

CHEMICAL COMPOSITION OF *Senecio belgaumensis* FROM INDIA

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Senecio belgaumensis (Wight) Cl. (Compositae) is an annual, erect, branched herb, distributed in the Western Peninsula of India; it is apparently endemic [1] and found frequently on hill slopes [2]. The essential oil compositions of some other species of the genus *Senecio* have been reported. Allo-aromadendrene, α -pinene, long-chain aldehydes, phytols and indene derivatives from the oil of *Senecio ambavilla* [3], germacrene D, δ -cadinene, γ -cadinene, germacrene-D-4-ol, α -cadinol, and β -longipinene from the leaf oil, and germacrene D, germacrene A, δ -elemene, α -cubebene, and β -eudesmol as the major constituents from the root oil of *Senecio rufinervis* [4] have been reported. Volatile components of this plant species have not been reported, and this is the first report. The oil was analyzed by gas chromatography (GC) and gas chromatography/mass spectroscopy (GC-MS).

Thirty-four volatile components were identified in the oil of *Senecio belgaumensis*, representing 90.3% of the total oil (Table 1). Long-chain saturated alcohols, as the major class of compounds constituted 34.2%, followed by sesquiterpene hydrocarbons (25.4%), monoterpene hydrocarbons (23.4%), oxygenated sesquiterpenes (6.2%), oxygenated monoterpenes (0.9%), and long-chain saturated aldehyde (0.2%). The major components of the oil were undecanol-1 (34.2%), β -caryophyllene (16.8%), *p*-cymene (11.0%), α -humulene (4.1%), and *cis*-ocimene (3.7%).

Plant Material and Isolation Procedure. The aerial parts of *Senecio belgaumensis* were collected in June 2009 from the campus of the Regional Medical Research Centre (RMRC), Belgaum, Karnataka, India. A voucher specimen (RMRC-417) has been deposited in the herbarium of RMRC, Belgaum. The oil was obtained by hydrodistillation of fresh aerial parts of the species using a cleverger-type apparatus for 4 h. The yield of oil was 0.01% (w/w), and the color of the oil was pale yellow. The oil was dissolved in *n*-hexane, dried over anhydrous sodium sulfate, and stored at 4°C.

Identification of the Oil Components. The oil was analyzed using a Varian 450 chromatograph with a CP-Sil 8 CB capillary column (30 m $\times$ 0.25 mm; 0.25 μ m film thicknesses) with an FID and a Thermo Scientific Trace Ultra GC interfaced with a Thermo Scientific ITQ 1100 mass spectrometer fitted with a TG-5 MS (Thermo Scientific) fused silica capillary column (30 m $\times$ 0.25 mm; 0.25 μ m film coating). The column temperature 60–220°C was programmed at 3°C/min using helium as carrier gas at 1.0 mL/min. The injector temperature was 230°C; injection size 0.1 μ L; prepared in hexane; split ratio 1:50. Mass spectra were taken at 70 eV with mass range 40–450 *m/z*, and characterization was done on the basis of the retention index, by the MS Library Search (NIST and Wiley), and by comparing with the mass spectral data [5].

TABLE 1. Composition of Extract from Aerial Part of *Senecio belgaumensis* (Wight) Cl., %

Compound	RI	%	Compound	RI	%
α -Pinene	943	2.5	β -Caryophyllene	1444	16.8
Camphene	957	0.1	α -Humulene	1456	4.1
Sabinene	979	3.6	(<i>E</i>)- β -Farnesene	1461	0.1
β -Pinene	985	1.4	γ -Gurjunene	1476	0.1
Myrcene	994	0.4	Germacrene D	1483	1.6
<i>p</i> -Cymene	1030	11.0	(<i>E</i>)- β -Ionone	1488	0.7
Limonene	1033	0.6	<i>epi</i> -Cubebol	1496	1.0
<i>cis</i> -Ocimene	1045	3.7	α -Muurolene	1501	0.9
γ -Terpinene	1065	0.1	Acor-4-ene, 6,11-oxide	1533	0.1
Undecanol-1	1089	34.2	<i>cis</i> -Muurol-5-en-4- β -ol	1547	0.8
<i>cis</i> -Thujone	1107	0.3	Caryophyllene oxide	1583	2.4
Terpin-4-ol	1181	0.2	Cedrol	1599	1.1
α -Terpineol	1193	0.1	<i>epi</i> - α -Cadinol	1642	0.1
<i>n</i> -Decanal	1209	0.2	Total		90.3
Thymol methyl ether	1239	0.3	Long-chain saturated alcohol		34.2
δ -Elemene	1343	0.7	Long-chain saturated aldehyde		0.2
α -Copaene	1380	0.1	Monoterpene hydrocarbons		23.4
β -Maaliene	1383	0.1	Oxygenated monoterpenes		0.9
<i>iso</i> -Longifolene	1389	0.2	Sesquiterpene hydrocarbons		25.4
β -Elemene	1391	0.1	Oxygenated sesquiterpenes		6.2
α -Gurjunene	1411	0.6			

RI: retention indices relative to C₈-C₂₈ *n*-alkanes on TG-5.

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