

Head-Space Solid Phase Micro-extraction Followed by GC/MS Analysis of the Volatile Components in Seeds of *Cinnamomum camphora*

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Abstract: The volatile components in seeds of *Cinnamomum camphora* were analyzed by Solid Phase Micro-extraction (SPME) combined with GC/MS. Twenty four main kinds of volatile compounds, among which the Sesquiterpene (29%), 3-Hexen-2-one (25%) and Monoterpene (10.22%), were separated and analyzed.

Key words: *Cinnamomum camphora*, volatile component, SPME/GC/MS

INTRODUCTION

The *Cinnamomum camphora*, distributed in many countries, is the main source of fragrant substances and the cinnamon from it has been used with long history^[1-3]. In order to develop new products from this species, the volatile components of *Cinnamomum camphora* in seed were separated and analyzed by the solid phase micro-extraction and GC/MS methods^[4,5].

MATERIALS AND METHODS

***Cinnamomum camphora* seeds:** The seeds were collected in autumn from the *Cinnamomum camphora* trees in the campus of Southern Yangtze University (Wuxi, China). When the fruit peel and seed shells were taken away by hand, the seeds were cracked into pieces and put into a 15 mL headspace vial. The headspace vial was immediately sealed with a silicone septum.

Apparatus and equipment: SPME injector 75 μ m Carboxen/PDMS fiber (Supelco), Finnigan Trace MS GC/MS.

SPME and GC/MS conditions

The solid phase micro-extraction (SPME): The 75 μ m Carboxen/PDMS fiber was used to extract the volatile components at 60°C for 30min.

Gas chromatograph: OV-1701 capillary column, (30 m \cdot 0.25 mm \cdot 0.25 μ m); Carrier gas Helium, a splitless mode, flow-rate 0.8 mL min⁻¹; The column temperature program was as follows: Initial temperature 35°C for 2 min, increased to 230°C at 5°C min⁻¹, 230°C was maintained for 8min. Transferline temperature, 250°C.

Mass spectroscopy: Ionic source temperature: 200°C ionization mode: EI; Electronic energy: 70eV; Ejection current: 200 μ A; Scanning quality scope: 33~450amu.

RESULTS AND DISCUSSION

Main components in the seeds of *Cinnamomum camphora*: Sesquiterpene (29%): Naphthalene (16.68%), Azulene (6.22%), Caryophyllene (4.45%); 3-Hexen-2-one (25%); Monoterpene (10.22%): Myrcene (1.40%), D-Limonene (1.41%).

Volatile components in the seed of *Cinnamomum camphora*

RT	Area	Area %	Name	Formula
2.86	8777328.76	1.51		
4.89	19956997.23	3.44		
5.36	14146354.13	2.44	Furan 2,4-dimethyl	C ₆ H ₈ O
6.32	22308430.26	3.84	Methyl Isobutyl ketone	C ₆ H ₁₂ O
8.58	9435390.20	1.63	Undecane	C ₁₁ H ₂₄
9.72	145044303.49	25.00	3-Hexen-2-one	C ₆ H ₁₀ O
10.10	12794062.21	2.20	Bicyclo [3.1.0] hexane, 4-methyl-1-[1-methyl]-, didehydro derive.	C ₁₀ H ₁₆
10.17	8139508.35	1.40	Myrcene	C ₁₀ H ₁₆
11.08	8192899.25	1.41	D-Limonene	C ₁₀ H ₁₆
11.27	15241036.27	2.63	2-Pentanol, 4-methyl-	C ₆ H ₁₄ O
13.37	30214842.48	5.21	Benzene, 1-methyl-4-[1-methyl, ethyl]-	C ₁₀ H ₁₄
21.93	6740412.56	1.16	Cyclohexane, 1-ethenyl-1-methyl-2,4-bis [1-methylethenyl]-	C ₁₅ H ₂₄
22.08	12372403.17	2.13	Caryophyllene	C ₁₅ H ₂₄
22.33	9824362.01	1.69	1H-Cycloprop[e]azulene, decahydro-1.1.7-trimethyl-4-methylene-, [14.a]	C ₁₅ H ₂₄
23.12	6808230.98	1.17	1H-Cycloprop[e]azulene,	C ₁₅ H ₂₄
23.81	13456608.59	2.32	Caryophyllene	C ₁₅ H ₂₄
23.98	8491667.25	1.46	2-Isopropenyl-4a,8-dimethyl-1,2,3,4,4a,5,6,7- octahydronaphthalene	C ₁₅ H ₂₄
24.46	19481943.50	3.36	1H-Cycloprop[e] azulene, 1a,2,3,5,6,7,7a,7b-octahydro-1,1,4,7-tetramethyl-	C ₁₅ H ₂₄
24.99	35395858.26	6.10	Naphthalene, decahydro-4a-methyl-1-methylene-7-[1-methylethenyl]-	C ₁₅ H ₂₄
25.10	26987669.04	4.65	Naphthalene, 1,2,3,4,4a,5,6,8a-octahydro-4a,8-dimethyl-2-[1-methylethenyl]-	C ₁₅ H ₂₄
25.34	2842017.18	0.49		C ₁₅ H ₂₄
25.86	9317990.05	1.61	Naphthalene, 1,2,4a,5,8,8a-hexahydro-4,7-dimethyl-1-[1-methylethyl]-	C ₁₅ H ₂₄
26.33	6339489.02	1.09	Naphthalene, 1,2,3,4,4a,5,6,8a-octahydro-4a,8-dimethyl-2-[1-methylethylidene]-	C ₁₅ H ₂₄
27.50	10293847.05	1.77	Naphthalene, 1,2,3,4-tetrahydro-1.6-dimethyl-4-[1-methylethyl]-	C ₁₅ H ₂₂

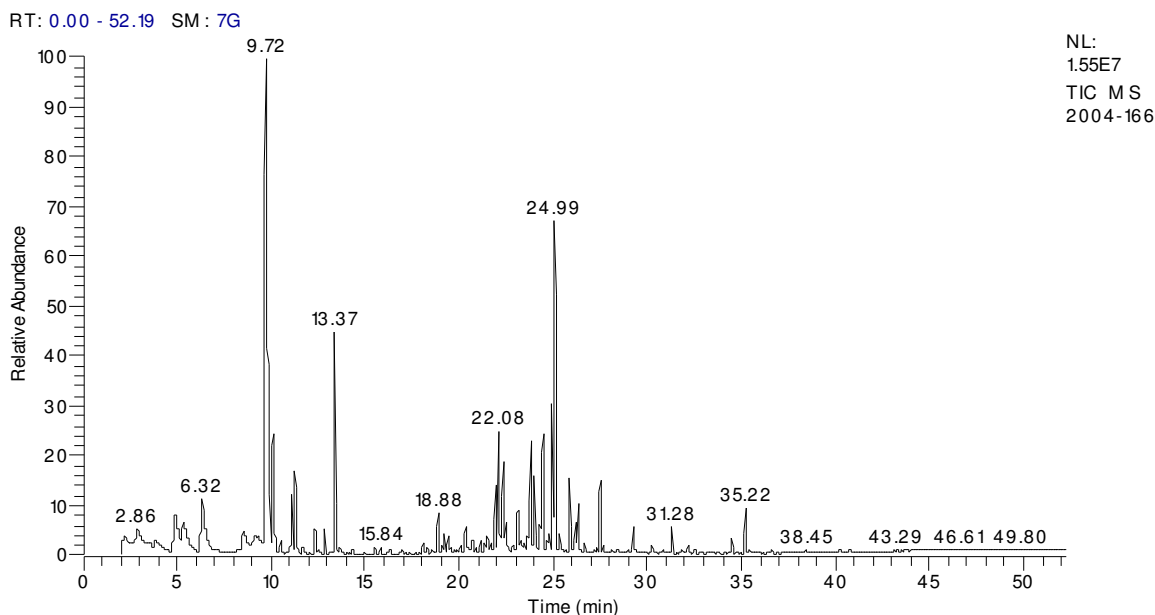


Fig. 1: Qualitative peaks

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