microwave assisted extraction as plant growth biostimulant. *Open Chemistry*. 2015 Jan 1;13(1).
4. Chan CH, Yusoff R, Ngoh GC, Kung FW. Microwave-assisted extractions of active ingredients from plants. *Journal of Chromatography A*. 2011 Sep 16;1218(37):6213-25.
5. Kumar BS, Swamy BV, Behara GM, Baidya M, Bilal S, Swamy A. Diuretic activity of the root of *Homonoia retusa* (GRAH. EX WT.) MUELL. *Pharmacology online*. 2010;3:276-84.
6. Nisha Pyngrope, Akila E, Dr. Narayanaswamy V.B. and Pruthvi N. Comparative Study Of Conventional Extraction And Microwave Assisted Extraction Of *Codiaeum Variegatum* Stem Bark. *European Journal Of Pharmaceutical And Medical Research* 2022;9(5): 258-260
7. Kokate CK, Purohit AP, Gokhale SB. *Pharmacognosy*. 10th ed. New Delhi: Nirali Prakashan Pvt Ltd, 1998; 92-4.