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ANALYSIS OF OIL COMPOSITION OF THE *CORIANDRUM SATIVUM* LINN FRUIT BY SOXHLATION AND MACERATION TECHNIQUE

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ABSTRACT

Coriandrum sativum Linn [Family Apiceae] is a medicinal herb used in the treatment of various disease and disorders. The present investigation was carried out to determine the change in the oil composition of the *C.sativum* fruits by two different method of extraction Viz., Soxhlation and maceration using GC-MS technique. The analysis revealed that by soxhlation method, a total of 34 compounds were obtained with major constituents as 9-E- octadecenoic acid [38.55%] and hexadecanoic acid[24.63%] whereas maceration method yielded 31 compounds with major constituents as Octadecanoic acid[25.89%] and hexadecanoic acid [20.18%]. The analysis concludes that soxhlation method is better than maceration technique. 9-E- octadecenoic acid [Oleic acid] is widely used in the Pharmaceutical industry. *Coriandrum sativum* can act as source for Oleic acid and soxhlation method can be used to extract it from the fruit.

Key words: *Coriandrum sativum*; GC-MS analysis, Oleic acid, Soxhlation, maceration.

INTRODUCTION

Coriander [*Coriandrum sativum* Linn.] an annual of the Apiaceae family is one of valuable medicinal and seasoning plant. This species comes from the Mediterranean region and it is grown all over the world. The coriander fruit and essential oil isolated from it are used for medicinal purpose. It is used to treat menstrual disorder, secondary infertility, ovaritis and cervicitis. It is used to treat female diseases such as menoxenia, ovulation type dysfunctional uterine bleeding [1]. It is aphrodisiac to enhance sexual function and reproductive capacity. It is used for treating leucorrhea; spermatorrhea.Coriander fruit possess stimulant and carminative properties [2]. Its oil is bactericidal and larvacidal [3]. It is hypoglycemic and anti-inflammatory [4]. The fruits are used as astringent, anthelmintic, emollient, stomachic, antibilious, digestive, appetizer, constipating, diuretic, antipyretic, refrigerant, tonic, expectorant, anodyne, antidiabetic and dyspepsia [5]. It is reported that coriander oil contains linalool and 20% hydrocarbons which differ from the seed oil [6]. Therefore present aim is to determine the change in the oil composition of the *C.sativum* fruits by two different method of extraction Viz., Soxhlation and maceration using GC-MS technique.

MATERIAL AND METHODS

Plant material and extraction procedure

Coriandrum sativum fruits were collected from local market in Bangalore, Karnataka, India and it was identified and authenticated by Botanist, Natural Remedies Pvt Ltd., Bangalore. The fruits were dried in shade and powdered coarsely. 350 g of powdered fruits were macerated with petroleum ether for 24 hrs and filtered and concentrated in Rota evaporator and dried. Similarly 250g of fruits were packed in the soxhlet apparatus and extracted with petroleum ether for 18 hours. The petroleum ether extract was concentrated by rotaevaporator and dried. The percentage yield was found to be 4.35 and 10.35 % w/w with respect to air dried plant material.

Gas Chromatography-mass Spectrum Analysis [GC-MS]

GC-Ms technique was used in this study to identify the components present in the extract which was carried out at Indian Institute of Science, Bangalore. GC-MS analysis was performed using GC Thermo scientific, Trace GC ultra and gas chromatograph interfaced to a Mass spectrometer DSQII equipped with Zebron ZB 5 ms

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capillary column [Length : 30 m, diameter:0.25 mm, film thickness:0.25 µm. For GC-MS detection, an electron ionization energy system with ionization energy of 70eV and Quadrapole as analyzer was used. Helium gas [99.99%] was used as the carrier gas at a constant flow rate of 1 ml/min and an injection volume of 1 µl was employed [split ratio: 10]. The oven temperature was programmed from 40◦C [isothermal for 2 min], with an increase at the rate of 10◦ C/min to 300◦ C for 5 min. Mass spectra were taken at 70eV; a scan interval of 5 min with scan range of 30-600 m/z. Toal GC running time was 60 min. The relative percentage amount of each component was calculated by comparing its average peak area to the total areas. The spectrum of unknown component was compared with spectrum of the known compound stored in the software libray [Xcaliber and AMDIS]. The name, retention time and % area of the component of the test material was ascertained with the data given in the AMDIS library.

Table 1. Chemical composition of oil obtained from Pet ether extract of *Coriandrum sativum* by soxhlation

No.	Compound	R.Time	I.Time	F.Time	Area	Area %
1	Heptanal	4.788	4.745	4.860	11712665	0.45
2	Decane	5.579	5.530	5.615	5732278	0.22
3	Linalool	6.550	6.480	6.585	112501987	4.30
4	Undecane	7.177	7.140	7.215	4363023	0.17
5	n.i	7.411	7.345	7.460	34622649	1.32
6	n.i	7.633	7.540	7.680	18243953	0.70
7	E-2-tridecenal	8.136	8.105	8.175	8766761	0.34
8	n.i	8.239	8.175	8.305	20432734	0.78
9	n.i	8.444	8.400	8.485	5982331	0.23
10	Undecanal	8.610	8.580	8.635	8056402	0.31
11	n.i	8.652	8.635	8.685	5416975	0.21
12	n.i	9.037	9.015	9.080	3602345	0.14
13	Gernyl acetate	9.285	9.230	9.315	61689107	2.36
14	Dodecanal or tetradecanal	9.559	9.520	9.595	9526616	0.36
15	Undecanoic acid	10.050	10.005	10.090	12556707	0.48
16	Limonene oxide	10.135	10.090	10.175	15343964	0.59
17	n.i	10.336	10.295	10.370	7303372	0.28
18	n.i	10.543	10.515	10.585	11080714	0.42
19	Dodecanoic acid	10.811	10.785	10.845	6413614	0.25
20	n.i	10.886	10.845	10.920	15115491	0.58
21	8-hexadecanal	10.970	10.920	11.030	95959711	3.67
22	n.i	11.255	11.185	11.290	16336133	0.63
23	9-Octadecanal	11.938	11.890	12.000	9090166	0.35
24	Tetradecanoic acid	13.008	12.805	13.125	131852354	5.04
25	2-E-2- dodecanoic acid	13.480	13.310	13.675	64127947	2.45
26	n.i	14.104	14.025	14.160	12051792	0.46
27	Pentadecanoic acid	14.257	14.190	14.330	13563128	0.52
28	Hexadecanoic acid	16.204	15.685	16.525	651488602	24.93
29	9E- Octadecanoic acid	20.235	19.415	20.400	1007490464	38.55
30	Octadecanoic acid	20.658	20.440	20.950	85973788	3.29
31	n.i	26.622	26.400	26.835	38362131	1.47
32	n.i	27.008	26.835	27.130	17476609	0.67
33	Hexadecanoic acid	34.562	34.365	34.770	47805199	1.83
34	n.i	48.752	48.590	48.990	43536284	1.67

Table 2. Chemical composition of oil obtained from Pet ether extract of *Coriandrum sativum* by Maceration

No.	Compound	R.Time	I.Time	F.Time	Area	Area%
1	Heptanal	4.802	4.775	4.870	3062003	0.83
2	n.i	5.586	5.550	5.630	5030585	1.36
3	Linalool	6.539	6.450	6.625	16468171	4.45
4	Undecane	6.694	6.625	6.780	21915792	5.92
5	Dodecanoic acid	7.397	7.335	7.450	7623650	2.06
6	n.i	7.635	7.535	7.715	3804270	1.03
7	E-2-Tridecanal	8.143	8.095	8.175	2257683	0.61
8	n.i	8.219	8.175	8.330	3695141	1.00

9	n.i	8.451	8.400	8.520	2028418	0.55
10	Undecanal	8.614	8.585	8.640	2180761	0.59
11	n.i	8.660	8.640	8.700	1535087	0.41
12	Geranyl acetate	9.284	9.235	9.320	7528916	2.03
13	Dodecanal	9.564	9.530	9.595	3253441	0.88
14	Oleic acid	10.057	10.005	10.080	1299275	0.35
15	n.i	10.142	10.090	10.200	2573394	0.70
16	n.i	10.555	10.505	10.620	2841107	0.77
17	2-E-Tridecenal	10.818	10.790	10.855	2777982	0.75
18	Tridecane	10.889	10.860	10.915	2386986	0.65
19	2-Dodecanal	10.962	10.920	11.045	38652022	10.44
20	Dodecanoic acid	11.234	11.190	11.300	1486989	0.40
21	8-Hexadecanoic acid	11.949	11.900	12.005	3077245	0.83
22	Tetradecanoic acid	12.926	12.870	13.015	13127571	3.55
23	Trans-2-Decanoic acid	13.396	13.320	13.490	5312942	1.44
24	n.i	14.111	14.080	14.145	406380	0.11
25	Pentadecanoic acid	14.230	14.150	14.310	1518201	0.41
26	Hexadecanoic acid	15.945	15.805	16.215	74669112	20.18
27	Linoleic acid	19.532	19.340	19.635	24105085	6.51
28	Octadecanoic acid	19.852	19.635	20.110	95812743	25.89
29	n.i	20.399	20.255	20.585	9312691	2.52
30	n.i	34.547	34.440	34.735	5416288	1.46
31	Pentatriacontane	48.747	48.590	48.920	4903723	1.33

Fig 1. GC-Ms of oil obtained from Pet ether extract of *Coriandrum sativum* by soxhlation

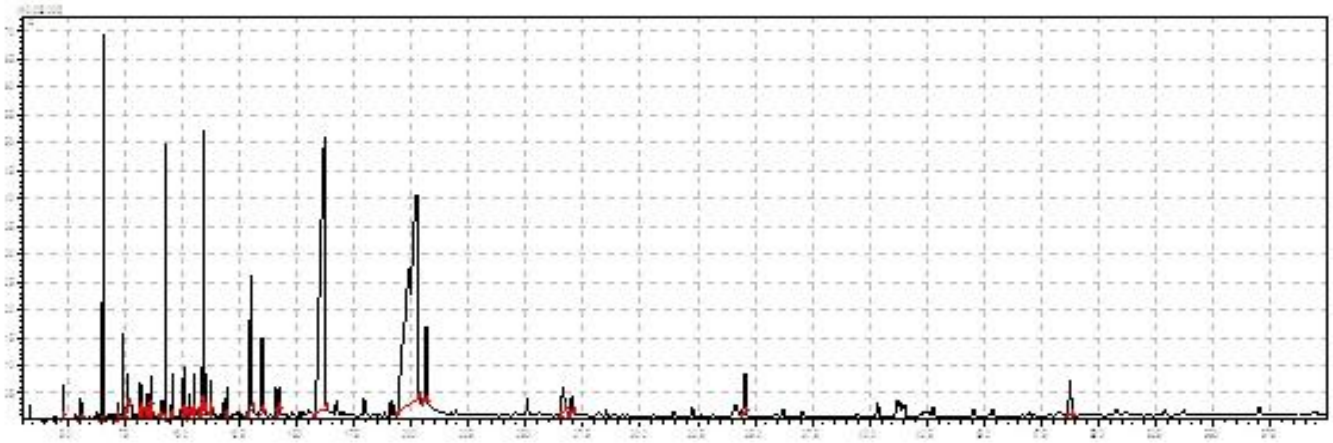
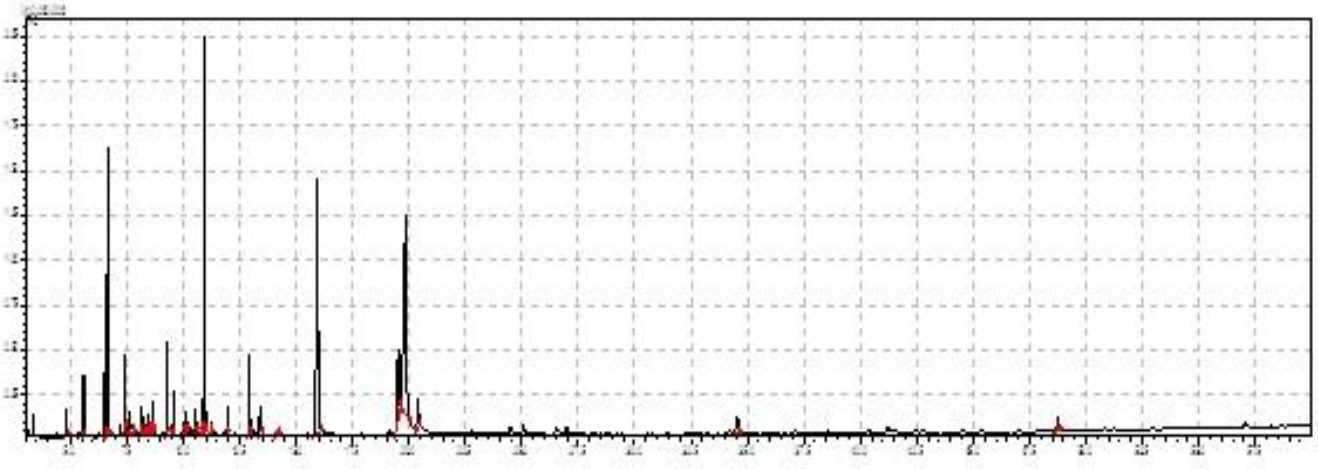


Fig 2. GC-Ms of oil obtained from Pet ether extract of *Coriandrum sativum* by maceration



RESULTS AND DISCUSSION

The Fig no 1 and 2 gives the GC-MS spectrum of oil obtained from petroleum ether extract of *Coriandrum sativum* by soxhlation and maceration respectively. It can be seen from Table No: 1 that total of 34 compounds were obtained with major constituents as 9-E- octadecenoic acid [38.55%] and hexadecanoic acid [24.63%] whereas Table No.2,maceration method yielded 31 compounds with major constituents as Octadecanoic acid[25.89%] and hexadecanoic acid [20.18%]. The other major constituents by soxhlation method were Tetradecanoic acid [5.04%], 8-Hexadecanal [3.67%], octadecanoic acid [3.29%], Linalool [4.30%], geranyl acetate [2.36%] and 2-E-2-Dodecanoic acid [2.45%]. The other major constituents by maceration method were Tetradecanoic acid[3.55%], Dodecanoic acid[2.06%],Linalool[4.45%], geranyl acetate[2.03%] , Trans-2-Decanoic acid[1.44%], 2-Dodecanal[10.44%], Linoleic acid[6.5%] and Undecane[5.92%]. The other common compounds which were obtained in both methods are 8-Hexadecanal, Octadecanic acid, Hexadecenoic acid, Linalool, geranyl acetate, Heptanal, undecane, E-3-Tridecenal, Undecenal, Dodecanal, 8-Hexadecenal, Dodecenoic acid and Pentadecanoic acid.

9-E- octadecenoic acid [Oleic acid] is widely used in the Pharmaceutical industry. *Coriandrum sativum* can act as source for Oleic acid as the percentage found was 38.55% and soxhlation method can be used to extract it from the fruit.

CONCLUSION

The result of this work suggests that the petroleum ether extract of *Coriandrum sativum* has number of components which can act as a drug for various diseases. The analysis revealed that by Soxlation method, a total of 34 compounds were obtained with major constituents as 9-E- octadecenoic acid [38.55%] and hexadecanoic acid [24.63%] whereas maceration method yielded 31 compounds with major constituents as Octadecanoic acid [25.89%] and hexadecanoic acid [20.18%]. The analysis concludes that soxhaltion method is better than maceration technique. Further in future, these components can be isolated and pharmacological activity may be studied to ascertain the traditional use and also to isolate Oleic acid for Pharmaceutical industry.

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Conflict of Interest

None to be declared

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