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Research Article

CHEMICAL ANALYSIS OF THE ESSENTIAL OIL OF *ERIGERON CANADENSIS L*

Unnithan CR*, Mehari Muuz, Amha Woldu, Reddy DN, Gebremedhin Gebremariam, Berhanu Menasbo, Masho Hilawie and Tesfamariam Teklu.

Department of Chemistry, Mekelle University, Ethiopia

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*Corresponding Author: **C.R. Unnithan**
E-mail: crunnithan@yahoo.co.in

ABSTRACT

The essential oil of *Erigeron canadensis L* (family: Asteraceae) extracted by hydrodistillation was analyzed by GC and GC-MS techniques. A total of 23 components were identified, representing 95.9 % of the oil. The main constituents were monoterpenoids (limomene (57.2%), camphene (2.5%) α and β-pinenes (1.9 % & 2.1%) and sesquiterpenoids (caryophyllene (6.7%), germacrene D (4.9%) and α-curcumene (3.0%). A few non-terpenoid acetylenic compounds (4.8%) were also detected.

Keywords: *Erigeron canadensis*, Asteraceae, essential oil composition, limonene

INTRODUCTION

Erigeron canadensis L (*Conyza canadensis L* Cronq. ,also known as horse weed or fleabane belong to the family of Asteraceae, is indigenous to North America and now globally distributed all over the world. It is an annual plant growing to 1.5 m tall, with sparsely hairy stems. The plant is used as a folklore medicine for diarrhea, dysentery, arthritis and bronchitis [1-3].The essential oil of *Erigeron canadensis* and its extracts are shown to exhibit antibacterial and anti-inflammatory activities [4-7].

MATERIALS AND METHODS

The aerial parts of *Erigeron canadensis* plant was collected during the month of March from Mekelle, Ethiopia in 2014. The plant was identified by the authors and its herbarium sheet was deposited at the Chemistry department, Mekelle University, Mekelle, Ethiopia.

Essential oil extraction: The shade dried aerial parts of *Erigeron canadensis* plant collected (1Kg) was subjected to hydro distillation in a Clevenger apparatus for 3h. The essential oil was separated from aqueous layer using a 100 mL 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 light yellow liquid in appearance which was stored at 4°C in dark brown 5-mL capacity sample bottle until analysis. The yield (fresh weight/w) was 0.69 % GC and GC-MS analysis: GC analyses were carried out in Agilent Technology 6890N gas Chromatograph data handling system equipped with a split-split less injector and fitted with a FID using N2 as carrier gas. The column was HP-5capillary column (30m x 0.32mm, 0.25µm film thickness) and temperature program was used as follows: initial temperature of 60^{o}C (hold: 2 min) programmed at a rate of 3^{o}C/min to a final temperature of 220 ^{o}C (hold: 5 min). Both the temperature of injector and FID were maintained at 210^{o}C. The GC-MS was performed by Perkin Elmer Clarus 500 gas chromatograph equipped with a split-split less injector (split ratio 50:1) data handling system. The column was an Rtx®-5 capillary columns (60 min 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 40-500 amu 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 ^{o} C and that of ion source at 200 ^{o}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 compound was also confirmed by comparison of its retention index with those of authentic compounds [8].

RESULTS AND DISCUSSION

The composition of essential oil of *Erigeron canadensis* is shown in the table 1. A total of twenty three components amounting 95.9% were identified. The identified compounds were monoterpenoids (67.9%) , sequiterpenoids (20.3 %) and a non-terpenoid acetylenic compounds (4.8%).

The major monoterpenoid components identified were limomene (57.2%), camphene (2.5%)α and β-pinenes (1.9 % & 2.1%). The main sesquiterpenoids included caryophyllene (6.7%), germacrene D (4.9%) and *α*-curcumene (3.0%).The unidentified compounds constituted 1.6%.The major constituent in the essential oil of *Erigeron canadensis* was found to be limonene which was reported by the majority of the investigators all over the world [9-14].This is in agreement with our findings .The presence of different components in the oil of *Erigeron* species was also reported from other regions of the continents [15,16] .

These variations of the active principles present in the essential oils may be attributed to the different environmental and climatic conditions of the regions [17,18].

CONCLUSION

The major componenets isolated from the essential oil of *Erigeron canadensis L* from Mekelle,Ethiopia were monoterpenoids (67.9 %) and the sesquiterpenoids were present in lesser quantity (20.3 %).Among the monoterpenoids limonene was found to be present in larger amount (57.2 %) as reported by many researchers.

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Table 1: Chemical compositions of essential oil of *Erigeron canadensis*

Peak no.	RI	Compounds identified	% composition
1	896	α-Pinene	1.9
2	902	β-Myrcene	1.2
3	934	p-Cymene	0.8
4	950	Limonene	57.2
5	958	(E) -β -Ocimene	1.1
6	986	β- Pinene	2.1
7	990	Sabinene	0.8
8	1012	p-Menth-1(7),8(10) dien-9-ol	0.3
9	1045	Camphene	2.5
10	1102	4-Hexen-3-one 2,2 dimethyl	0.8
11	1136	*β*-Caryophyllene	6.7
12	1157	Spathulenol	1.5
13	1190	*α*-Curcumene	3.0
14	1202	π-Muurolene	1.1
15	1224	Himachala-1,4-diene	0.7
16	1274	2-Allyl phenol	0.5
17	1290	Un identified	0.2
18	1305	*2E,8Z*-Matricaria ester	0.2
19	1329	Farnesene	0.8
20	1345	β-Vatriene	0.9
21	1385	*δ*-Cadinene	0.7
22	1396	Unidentified	0.8
23	1408	Z,Z-Matricaria ester	3.4
24	1412	Unidentified	0.6
25	1445	Germacrene D	4.9
26	1487	*2E,8E*-matricaria ester	1.2
Total			95.9
Monoterpenoids			67.9
Sesquiterpenoids			20.3
Non-terpenoids			6.1

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