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Original Research Article

ESSENTIAL OIL COMPOSITION OF *VERONIA AMYGDALINA* DEL FROM MEKELLE, NORTHERN ETHIOPIA.

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Abstract: The essential oil constituents isolated from the aerial parts of *Veronia amygdalina* Del., family, Asteraceae, from Mekelle, Northern Ethiopia was screened by GC-MS. A total of 23 constituents representing 95.8% in the oil of *V. amygdalina* were identified by GC-MS. The oil is composed of a mixture of mono and sesquiterpine components. The major essential oil contents of *Veronia amygdalina* identified were 1, 8-cineole (23.2%) and muuralol (17.1%). The oil also contained α- pinene (5.4%), carvone (5.3%), and caryophyllene (6.4%), humulene (6.0% farnesol (5.5 %) A comparative study of the oil constituents indicated that there are significant variations.

Keywords: *Veronia amygdalina*, Asteracea, essential oil.

Introduction: *Veronia amygdalina* Del., (Asteraceae), is a perennial shrub of 2.5m in height that grows throughout tropical regions of Africa. It has wide range of applications in folklore medicine as a digestive tonic, appetizer, febrifuge and for healing of wounds[1].The traditional medical practitioners in Northern Africa use this plant as an anti-helminthic, anti-malarial, antifungal and laxative[2]. It is also shown to exhibit anticancer activity [3-6]. This medicinal herb contains significant quantity of lipids, proteins, amino acids, carbohydrates, ascorbic acid, carotenoids and essential elements [7-8]. The aim of this research paper is the isolation and identification of the components of *V. amygdalina* Del., by GC-MS.

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Experimental

Plant material: The aerial parts of the plant, *Veronia amygdalina* Del., were collected during the month of February 2014 from Mekelle, Ethiopia. The plant material was identified by the author and its herbarium sheet was deposited at the P.G. Department of Chemistry, CNCS, and Mekelle University, Ethiopia.

Essential oil extraction: The shade dried aerial parts of *Veronia amygdalina* Del., (1Kg) was subjected to hydrodistillation in a Clevenger apparatus for 3 hrs. The oil was separated from

the aqueous layer by using a 1000 mL capacity separating funnel, dried over anhydrous sodium sulfate and filtered using a Whatman filter paper. The extracted oil was stored at 4^{o} C in dark brown 6 ml capacity vial tube for analysis. The yield of the oil was shown to be 0.4% (v/w) in relation to dry weight basis.

GC-MS analysis: GC analysis was carried out in Agilent Technology 6890 N Gas Chromatograph data handling system equipped with a split/splitless injector using nitrogen as carrier gas. The column was HP-5 capillary column (30 m x 0.32 mm, 0.25 µm film thickness) and temperature program was used as follows: initial temperature of 60 ^{0}C (hold: 2 min) programmed at a rate of 3 ^{0}C /min to a final temperature of 220^{0}C (hold: 5 min). The temperature of injector was maintained at 210^{0}C. 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 columns (60 mm x 0.32 mm, 0.25µm film thickness). Helium was used as carrier gas at a flow rate of 1.0 mL/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 compound was confirmed by comparison of its retention index with those of authentic compounds [9].

Results and Discussion: The GC-MS profile of the essential oil of *Veronia amygdalina* Del., showed 23 components which are depicted in Table-1. A total of 95.8% of compounds were identified. The major monoterpine components were 1, 8-cineole (23.2%), α- pinene (5.4%), carvone (5.3%). The sesquiterpenes included muuralol (17.1%), caryophyllene (6.4%), humulene (6.0% and farnesol (5.5%).

A study from Nigeria on the essential oil contents of *V. amygdalina* Del., showed the predominance of monoterpines in the oil mixture with thymol (27.0%) as major constituent [10]. But a few other reports indicated the presence and dominance of different mono and sesquiterpinoids in the oil [11-13].

Table 1: Chemical composition of essential oil of *Veronia amygdalina* Del.

Peak No	RT	Compounds identified	Percentage composition
1	6.132	Ocimene	1.2
2	8.23	1,8-cineole	23.2
3	9.21	α-pinene	5.4
4	10.42	Phelladrene	1.0
5	11.67	β-carene	0.6
6	12.98	Phytol	0.5
7	13.87	Linalool	1.2
8	15.00	γ-pinene	3.9
9	16.28	γ-terpinene	1-5
10	17.76	p-cymene	3.1
11	18.98	Sabinene	1.0
12	20.12	Unidentified	1.5
13	22.34	Thujol	2.1
14	23.90	Carvone	5.3
15	24.98	myrtenol	3.2
16	26.12	Cuminal	1.1
17	27.54	Phellandral	1.3
18	28.96	Apiole	1.2
19	30.74	β-caryophyllene	6.4
20	31.84	α-humulene	6.0
21	33.98	Muuralol	17.1
22	35.74	Farnesol	5.5
23	36.57	α-copaene	2.5
24	38.94	β-selinene	1.5
Total percentage composition			97.3

Conclusion: The major essential oil contents of *Veronia amygdalina* Del., in the present study were 1, 8-cineole (23.2%), α- pinene (5.4%), carvone (5.3%). The sesquiterpene components included muuralol (17.1%), caryophyllene

(6.4%), humulene (6.0%) and farnesol (5.5%). It is found that the monoterpines predominated in the oil of *V. amygdalina* with 1, 8-cineole as the major ingredient. The essential oil components of this species reported in literature showed variance in mono and sesquiterpene contents [10-13].

The above variations in oil contents in similar chemo types may be attributed to difference in environmental and climatic conditions of the regions [14-15].

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