CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *Senecio scandens* FLOWERS

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The genus *Senecio* (Compositae) is composed of about 1000 species widely distributed in the world except in Antarctica. In China, there are 63 species grown mainly in southwestern area [1]. A great deal of interest in phytochemical studies on plants of the *Senecio* genus has yielded various types of compounds such as pyrrolizidine alkaloids, sesquiterpenoids, diterpenoids, and flavonoids, with hepatotoxic, carcinogenic, insecticidal, antimicrobial, antitumor, antivirus, antiulcer, and immunosupressing activities [2–6]. Pyrrolizidine alkaloids and sesquiterpenoids have been proved to be the potent constituents of *Senecio* species and are known to be hepatic toxins and carcinogens [7].

S. scandens was used in traditional Chinese medicine to treat ophthalmic diseases, inflammation, and leptospirosis [8]. Its extracts and compounds were reported to possess significant antimicrobial and antiinflammatory activities [2, 9–10], but there are no references about the oil content and chemical composition of its fresh flower. We report here the results of our studies on the composition of oil from the fresh flowers of *S. scandens.*

TABLE 1. Composition of the Essential Oil from the Fresh Flowers of *Caragana sinica*

Compound	%	Compound	%	Compound	%
3-Methyl-1-butanol	0.37	Bicycle[2,2,1]heptane	0.29	(+)-Spathulenol	0.16
Hexanal	0.25	Thymol	0.21	Hexadecane	1.75
(*E*)-3-Hexen-1-ol	0.18	*p*-Cymen-2-ol	0.44	Oplopenone	0.41
1-Hexanol	1.75	2-Acetylcyclopentanone	1.63	α-Cadinol	2.00
α-Pinene	1.98	α-Copaene	1.30	δ-Cadinol	0.27
Camphene	1.97	β-Cubebene	0.95	*t*-Muurolol	0.14
Benzaldehyde	15.13	Methylnaphthalene	0.18	Heptadecane	0.31
β-Pinene	32.89	β-Caryophyllene	10.07	Hexadecanal	0.32
Myrcene	1.56	α-Caryophyllene	3.27	12-Hydroxy-2,6,10-trimethyl-2,6,10-d	0.32
1-Phellandrene	2.92	β-Farnesene	0.67	odecatrien-4-one	
1-Methyl-4-isopropyl benzene	0.23	*D*-Germacrene	0.62	Octadecane	0.34
1-Limonene	0.15	Zingiberene	0.93	Nonadecane	0.17
cis-Ocimene	0.48	α-Muurolene	3.65	Dibutyl phthalate	0.21
β-Ocimene	0.26	α-Farnesene	0.16	Ethyl cetylate	0.17
α-Terpinolene	0.22	γ-Cadinene	0.36	Eicosane	0.16
L-Linalool	0.15	δ-Cadinene	0.48	Heneicosane	0.20
p-Cymen-8-ol	0.34	γ-Elemene	0.16	Monoterpenes	42.75
α-Terpineol	0.17	Nerolidol	0.15	Sesquiterpenoids	30.79
Decanal	0.68	1,6-Germacradien-5-ol	4.72	Aromatics	16.99
Thymyl methyl ether	0.25			Aliphatics	8.57

%: calculated from TIC data.

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The fresh flowers were collected in Kunming, Yunnan of China and identified by Dr. Hong Yu, Biological Department of Yunnan University, Kunming, Yunnan of China. A voucher specimen is kept in the Herbarium of the Department of Chemistry, Yunnan Normal University, Kunming, China.

The fresh flowers were crumbled and hydrodistilled for 5 hours using a Clevenger apparatus. The oil was subsequently dried over anhydrous sodium sulfate and stored at 4°C until analysis.

The essential oil was subjected to gas chromatographic/mass spectral analysis using an Agilent 6890 GC with Agilent 5973 mass selective detector.

The fresh flowers of *S. scandens* yielded 0.79% of a yellowish oil. Fifty-four components were detected in the oil, representing 99.10% of the total oil. The identified components and their percentages are given in Table 1, where the components are listed in the order of their elution on the column. As can be seen, the major components of the oil are β-pinene (32.89%), benzaldehyde (15.13%), β-caryophyllene (10.07%), 1,6-germacradien-5-ol (4.72%), α-muurolene (3.65%), and α-caryophyllene (3.27%). The terpenes were the dominant group in the oil (monoterpenes, 42.75%; sesquiterpenoids, 30.79%), whereas aromatics (16.99%) and aliphatics (8.57%) accounted for 25.56%.

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