IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Human Journals
Research Article
March 2016 Vol.:5, Issue:4

Microwave Assisted Extraction of *Ocimum gratissimum*

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Submission: 9 March 2016
Accepted: 15 March 2016
Published: 25 March 2016

Keywords: Microwave, *Ocimum gratissimum*, extraction, solvent mixture

ABSTRACT

Microwave Assisted Extraction (MAE) is a conventional technique for the extraction of active components from medicinal plants, using microwave energy to heat solvents containing samples, thereby partitioning analytes from a sample matrix into the solvent. The main advantage of MAE is its ability to rapidly heat the sample solvent mixture, resulting in its wide applicability for the rapid extraction of analytes, including thermally unstable substances. Microwave assisted extraction requires shorter time, less solvents, higher extraction rate and better products with lower loss. In present work microwave assisted extraction of *Ocimum gratissimum* has been carried out. The widely used plants were selected on the basis of their phytochemical profile. The parameters selected were time required and percentage yield. It was observed that there was significant increase in the yield for aqueous extract in microwave assisted method. Hence it can be concluded that the microwave assisted method is a rapid and convenient method of extraction of plant materials.

INTRODUCTION:

Medicinal plants produce secondary metabolites with remarkable and diverse biological functions that are widely used as food additives and pharmaceutical ingredients for therapeutic, aromatic, and culinary purposes. It is a green technology that is effective for extracting bioactive compounds from plant samples[1].

Microwave Assisted Extraction (MAE) is a conventional technique for the extraction of active components from medicinal plants, using microwave energy to heat solvents containing samples, thereby partitioning analytes from a sample matrix into the solvent. The main advantage of MAE is its ability to rapidly heat the sample solvent mixture, resulting in its wide applicability for the rapid extraction of analytes, including thermally unstable substances.

Microwave-assisted extraction works with a principle by which polarizable materials and dipoles of polar solvent interact with microwave radiation whereby the forces between magnetic and electric components change direction rapidly. The molecules of polar solvent get heated when they orient in the changing field direction. In the case of non-polar solvents that do not have polarizable groups, the heating is poor. This thermal effect at the molecular level is rapid but limited to the depth near the surface and a small portion of the samples. The remaining part of the samples is heated up by conduction. Therefore, this is the major drawback of the MAE because large samples or agglomerates of small samples cannot be heated uniformly. There is a possibility of using high power sources in order to enhance the depth of penetration but microwave radiation involves an exponential decay once inside a microwave-absorbing solid[2]. In present work microwave assisted extraction of *Ocimum gratissimum* has been carried out.

Ocimum gratissimum L. (Lamiaceae), known as tree basil, is widely used medicinally as a topical antiseptic and for the treatment of conjunctivitis, bronchitis and diarrhea as well as a food flavoring[3,4]. Antimicrobial activity was confirmed for the essential oil[5], ethanolic[6], methanolic[7] and aqueous extracts[6]. This activity has also been correlated with a high content of eugenol[5].

Fig. 1: *Ocimum gratissimum* Leaf

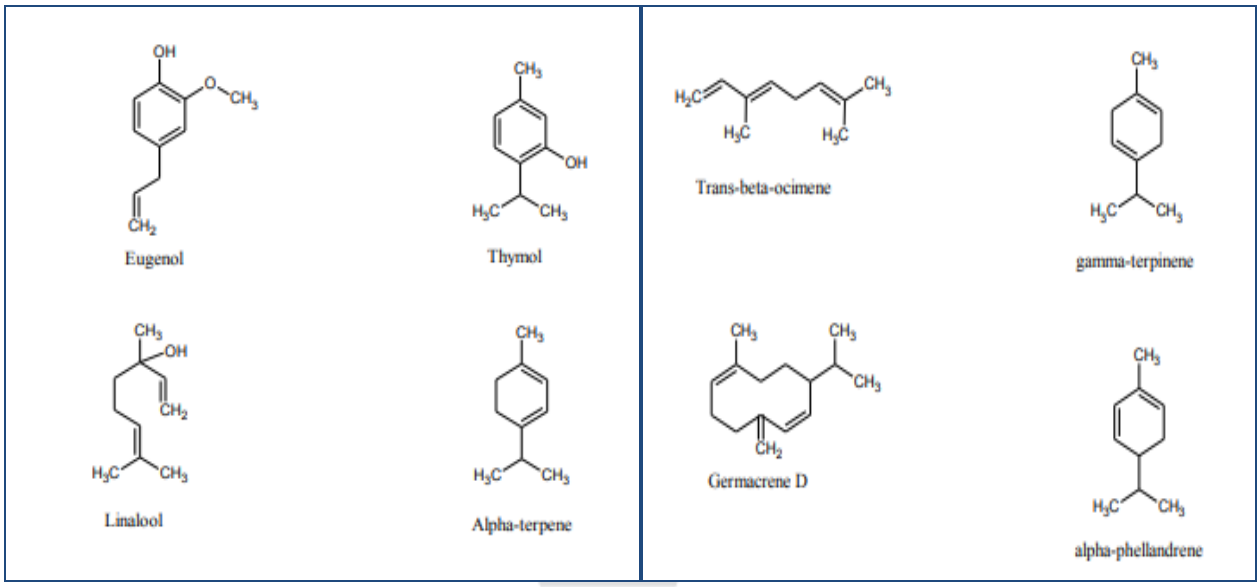

Fig. 2: Chemical compounds present in *O. gratissimum*

EXPERIMENTAL WORK:

Plant Material:

The powder was obtained using aerial parts of *O. gratissimum* leafs. The plant material was collected and dried in a ventilated oven at 45°C for three days and stored in closed dark packages until the extraction processes.

Microwave assisted extraction:

10 gm leaf powder was taken in 250 ml reaction flask and adds 100 ml solvent. Then it was subjected to microwave irradiation. The different parameters are selected such as time and intensity. Trial and Error method was followed to set time and intensity. At first the time was set 5 mins and increased by +5 min till 30 mins. Side by side reaction was monitored till colourless solvent was obtained in reflux flask. The intensity was not fixed but checked for

140 W, 210W, 245W, 280W, 350W, 420W, 455W, 490W, 560W, 700W for both drugs but the extraction was stopped when vigorous boiling started. In both the cases, 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[8]. The presence of phytoconstituents was confirmed by thin layer chromatography[9-10].

Table 1: Microwave assisted extraction of *Ocimum gratissimum*

Sr. No.	Solvent	Microwave assisted extraction				
		Colour and consistency	Watt (W)	Power (%)	Time (mins)	% Yield
1.	Chloroform	Reddish brown powder	210	30	20	7.25
2.	Methanol	Brown semisolid mass	210	30	20	4.65
3.	Aqueous	Brown semisolid mass	210	30	25	11.66

RESULTS:

The results of Microwave assisted extraction of *Ocimum gratissimum* are tabulated in table 1. The yield obtained was found to be different in microwave assisted extraction for different solvents. Also the time required for microwave assisted extraction was much less. Good results were obtained in microwave assisted extraction in aqueous solvent.

CONCLUSION

In conclusion, microwave assisted extraction has proven to be a highly efficient and effective method for extracting natural products from plants like *Ocimum gratissimum*. With its ability to reduce extraction time, minimize solvent usage, and yield higher extraction rates with superior quality products, it has become a popular alternative to traditional extraction methods. The results of this study demonstrate the potential for this technique to be widely adopted in the pharmaceutical, food, and cosmetic industries for the production of natural products.

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