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LCMS ANALYSIS OF LEAF EXTRACT OF *CORIANDRUM SATIVUM* CULTIVATED IN INDIA

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ABSTRACT

Coriandrum sativum L. (family: Apiaceae) was grown in Vadodara region of Gujarat, India and its leaves were analyzed by LC-MS. The analysis led to the identification of 14 constituents. The major metabolites in leaf were Caffeic acid-hexose, Coumaric acid-hexose, Quercetin-hexosedeoxyhexose-pentose, Quercetin-Glc-rhamnose, Kaempferol-Glc-rhamnose, Naringenin chalcone-hexose, Naringenin, Naringenin chalcone, Dicaffeoylquinic acid, Quercetin-hexosedeoxyhexose-pentosep-coumaric acid, Naringenin chalcone rhamnose, Tricaffeoylquinic acid I, Tricaffeoylquinic acid II and Tricaffeoylquinic acid III.

Keywords: *Coriandrum sativum*, Apiaceae, LCMS

INTRODUCTION

Coriander (*Coriandrum sativum* L.) is an annual and herbaceous plant, belonging to the *Apiaceae* family **[1]**. Coriander is a culinary and medicinal plant native to southern Europe and western Mediterranean region, and is extensively cultivated worldwide since human antiquity **[2]**. Coriander is of economic importance since it has been used as flavouring agent in food products, perfumes and cosmetics **[3]**. As a medicinal plant, *Coriandrum sativum* L. has been credited with a long list of medicinal uses. Powdered seeds or dry extract, tea, tincture, decoction or infusion have been recommended for dyspeptic complaints, loss of appetite, convulsion, insomnia and anxiety bedsides their use as analgesic, carminative, digestive, anti-rheumatic and antispasmodic agents **[4]**. The mature fruits have a fresh and pleasant flavour and are largely used for flavouring candies, sweets, beverages, baked goods, perfumery, as an ingredient for curry powder and in the tobacco industry's **[5]**. Moreover, the essential oils and various extracts from coriander have been shown to possess antibacterial, antioxidant, antidiabetic, anticancerous and antimutagenic activities **[8]**. Numerous phytochemical studies have been conducted on the essential oil composition of leaves and seed of *Coriandrum sativum L*. from different origins which report variety of terpenoids depending upon geographic location, origin, maturity, stages of studies material **[6]**. In the present work, we investigated the metabolite composition of leaves of Coriandrum sativumfrom Vadodara region of Gujarat, India.

MATERIALS AND METHODS

Plant materials: Leaves of Coriandrum sativum were collected from Vadodara region of Gujarat, India. The plant (CS#01/2018) was identified by Dr. Vinay Raole, Taxonomist, MS University, Vadodara, India. The plant material (100 g, each) was subjected to Soxhlet extraction **[7]**.

Liquid chromatography-Mass Spectrometry (Applied BioSystem®):

The 75% methanol/water extract enabled separation by C18-reversed-phase LC **[9]** and detection by both PDA and MS of semipolar metabolites **[10]**. Software was metAlign **[11]**. Running time was 50 minutes. Flow rate was 1.0 ml/min and Volume was 5µl. Chemicals included Methanol (absolute)-HPLC preparatory grade, Formic acid (98%), Acetonitrile-HPLC preparatory grade, Ultrapure water (MilliQ), Liquid nitrogen or nitrogen gas generator for supplying gas to the mass spectrometer ionization source, Argon (99.999% pure) for supplying gas to the mass spectrometer collision cell, Leucine enkaphaline (95% pure) for online mass

correction **[12]**. Reagents and Solvents included Sample extraction solution- 0.133% (v/v) formic acid (FA) in pure methanol, HPLC mobile phase: 0.1% FA (v/v) in ultrapure water (eluent A), and eluent B is 0.1% FA (v/v) in acetonitrile (eluent B), MS calibration solution: 1 mL of a 0.05% (v/v) phosphoric acid solution in 50% acetonitrile/ultrapure water. Load into the gas-tight glass syringe, Lock mass solution like leucine enkaphaline in 50% (v/v) acetonitrile/ ultrapure water to obtain a fnal concentration of 0.1 mg/mL.The column temperature (6-24°C) was programmed at 3°C/min with final hold time of 10 min.Identification of constituents were done on the basis of retention time, Retention Index (RI, determined with reference to homologous series of n-alkanes (C9 -C24, Polyscience Corp., Niles IL) **[13]** under identical experimental condition) in both polar and non polar column, coinjection with standards (Aldrich and Fluka), mass spectra library search (NIST/EPA/NIH version 2.1 and Wiley registry of mass spectral data 7th edition) and by comparing with the mass spectral literature data **[14]**.

RESULTS AND DISCUSSION

The metabolite compositions of leaves of *Coriandrum sativum* grown in Vadodara region of Gujarat, India were analysed using LCMS. The analysis led to the identification of 14 constituents. The Metabolites identified by LC-MS in leaf extracts of *Coriandrum sativum* is represented in **Table 1, Figure 1**. Themetabolites identified in leaves were given in **Table 1** in order of their elution on DB-5 (30 m x 0.32 mm) column **[15]**. The odor and flavor of leaves of coriander are completely different. Aliphatic compounds are mainly comprised of C8-C16 aldehydes and alcohol predominate in the steam-volatile oil extracted from leaves of *Coriandrum sativum* and are responsible for its peculiar, fetid-like aroma. While the major metabolites in the leaves of coriander include Tricaffeoylquinic acid as major constituents. Three compounds were identified in leaf of *Coriandrum sativum*. The leaf from Coriandrum sativum was dominated by aliphatic compounds; while hexoses were the major class of compounds in leaves of *Coriandrum sativum*. Caffeic acid-hexose, Coumaric acid-hexose, Quercetin-hexosedeoxyhexose-pentose, Quercetin-Glc-rhamnose, Kaempferol-Glc-rhamnose, Naringenin chalcone-hexose presented as major constitutes. Aliphatic compounds like Naringenin, Naringenin chalcone, Dicaffeoylquinic acid, Quercetin-hexosedeoxyhexose-pentosep-coumaric acid were recorded too.

Table 1: Metabolites identified by LC-MS in leaf extracts of *Coriandrum sativum*

Metabolites identified by LC-MS in leaf extracts of *Coriandrum sativum*					
Ret time (min)	*Av m/z*	*Mol form*	*Theo. mass*	*Mean Δ(ppm)*	*Metabolites*
12.72	341.0883	$C_{15}H_{18}O_9$	341.0878	1.49	Caffeic acid-hexose
13.63	325.0929	$C_{15}H_{18}O_8$	325.0929	0.05	Coumaric acid-hexose
18.06	741.1870	$C_{32}H_{38}O_{20}$	741.1884	2.75	Quercetin-hexosedeoxyhexose-pentose
19.88	609.1451	$C_{27}H_{30}O_{16}$	609.1461	2.64	Quercetin-Glc-rhamnose
21.36	593.1505	$C_{27}H_{30}O_{15}$	593.1512	-1.08	Kaempferol-Glc-rhamnose
23.36	433.1135	$C_{21}H_{22}O_{10}$	433.1140	-121	Naringenin chalcone-hexose
24.70	271.0617	$C_{15}H_{12}O_5$	271.0612	1.84	Naringenin
26.16	271.0615	$C_{15}H_{12}O_5$	271.0612	1.15	Naringenin chalcone
29.59	515.1193	$C_{25}H_{24}O_{12}$	515.1195	0.53	Dicaffeoylquiniq acid
32.59	887.2246	$C_{41}H_{44}O_{22}$	887.2251	0.57	Quercetin-hexosedeoxyhexose-pentosep-coumaric acid
33.75	433.1137	$C_{21}H_{22}O_{10}$	433.1140	-0.81	Naringenin chalcone rhamnose
38.28	677.1503	$C_{34}H_{30}O_{15}$	677.1512	-1.28	Tricaffeoylquinic acid I
41.80	677.1493	$C_{34}H_{30}O_{15}$	677.1512	-2.56	Tricaffeoylquinic acid II
43.26	677.1569	$C_{34}H_{30}O_{15}$	677.1512	-2.88	Tricaffeoylquinic acid III

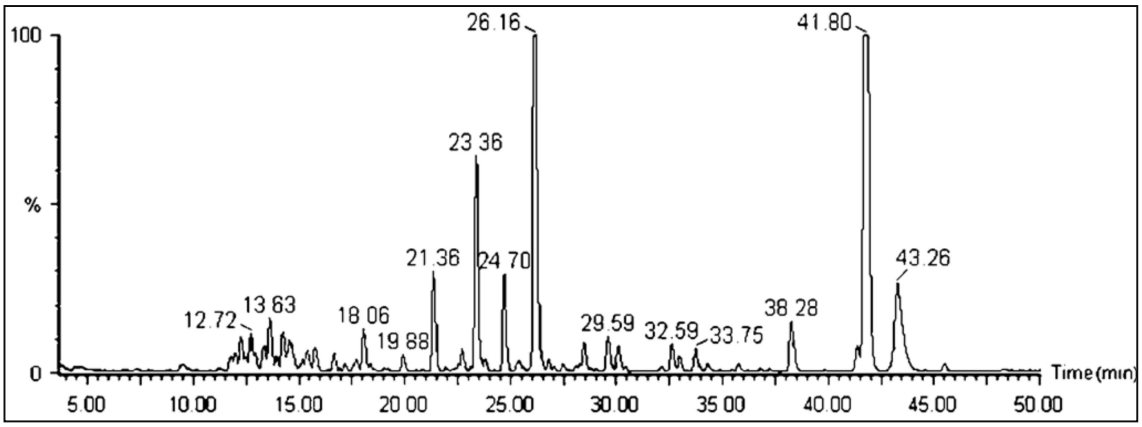

Figure 1: Graphical view of run time of *Coriandrum sativum* metabolites identified through LCMS system

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