ejpmr, 2017,4(06), 410-412

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

CHEMICAL COMPOSITION OF *OCIMUM GRATISSIMUM L* BY GC-MS ANALYSIS.

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Article Received on 28/04/2017 **Article Revised on 28/04/2017** **Article Accepted on 18/05/2017**

ABSTRACT

Ocimum gratissimum L (Labiatae), growing wild in Ethiopia was subjected to hydrodistillation The monoterpenoids dominated over sesquiterpenoids in the essential oil contents of *O.gratissimum L* extracted from Mekelle, Ethiopia by the authors. The major components among them were eugenol (48.4%), thymol(11.9%),p-cymene (5.1%) and sabinene hydrate (5.9%).The sesquterpine found was bisabolene and it constituted 9.2% in the oil composition. This report also suggested the dominance of eugenol as the major constituent in essential oil of *O.gratissimum* as in earlier investigations.

KEYWORDS: Ocimum gratissimum, Labiate, essential oil.

INTRODUCTION

Ocimum gratissimum L (family Labiatae) is an African basil and also known as Clove Basil .It is growing wild and is widely distributed in tropical and warm temperature regions. *Ocimum gratissimum L* is commonly used in folk medicine to treat diseases like upper respiratory tract infections, diarrhoea, headache, ophthalmic, skin diseases, pneumonia, and also as a treatment for cough, fever, and conjunctivitis (Corrêa 1932, Onajobi 1986).The essential oil of *Ocimum gratissimum L* exihibits considerable antibacterial and antifungal activities. The aim of the present study was to analyse the essential oil components of *O.gratissimum L* by GC-MS and to compare the active principles present with already reported in literature.

EXPERIMENTAL

Plant material

The aerial parts of plant, *Ocimum gratissimum L* were collected during the month of March 2014 from Mekelle, Ethiopia. The plant material was identified by the authors and its herbarium sheet was deposited at the post graduate laboratory of the Department of Chemistry, Mekelle University, Ethiopia.

Chemical Reagents

All chemicals used in the present study were of analytical grade and obtained from Sigma Co. (St. Louis, MO, USA).

Essential oil extraction

The shade dried aerial parts of *Ocimum gratissimum L* plant collected (1Kg) was subjected to hydrodistillation in a Clevenger apparatus for 3hrs. The essential oil was separated from the aqueous layer using a 100mL capacity separatory funnel. The collected essential oil was dried over anhydrous sodium sulphate and filtered using a Whatman filter paper no. 40. The extracted essential oil was stored at 4°C in dark brown 5mL capacity sample vial until analysis. The yield of the oil was found to be 0.5% (w/w) in relation to the dry weight.

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The shade dried aerial parts of *Ocimum gratissimum L* plant collected (1Kg) was subjected to hydrodistillation in a Clevenger apparatus for 3hrs. The essential oil was separated from the aqueous layer using a 100mL capacity separatory funnel. The collected essential oil was dried over anhydrous sodium sulphate and filtered using a Whatman filter paper no. 40. The extracted essential oil was stored at 4°C in dark brown 5mL capacity sample vial until analysis. The yield of the oil was found to be 0.5% (w/w) in relation to the dry weight.

GC and GC-MS analysis

GC analysis was carried out in Agilent Technology 6890N Gas Chromatograph data handling system equipped with a spilt/splitless injector using N2 as carrier gas. The column was HP-5 capillary column (30m x 0.32mm, 0.25µm film thickness) and temperature program was used as follows: initial temperature of 60^0C(hold: 2min) programmed at a rate of 3^0C/min to a final temperature of 220^0C (hold: 5min). The temperature of injector was maintained at 210^0C. The GC-MS analysis was performed by Perkin Elmer Clarus 500 Gas Chromatograph equipped with a spilt/splitless injector (split ratio 50:1) data handling system. The column was an Rtx®-5 capillary column (60 mm x 0.32

mm, 0.25µm film thickness). Helium was used as carrier gas at a flow rate of 1.0mL/min. The GC was interfaced with Perkin Elmer 500 Mass Detector operating in EI+ mode. The mass spectra was recorded over 40-500amu and revealed the Total Ion Current chromatograms. The temperature program remained the same as in GC. The temperatures of injector and transfer line were kept at 210 ^{0}C & that of the ion source at 200^{0}C.

Identification of the oil components was done by comparison of their mass spectra with the NIST/Wiley library as well as by comparing them with those reported in literature. The identification of each gradient was also confirmed by comparison of its retention index with those of authentic compounds.[7]

RESULTS AND DISCUSSION

The GC-MS analysis of essential oil of *Ocimum gratissimum L* showed the presence of 13 components and the identified components are presented in Table-1. A total of 93.8% of compounds were identified. In the oil mixture monoterpine contents predominated (79.1%) over sesquiterpine components (14.7%). The major components among monoterpines were eugenol(48.4%), thymol(11.9%),p-cymene (5.1%) and sabinene hydrate (5.9%). On the other hand, the sesquterpine factor, bisabolene constituted 9.2% in the oil composition.

A previous study reports on the essential oil contents of *Ocimum gratissimum L* showed the dominance of monoterpine, eugenol as the major constituent.[8-10] The present report is also in agreement with the earlier studies, eventhough the quantity of eugenol varies.

Table: 1 Chemical composition of essential oil of *Ocimum gratissimum L*

Peak No	RT	Compounds identified	Percentage composition
1	6.132	ocimene	1.1
2	8.23	α-pinene	2.2
3	9.21	eugenol	48.4
4	10.42	β-pinene	1.0
5	11.67	β-carene	0.6
6	12.98	camphor	1.5
7	13.87	linalool	0.2
8	15.00	thymol	11.9
9	16.28	γ-terpene	1-2
10	17.76	p-cymene	5.1
11	18.98	sabinene hydrate	5.9
12	20.12	unidentified	1.5
13	22.34	β-caryophyllene	1.3
14	23.90	germacrene-D	2.3
15	24.98	β-bisabolene	9.2
16	26.12	farnesol	1.0
17	27.54	copaene	0.9
Total percentage composition		95.3	

CONCLUSION

The monoterpinoids dominated over sesquiterpenoids in the essential oil contents of *O.gratissimum L* extracted from Mekelle, Ethiopia by the authors. The major components among them were eugenol 48.4 %), thymol(11.9%), p-cymene (5.1%) and sabinene hydrate (5.9%).The main sesquterpine factor was bisabolene and it constituted 9.2% in the oil composition. This report also suggests the dominance of eugenol as the major constituent in essential oil of *O.gratissimum* as in earlier investigations.

ACKNOWLEDGEMENT

The authors acknowledge the Department of Chemistry, College of Natural and Computational Sciences, of Mekelle University for providing the laboratory facilities and also Test House, Banglore, India for furnishing the spectral information.

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