

Comparative Study of Conventional Extraction and Microwave Assisted Extraction of *Chenopodium giganteum* Leaves

Shailin Dkhar*, Akila E, Dr. Narayanaswamy, Pruthvi N

Department of Pharmacognosy, RR College of Pharmacy, Bangalore, Karnataka, , India

ABSTRACT

Microwave assisted extraction is one of the advanced techniques under thought now a days. In MAE, microwave vitality is utilized to concentrate plant metabolites with the solvents. The present study shows an efficient microwave assisted extraction (MAE) method for taking out of secondary metabolites from the medicinal plant of *Chenopodium giganteum*. The dried powder samples were subjected to extraction process by Conventional method as well by microwave assisted extraction and the extracts were subjected to qualitative phytochemical screening. The phytochemical screening of both the extracts revealed the presence of proteins, carbohydrates, tannins, flavonoids, terpenoids, alkaloids, phenols, glycosides.

Keywords: Microwave assisted, Conventional, phytochemical, extracts.

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I. INTRODUCTION

Medicines from natural sources are the first choice for the prevention and treatment of all kind of diseases for thousands of years. These Natural medicinal products are prior sources for drug development. The drawback facing with in natural medicines are the quantity of bioactive substances which are comparatively less. So, Development of proper effective and selective methods for the extraction of those bioactive substances from the natural source is very important.

To separate the precise chemical ingredients from the herbal drug is the number one concept of extraction. There are special styles of Extraction strategies which

encompass solvent extraction, distillation method, urgent and sublimation consistent with the diverse idea of extraction.

Extraction entails isolating dissolvable substances from non-dissolvable residues using solvent(s); it may be in shape of liquid or solid There are categories of extraction which are traditional and contemporary; the former includes Soxhlet, soaking, maceration, extremely-sonication, rapid-rapid blending, and solvent permeation; the latter includes ultrasonic-assisted, subcritical, supercritical CO₂, enzyme-assisted, pressure-assisted, and microwave-assisted techniques.² The traditional methods are mainly associated with an extended time of extraction, destruction of heat-sensitive bioactive compounds,

and enormous consumption of solvents.³ It's far then critical to explore modern strategies of extraction to conquer the setbacks related to the traditional methods. Out of all of the current strategies of extraction, microwave-assisted extraction (MAE) has received the greatest attention because of its reduced consumption of solvent, shorter operation time, reproducibility, improved recovery yield, top selectivity, and reduced pattern manipulation ⁴. Gedye et al. And Giguere et al. Were groups that first described the usage of microwave power in 1986, it was hired in natural synthesis; microwave power become additionally hired in the extraction of biological samples for analysing natural compounds.

II. METHODS AND MATERIAL

Powder of *Chenopodium giganteum* were collected from Tirunelveli district, Tamilnadu. The plant was identified and authenticated by V. Chelladurai, Research officer – Botany, (Retired) Central council for research in Ayurveda & Siddha. The healthy leaves were shade dried and powdered using electric blender to get a coarse powder.

Conventional extraction:

10 gm of powder of both the drugs was subjected to successive solvent extraction using petroleum ether, chloroform, ethyl acetate and ethanol and Water. The

extract was concentrated and weighed to calculate % yield.

Microwave assisted extraction:

2 gm of powders of both the drugs were separately taken in 250 ml reaction flask and were subjected to microwave irradiation. the time set was 15 min and intensity 450 W but the extraction was stopped when vigorous boiling started. the extracts were concentrated and weighed to calculate % yield. The extracts obtained by conventional as well as microwave assisted extraction were subjected to preliminary phytochemical screening.⁵

Both above given extracts were subjected to Preliminary phytochemical screening by standard protocols.^{6,7}

III. RESULTS AND DISCUSSION

Powder of *Chenopodium giganteum* has been subjected to the extraction process by conventional method as well Microwave assisted extraction and the % yield and Color and Consistency of the extracts were compared and tabulated (Table 1). Both extracts are subjected to preliminary phytochemical screening and the results are given below Table.2.

Table 1: Comparative study of Conventional extraction and Microwave assisted extraction of *Chenopodium giganteum*

NO	SOLVENT	<i>Chenopodium giganteum</i>					
		CONVENTIONAL EXTRACTION			MICROWAVE ASSISTED EXTRACTION		
		COLOR AND CONSISTENCY	% YIELD	TIME (Hrs)	COLOR AND CONSISTENCY	% YIELD	TIME (Hrs)
2	Pet. ether	Yellowish green Semisolid	0.5%	2hrs	Yellowish green Semisolid	1%	10 Mins

		Consistency			Consistency		
	Chloroform	Greenish black Semisolid with oily mass	1.4%	3hrs	Greenish black Semisolid with oily mass	2%	15 Mins
	Ethyl acetate	Greenish black Semisolid with mass	0.7%	3.5hrs	Greenish black Semisolid with oily mass	2.5%	15 Mins
	Ethanol	Dark green Semisolid Consistency	0.4%	2.5hrs	Dark green Semisolid Consistency	3.5%	15 Mins
	Water	Dark Brown Semisolid Consistency	4.5%	2hrs	Brownish Black Semisolid Sticky Consistency	10%	15 Mins

Table 2: Preliminary phytochemical Screening of *Chenopodium giganteum* leaf extract prepared by Conventional extraction and Microwave assisted extraction

S.No	Chemical Constituents	CONVENTIONAL EXTRACTION	MICROWAVE ASSISTED EXTRACTION
1	Carbohydrates	+	+
2	Alkaloids	+	+
3	Steroids	+	+
4	Glycosides	+	+
5	Saponins	+	+
6	Flavanoids	+	+
7	Tannins	+	+
8	Phenolic Compounds	+	+
9	Proteins	+	+
10	Amino acids	+	+
11	Terpenoids	+	+

DISCUSSION

The color and consistency obtained in both the methods of extractions were same. The yield obtained was more in some of the cases in microwave assisted extraction than conventional extraction but time required for microwave assisted extraction was much less. Better results were obtained in microwave assisted extraction.

IV. CONCLUSION

The results were encouraging as better results were obtained with reference to % yield at medium intensity and more time. It was not clear whether the extraction in microwave was complete. Hence, it is necessary to carry out further study to evaluate completion of the process.

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