Journal of Applied Pharmaceutical Science Vol. 3 (08), pp. 113-115, August, 2013
Available online at http://www.japsonline.com
DOI: 10.7324/JAPS.2013.3820
ISSN 2231-3354

Chemical composition of the essential oil extracted from the leaves of the dwarfish (*Chamaerops humilis* L.) palm tree of Morocco (Region of Benslimane)

Khoudali Saïd*[1], Essaqui Abdelhak[1], M'bark Haidoune, Mohamed Benaissa[1]
[1]Equipe de Chimie Agroalimentaire et Chimie des substances naturelles végétales et marinesFaculté des Sciences Aîn Chock, Université Hassan II-Casablanca - B.P 5366.

ARTICLE INFO

Article history:
Received on: 20/05/2013
Revised on: 23/06/2013
Accepted on: 15/07/2013
Available online: 30/08/2013

Key words:
Chamaerops humilis L.,
Chemical composition,
essential oil, Clevenger,
Morocco.

ABSTRACT

The wild sample of the dwarfish palm tree (Chamaerops humilis L.) was collected in the region of Benslimane (center of Morocco) in December, 2009. The organic extract of the plant was distilled using a typical device Clevenger (European Pharmacopoeia). The obtained essential oil was analyzed by GC-MS. The obtained yield is 0.40%, with a total of forty compounds. The main components of this oil are (E)-β-ocimene (39,36%) Cyclobutane, 1,2-bis(1-methylethenyl)-, trans- (4,51%), Cyclohexanone, 5-methyl-2-(1-methylethylidene) (4,17%) . We consider ourselves the first ones who analyzed this essential oil of this plant and found this number of constituent.

INTRODUCTION

Essential oils are products of the secondary metabolism of plants (Hatanaka *et al.*,1987), Their constituents are mainly monoterpenes and sesquiterpenes of general formula (C5H8) n. Other compounds include phenylpropanes and specific compounds containing the sulfur or the nitrogen (Svoboda *et al.*,1998). *Chamaerops humilis* can grow up between 1 to 1.5 m in mean height. But, this plant can reach 9 to 10 m of height in the protected areas. It is characterized in particular by its coming out trunk(Chevalier, 1995).

It is one of the rare species of palm tree that the stipe can branch out. Its slow growth favours the appearance of numerous discharges on its basis which are responsible of its appearance in bundle(Gaamoussi *et al.*,2010). The Leaves arranged in terminal bow, are webbed in shapes of 90 cms in diameter. The limb is dissected in 10 to 20 lengthened and acute stiff and tough pseudo-sepals. Leaves are green in the superior and almost white face down (Larousse , 2001), (Anstett, 2010).The bays (berries) of the dwarfish palm tree were used as food but also to treat diverse disorders of men's urinary system, and look after women's mammary problems (Benjilali and Zrira, 2005), (Hmamouchi, 2001). to treat diverse disorders of men's urinary system, and look after women's mammary problems (Benjilali and Zrira, 2005), (Hmamouchi, 2001).

To contribute to a better valuation of this plant, this work approaches the chemical composition of essential oil extracted from leaves of this dwarfish palm tree.

MATERIAL AND METHODS

Plant material

Twigs of dwarfish palm tree (Chamaerops humilis L.) were taken in the region of Benslimane (Center of Morocco) in December, 2009 on leaves set randomly chosen then dried ten days in the shade before their use.

Extraction of essential oil

The extraction of the essential oil was realized by hydrodistillation of the sample using a Clevenger's type device (Clevenger,1928). Distillation was realized by boiling 100 g of plant material freshly cut in 3cm pieces approximately. The distillation took three hours after the appearance of the first drop of distillate at the exit of the condensation's tube of the vapor with 1

* *Corresponding Author*
Khoudali Saïd
E-mail:khoudalisaid@hotmail.com

liter of water in to 2 liter balloon surmounted by a column of 60 cms in length connected with a cooler. The essential oil was stored in 4°C in the darkness and dried with some sulfate of sodium anhydrous. The value of the yield is expressed compared with the dry material (ml / 100 g of dry material). The percentage of dry material is estimated by drying 5g of the sample for four hours at the steam room at 103 ± 2°C. The essential oil was diluted in some methanol (1/20, v/v) before proceeding to CG / SM analyses.

Analysis of Chemical composition of essential oils

The *Chamaerops humilis L.* essential oils was analyzed by gas chromatography-mass spectrometry (GC-MS).

Gas chromatography-mass spectroscopy

The analysis was done using a Hewlett-Packard HP 5980 Series II gas chromatograph equipped with HP-5 capillary column (25m x 0.3mm; film thickness 0.25 µm) and an HP 5772A mass selective detector. Analytical conditions were: injector and detector temperatures: 240 and 260°C respectively. The oven temperature is programmed from 50 to 250°C at 4°C/min, then isothermal at 250°C for 10 min; the carrier gas was 2 ml He/min; we used an ionization mode with electronic impact at 70 eV. The constituents were identified by the combination of retention index data and mass spectra data using NIST 2005 library.

RESULTS AND DISCUSSION

The yield (ml / 100g) of dry material is calculated by the relation below. The chemical composition (in %) of some isolated essential oil from leaves is presented in the table1 below:

The yield in essential oil is 0,40 %. It is relatively high compared with certain plants which are industrially run as source of essential oil (Edward P. and al.,1987), For example: lavender (0,8-2,8 %), peppermint (0,5-1 %), neroli (0,5-1 %), pink(rose) (0,1-0,35 %), etc. This oil consists mainly on: (E)-β-ocimene (39,36%) accompanying other constituents in relatively low contents.
The yield is expressed by the following relation:

$$T_{HE}=(V/M_S*100)\pm(\Delta V/M_S*100)$$

- T_{HE} : amount of essential oil
- V : volume collected of essential oil (ml)
- ΔV : incertitude on volume
- M_s : mass of the dried plant leaves (g)

CONCLUSION

The yield in essential oil of the studied plant, dwarfish palm tree (Chamaerops humilis L.) is acceptable and can be profitable in the industrial scale. Furthermore, the main compounds of this oil present several interesting biological activities. However, it is necessary to indicate that the biological activities of an essential oil are not only due to its compounds but also to all the components of this oil. That is why it is necessary to lead a detailed study on the biological activities of this oil to show their importance and the possibility of their exploitation in certain domains: pharmaceutical, cosmetic, insecticidal, food-processing,etc.

The number of the constituent identified in this oil is forty compounds, with (E)-β-ocimene as the major compound of the essential oil.

Table. 1: Chemical composition of essential oils extracted from leaves of the dwarfish palm (*Chamaerops humilis* L.) tree of Morocco.

T_r(min)	compounds name	%
8,36	Androstane-11,17-dione, 3- oxy, 17-[O-(phenylmethyl)oxime], (3α,5α)-	0,15
10,97	2-methoxy[1]benzothieno[2,3-c]quinolin-6(5H)-one	2,13
11,74	Cyclobutane, 1,2-bis(1-methylethenyl)-, trans-	4,51
12,91	Ethyl 4-Chloro-5-methoxy-3-methylindole-2-carboxylate	0,67
15,77	9-Methoxy-5-methyl-6-phenyl-3,4,5,6-tetrahydro-2H-1,5-benzoxazocinium iodide monohydrate	0,40
16,20	2-(2-Pyridyl)-3-hydroxy-5,6,7,8-tetrahydroquinoline	0,63
16,63	[1]benzothieno[2,3-c]quinolin-6(5H)-thione	2,61
17,07	Canrenone	0,30
19,28	Cyclohexanone, 5-methyl-2-(1-methylethylidene)-	4,17
21,97	9H-pyrrolo[3',4':3,4]pyrrolo[2,1-a]phthalazine-9,11(10H)-dione,10-ethyl-8-phenyl	1,81
22,51	3-(4'-Methoxyphenyl)-1-acetyl-2-phenylindolizine	1,87
26,75	α-Tetralol, 2-amino-5,6-dimethoxy-	1,67
27,25	1H-Indene, 1-ethylideneoctahydro-7a-methyl-, cis-	1,67
27,87	1-Amino-1-ortho-chlorophenyl-2-(2-quinoxalinyl)ethene	1,34
28,88	Pyrazole[4,5-b]imidazole, 1-formyl-3-ethyl-6-á-d-ribofuranosyl-	0,59
31.63	Cholic acid	0,93
32,00	Chiapin B	0,69
32,25	Ursodeoxycholic acid	0,39
32,71	Gibbberellin A7 methyl ester	1,01
33,61	Dotriacontane (CAS)	0,27
33,72	5,7,9(11)-Androstatriene, 3-hydroxy-17-oxo-	0,14
33,84	Azafrin	0,42
34,41	Cedran-diol, 8S,14-	0,81
34,86	1-Naphthalenemethanol, 1,4,4a,5,6,7,8,8a-octahydro-2,5,5,8a-tetramethyl-	0,77
36,93	Spironolactone	0,10
37,49	2,7-Diphenyl-1,6-dioxopyridazino[4,5:2',3']pyrrolo[4',5'-d]pyridazine	0,56
38,23	Betulin	0,57
38,38	9,12,15-Octadecatrienoic acid, 2,3-bisoxypropyl ester, (Z,Z,Z)-	0,34
38,85	Lucenin 2	0,22
39,11	1-Methyl-3-(3,4-dimethoxyphenyl)-6,7-dimethoxyisochromene	2,54

40,11	p-cymene	1,12
40,30	Corynan-17-ol, 18,19-didehydro-10-methoxy-	0,49
40,59	Ergosteryl acetate	2,73
40,97	9,12-Octadecadienoic acid (Z,Z)-, 2,3-bisoxypropyl ester	0,18
41,15	1-Monolinoleoylglycerol ether	0,30
41,23	Stearic acid, 3-(octadecyloxy)propyl ester	0,35
41,42	Endrin	0,28
41,53	Pregn-9(11)-en-3-one, 18,20-dihydroxy-, cyclic 1,2-ethanediyl acetal, (5α,20R)-	1,84
41,71	Corynan-17-ol, 18,19-didehydro-10-methoxy-	0,38
43,59	(E)-β-ocimene	39,36
	Total	**81,31**

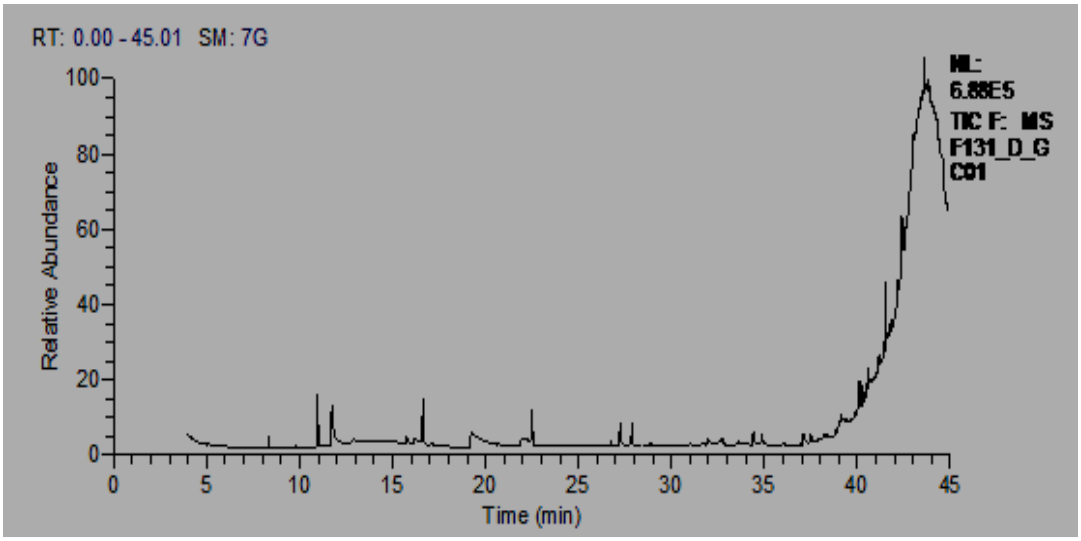

Fig. 1: Chromatogram of GC-MS analysis essential oil.

REFERENCES

Anstett M. C. An experimental study of the interaction between the dwarf palm (Chamaerops humilis L.) and its floral visitor Derelomus chamaeropsis throughout the life cycle of the weevil. Acta Oecologica, 2010; 36 (3): 269-356.

Benjilali, B. et Zrira S.2005. Plantes aromatiques & médicinales. Atouts du secteur et exigences pour une valorisation durable. Actes editions. Institut agronomique et vétérinaire Hassan II Rabat Maroc.

Chevalier A.1995. Encyclopedia of medicinal plants, Dorling Kindersley Pty Limited, St Leonards, NSW.

Clevenger J.F. Apparatus for the determination of volatile oil. *J. Am. Pharm. Assoc.*, 1928, **17**(4): 346-351.

Edward P, Claus E, Varro, Lynn R.1987. Pharmacognosy, sixth edition LEA and Febiger (ed) 184-187

Hatanaka A., Kajiwara T. et Sekiya J. Biosynthesis pathway for C6-aldehydes formation from linolenic acid in green leaves. *Chem. Phys. Lipids.* 1987 ; 44 : 341–361.

Hmamouchi, M.2001. Les plantes médicinales et aromatiques marocaines. Utilisation, biologie, écologie, chimie, pharmacologie, toxicologie, lexiques. 2eme édition ; 450.

Gaamoussi, F., Israili, Z.H, Lyoussi, B. Hypoglycemic and hypolipidemic effects of an aqueous extract of Chamaerops humilis leaves in obese, hyperglycemic and hyperlipidemic Meriones shawi rats. *Pak. J. Pharm. Sci.* 2010; 23(2) 212-219.

Larousse.2001. Encyclopédie des plantes médicinales : Identification, Préparations, soins, 2nd Edn, Larousse, Paris, France, 335.

Svoboda K.P, Inglis A., Hampson J., Galambosi B. and Asakawa Y. Biomass production, essential oil yield and composition of Myrica gale L. harvested from wild populations in Scotland and Finland. Flav. Fragr. J. 1998; 13: 367 – 372.

How to cite this article:

Khoudali Saïd, Essaqui Abdelhak, M'bark Haidoune, Mohamed Benaissa., Chemical composition of the essential oil extracted from the leaves of the dwarfish palm tree of Morocco (Region of Benslimane). J App Pharm Sci. 2013; 3 (08): 113-115.