

## 大齿山芹根的精油成分\*

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**Chemical constituents of the essential oil from the root of *Ostericum grosseserratum* (Maxim.) Kitag.**  
Xue Yi-Chen, Xian Qi-Ming, Zhang Han-Qing (Institute of Botany, Jiangsu Province and Chinese Academy of Sciences, Nanjing 210014), *J. Plant Resour. & Environ.* 1995, 4(1): 61~63  
The essential oil from the root of *Ostericum grosseserratum* (Maxim.) Kitag., a traditional Chinese medicine in China, was first isolated by GC method. 96 components have been identified by GC/MS. The main constituents are octanal,  $\beta$ -pinene, 4-methyl-1-(1-methylethyl)-bicyclo [3, 1, 0] hexan-3-ol, octahydro-1,9,9-trimethyl-4-methylene-1H-7-methanoazulene, p-cymene,  $\alpha$ -pinene, heptanal, 3,7-dimethyl-1-octene, 2-decenal etc. The chemical data will provide basic information for the study of phytotaxonomy and economic utilization.

**关键词** 伞形科; 大齿山芹; 精油

**Key words** Umbelliferae; *Ostericum grosseserratum* (Maxim.) Kitag.; essential oil

大齿山芹(*Ostericum grosseserratum* (Maxim.) Kitag.)系伞形科山芹属多年生草本。根细长,单一或稍有分枝。产辽宁、吉林、河北、山西、陕西、河南、江苏、安徽、浙江、福建等省。朝鲜、日本、苏联远东地区也有分布。生长于山坡、草地、溪沟旁、林缘灌丛中。大齿山芹的果实、根、茎、叶均含芳香油,有浓郁香气,可研究使用于调合香精<sup>[1]</sup>。关于其精油成分尚未见报道。

本文应用气相色谱-质谱联用仪进行了大齿山芹根的精油成分分析。

### 1. 实验部分

大齿山芹根的样品系1989年5月从宜兴市太华乡采集,袁昌齐鉴定。根切碎后,以水蒸汽蒸馏制取精油,油样淡黄色,不进行任何处理,直接进样分析。

仪器: JEOL-JGC-20K 与 JEOL-D300型 GC/MS 联用仪,数据处理使用 JMA-2000系统。分流柱: SE-30石英毛细管柱(50 m $\times$ 0.23 mm),载气为 He,柱前压1.8 atm,柱流量1 ml/min,分流比1:10。入口温度240 $^{\circ}$ C,纸速20 cm/hr,采用程序升温操作,柱温最初为40 $^{\circ}$ C,保持5 min,然后以2 $^{\circ}$ C/min升至145 $^{\circ}$ C,再以1 $^{\circ}$ C/min升至210 $^{\circ}$ C。

GC/MS 接口温度210 $^{\circ}$ C,用 EI 源,电子能量70 eV,加速电压3 kV,离子源温度220 $^{\circ}$ C,扫描范围(m/z) 35~350。

所得各分离组分的质谱信息,根据其质谱裂解规律<sup>[2]</sup>并参考文献<sup>[3]</sup>和标准质谱图<sup>[4,5]</sup>,确定相应的化学成分。按峰面积归一法计算各组分的相对含量。

### 2. 结果与讨论

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实验结果表明,大齿山芹根精油是一种复杂的多组分的混合物,当选用SE-30石英毛细管柱,在上述最佳色谱条件下,可获得满意的分离,得137个色谱峰。质谱鉴定出其中96个化学成分,与总离子流程图的峰号对应列表1。

表1 大齿山芹根精油的化学成分

Tab 1 Chemical constituents of essential oil from the root of *Ostericum grosseserratum* (Maxim.) Kitag.

峰号 Peak No.	化合物 Compound	分子式 Formula	相对含量 Content %	峰号 Peak No.	化合物 Compound	分子式 Formula	相对含量 Content %
4	hexane	C <sub>6</sub> H <sub>14</sub>	0.17	46	2-nonenal	C <sub>9</sub> H <sub>16</sub> O	1.59
5	heptane	C <sub>7</sub> H <sub>16</sub>	0.69	47	2-cyclohexene, 1,3-dimethyl	C <sub>8</sub> H <sub>14</sub>	0.17
6	hexanal	C <sub>8</sub> H <sub>16</sub> O	1.68	48	2-cyclohexene-1-one, 4,4,5-trimethyl	C <sub>9</sub> H <sub>14</sub> O	0.44
7	1-hexene	C <sub>6</sub> H <sub>12</sub>	0.08	49	3-cyclohexene-1-methanol, 4-trimethyl	C <sub>10</sub> H <sub>18</sub> O	0.07
8	heptanal	C <sub>7</sub> H <sub>14</sub> O	3.17	50	1-nonen-3-ol	C <sub>9</sub> H <sub>18</sub> O	0.17
9	bicyclo[3,1,0]hexane, 4-methyl-1-(1-methylethyl)-didehydro	C <sub>10</sub> H <sub>16</sub>	0.12	51	bicyclo[3,1,1]hept-2-ene-2- carboxaldehyde, 6,6-dimethyl	C <sub>10</sub> H <sub>14</sub> O	0.08
10	α-pinene	C <sub>10</sub> H <sub>16</sub>	3.39	52	α-terpineol	C <sub>10</sub> H <sub>18</sub> O	0.41
12	camphene	C <sub>10</sub> H <sub>16</sub>	0.33	53	bicyclo[3,1,1]hept-2-ene 2-methanol, 6,6-dimethyl	C <sub>10</sub> H <sub>16</sub> O	0.30
13	cyclopentane, 1,3-dimethyl	C <sub>7</sub> H <sub>14</sub>	0.33	54	1-octene	C <sub>8</sub> H <sub>16</sub>	0.23
14	β-pinene	C <sub>10</sub> H <sub>16</sub>	5.62	55	cyclohexanone, 2-methyl-5- (1-methylethenyl)	C <sub>10</sub> H <sub>16</sub> O	0.28
15	Furan, 2-pentyl	C <sub>9</sub> H <sub>14</sub> O	0.41	56	spiro[2,4]heptane, 1,5- dimethyl-6-methylene	C <sub>10</sub> H <sub>16</sub>	0.44
16	octanal	C <sub>8</sub> H <sub>16</sub> O	5.93	57	m-cresol, 2-tert-butyl	C <sub>11</sub> H <sub>16</sub> O	2.33
17	cyclohexene, 1-methylene- 4-(1-methylethenyl)	C <sub>10</sub> H <sub>16</sub>	0.36	58	benzene, 1-ethyl-3-(1-methylethyl)	C <sub>11</sub> H <sub>16</sub>	2.45
19	Δ <sup>3</sup> -carene	C <sub>10</sub> H <sub>16</sub>	0.08	59	octanoic acid	C <sub>8</sub> H <sub>16</sub> O <sub>2</sub>	0.12
20	p-cymene	C <sub>10</sub> H <sub>14</sub>	3.50	60	2-decenal	C <sub>10</sub> H <sub>18</sub> O	2.69
21	β-phellandrene	C <sub>10</sub> H <sub>16</sub>	2.09	61	2-cyclohexen-1-one, 6-methyl-3-(1-methylethyl)	C <sub>10</sub> H <sub>16</sub> O	1.47
22	tricyclo[2,2,1]heptane, 1,7,7-trimethyl	C <sub>10</sub> H <sub>16</sub>	0.28	63	spiro[5,5]undec-1-ene	C <sub>11</sub> H <sub>18</sub>	0.25
23	cyclopentane, 1-ethyl-2-methyl	C <sub>8</sub> H <sub>16</sub>	0.33	64	bicyclo[3,1,0]hexan-3-ol, 4-methyl-1-(1-methylethyl)	C <sub>10</sub> H <sub>18</sub> O	4.55
24	γ-terpinene	C <sub>10</sub> H <sub>16</sub>	0.61	65	1-oxaspiro[2,5]oct-5-ene, 8,8-dimethyl-4-methylene	C <sub>10</sub> H <sub>14</sub> O	0.30
25	cyclopropane, pentyl	C <sub>8</sub> H <sub>16</sub>	0.55	66	bicyclo[3,1,0]hexan-3-one, 4-methyl-1-(1-methylethyl)	C <sub>10</sub> H <sub>16</sub> O	0.68
27	benzene, ethenyl-, dimethyl	C <sub>10</sub> H <sub>12</sub>	0.06	67	dodecane, 2-methyl	C <sub>13</sub> H <sub>28</sub>	0.77
28	2-nonanone	C <sub>9</sub> H <sub>18</sub> O	1.93	68	bicyclo[3,1,0]hexan-3-ol, 4-methylene-1-(1-methylethyl)	C <sub>10</sub> H <sub>18</sub> O	0.22
29	nonanal	C <sub>9</sub> H <sub>18</sub> O	2.23	69	1-dodecene	C <sub>12</sub> H <sub>24</sub>	1.32
30	linalool	C <sub>10</sub> H <sub>18</sub> O	0.12	70	1H-cyclopenta[1,3]cyclopropa[1,2]benzene, hexahydro-3,7-dimethyl-4-(1-methylethyl)	C <sub>15</sub> H <sub>24</sub>	0.55
31	undecane	C <sub>11</sub> H <sub>24</sub>	2.48	72	1-undecyne	C <sub>11</sub> H <sub>20</sub>	0.74
32	4,6-decadiene	C <sub>10</sub> H <sub>18</sub>	0.69	73	tricyclodec-3-ene, 1,3-dimethyl-8-(1-methylethyl)	C <sub>15</sub> H <sub>24</sub>	0.87
33	eucarvone	C <sub>10</sub> H <sub>14</sub> O	0.28	76	elemene	C <sub>15</sub> H <sub>24</sub>	1.13
35	1,4-undecadiene	C <sub>11</sub> H <sub>20</sub>	0.06	77	β-elemene	C <sub>15</sub> H <sub>24</sub>	0.29
37	pentalene, octahydro-2,5-dimethyl	C <sub>10</sub> H <sub>18</sub>	0.10	78	benzene, 1,4-dimethoxy- 2,3,5,6-tetramethyl	C <sub>12</sub> H <sub>18</sub> O <sub>2</sub>	0.61
38	p-menth-3-ene-1,2-diol	C <sub>10</sub> H <sub>18</sub> O <sub>2</sub>	0.07	79	cyclohexene, 1-methyl-4- (5-methyl-1-methylene-4-hexenyl)	C <sub>15</sub> H <sub>24</sub>	0.51
40	1-octene, 3,7-dimethyl	C <sub>10</sub> H <sub>20</sub>	2.95	80	1H-7-methanoazulene, octahydro- 1,9,9-trimethyl-4-methylene	C <sub>15</sub> H <sub>24</sub>	3.89
42	isomer of 35	C <sub>11</sub> H <sub>20</sub>	0.04	82	cyclohexene, 6-ethenyl-6-methyl-1-(1- methylethyl)-3-(1-methylethylidene)	C <sub>15</sub> H <sub>24</sub>	0.26
44	cyclohexene, 3-(2-methylpropyl)	C <sub>10</sub> H <sub>18</sub>	0.06	83	naphthalene, octahydro-7-methyl-4- methylene-1-(1-methylethyl)	C <sub>15</sub> H <sub>24</sub>	1.67
45	isomer of 38	C <sub>10</sub> H <sub>18</sub> O <sub>2</sub>	0.04	84	2-hexene, 1-methoxy-3-methyl	C <sub>8</sub> H <sub>16</sub> O	0.77

续表1 Tab 1 (Continued)

峰号 Peak No.	化合物 Compound	分子式 Formula	相对含量 Content %	峰号 Peak No.	化合物 Compound	分子式 Formula	相对含量 Content %
85	$\alpha$ -bisabolene	C <sub>15</sub> H <sub>24</sub>	0.72	102	ethanol, 2-[4-(1,1-dimethyl ethyl)]-2-methylphenoxy]	C <sub>13</sub> H <sub>20</sub> O <sub>2</sub>	0.12
86	$\beta$ -farnesene	C <sub>15</sub> H <sub>24</sub>	1.63	103	15-copaenol	C <sub>15</sub> H <sub>24</sub> O	0.15
87	naphthalene, decahydro-4-methyl-1-methylene-7-(1-methyl ethenyl)	C <sub>15</sub> H <sub>24</sub>	1.79	112	2(1H)-naphthalenone, 4,5,6,7,8,8-hexahydro-7-isopropyl-4,8-dimethyl	C <sub>15</sub> H <sub>24</sub> O	1.17
89	spiro[4,5]dec-7-ene, 1,8-dimethyl-4-(1-methylethenyl)	C <sub>15</sub> H <sub>24</sub>	0.36	115	cyclopropanaphthalene, 1,1,4,4,5,6,7,8-octahydro-2,4,8,8-tetramethyl	C <sub>15</sub> H <sub>24</sub>	0.80
90	isomer of 73	C <sub>15</sub> H <sub>24</sub>	1.97	116	isomer of 112	C <sub>15</sub> H <sub>24</sub> O	0.29
91	tricycloundecane, 6,10,10-trimethyl-2-methylene	C <sub>15</sub> H <sub>24</sub>	1.89	117	isomer of 112	C <sub>15</sub> H <sub>24</sub> O	0.44
92	cubebene	C <sub>15</sub> H <sub>26</sub>	0.12	121	2,6,10-dodecatrien-1-ol, 3,7,11-trimethyl	C <sub>15</sub> H <sub>26</sub> O	0.90
93	$\alpha$ -bisabolene	C <sub>15</sub> H <sub>24</sub>	1.27	122	isomer of 112	C <sub>15</sub> H <sub>24</sub> O	0.35
94	copaene	C <sub>15</sub> H <sub>22</sub>	1.20	126	isomer of 121	C <sub>15</sub> H <sub>26</sub> O	2.67
95	$\beta$ -farnesene	C <sub>15</sub> H <sub>24</sub>	0.48	127	1 $\alpha$ -hydroxyaristolene-9	C <sub>15</sub> H <sub>24</sub> O	0.37
96	1H-cyclopenta[1,3]cyclopropano[1,2]benzene, octahydro-7-methyl-3-methylene-4-isopropyl	C <sub>15</sub> H <sub>24</sub>	0.48	128	anastreptene	C <sub>15</sub> H <sub>26</sub> O	1.25
97	naphthalene, 1,2,3,4-tetrahydro-1,6-dimethyl-4-(1-methylethyl)	C <sub>15</sub> H <sub>22</sub>	0.69	129	isomer of 128	C <sub>15</sub> H <sub>26</sub> O	1.70
98	naphthalene, 1,2,3,5,6,8-hexahydro-4,7-dimethyl-1-(1-methylethyl)	C <sub>15</sub> H <sub>24</sub>	2.63	130	butyric acid, 3-(2,5-dimethyl benzoyl)	C <sub>13</sub> H <sub>16</sub> O <sub>3</sub>	0.47
101	1-phenyl-bicycol[3,3,1]nonane	C <sub>15</sub> H <sub>20</sub>	0.46	136	alismol	C <sub>13</sub> H <sub>16</sub> O <sub>3</sub>	0.22

由表1可见,精油的主要化学成分是辛醛、 $\beta$ -蒎烯、4-甲基-1-(1-甲基)-二环[3,1,0]己-3-醇、八氢-1,9,9-三甲基-4-亚甲基-1H-7-亚甲奥、p-伞花烃、 $\alpha$ -蒎烯、正庚醛、3,7-二甲基-1-辛烯和2-癸醛等。该精油成分复杂,有开发前景。

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### 土壤资源与稳定农业国际会议

由马来西亚土壤学会主办, 东亚和东南亚土壤学会联盟协办的“土壤资源与稳定农业国际会议”(International Conference on Soil Resources and Sustainable Agriculture)将于1995年9月12~15日在马来西亚吉隆坡举行。内容包括酸性土的改良, 坡地的保护, 生活周期分析, 低投入技术, 稳定农业的机械化问题, 养分再循环与平衡, 土壤/陆地退化的评

价, 土壤生物群, 土壤-作物的稳定性, 土壤物理化学特性的保持, 有机物质及肥料的施用等。1995年2月28日前提交论文摘要, 6月1日提交全文, 注册费240美元, 通讯地址: The Secretary, Soil Resources and Sustainable Agriculture, Department of Soil Science, Universiti Pertanian Malaysia, 43400 UPM Serdang, Selangor D. E.