

COMPOSITION OF *Senecio viscosus* EXTRACT OBTAINED BY CO₂ EXTRACTION

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Biologically active pyrrolizidine alkaloids senecionine [1], squalidine, and alkaloid S-F [2] were isolated previously from *Senecio viscosus* L. (Compositae). We isolated flavonoids pochilidol and velutin [3]. Volatile components of this plant have not been reported. We extracted the aerial part of air-dried raw material collected during flowering in Pavlodar Oblast, Republic of Kazakhstan, with supercritical CO₂ and studied its component composition by GC–MS.

We used an IWAKU Asahi Glass CLU-33 cooling system for supercritical CO₂ extraction; an EYELA WFO-400 system for heating the extractor; a Jasco PU-1586 Intelligent Prep. Pump, a Jasco BP-2080 plus automatic pressure regulator, and a SinaO AWA model W-NK-1A gas meter. The raw material (7 g, without thick stems) was placed in a thar designs, Ink Us, Vessel (25 mL). Supercritical extraction was performed at 15 MPa; CO₂ flow rate, 3 mL/min; and extractor temperature 40°C for 1 h. The yield of extract was 2.0%. The resulting extract was dissolved in EtOH (1 mL), cooled to –20°C, filtered, and analyzed by GC–MS.

The component composition of the extract was analyzed on a Hewlett–Packard GCD with a quadrupole detector. We used an HP-5 FSC column (60 m × 0.25 mm) with He carrier gas at flow rate 1 mL/min. The column was held at 60°C for 10 min with temperature programmed up to 220°C at 4°C/min and then held isothermally for 10 min. The flow rate was regulated up to 50 mL/min. The injector and detector temperature was 250°C. Mass spectra were recorded by EI at 70 eV in the *m/z* range 35–425. The percent content of the components was calculated automatically from peak areas of the total ion chromatogram. Components were identified from mass spectra and retention times using the Wiley GC/MS library.

The extract contained 18 components, of which the principal ones were (*Z*)-9-tricosene (14.21%), 1-nonadecene (7.77), hexanoic acid propenyl ester (5.99), nonadecane (5.90), heptadecane (5.87), artemisia ketone (5.48), and docosane (5.17) (Table 1). Five components, the mass spectra of which could not be found in the library, were unidentified. These compounds are promising for further preparative isolation and spectral analysis.

TABLE 1. Composition of Extract from Aerial Part of *Senecio viscosus* L., %

Component	RT	%	Component	RT	%
Unidentified 1	33.02	7.86	1,1,10-Trimethyl- <i>trans</i> -2-decalone	55.48	5.32
Tetradecanoic acid ethyl ester	43.90	3.12	Hexanoic acid propenyl ester	56.10	5.99
Phytol	46.60	3.98	Nonadecane	56.46	5.90
Octadecanoic acid ethyl ester	48.41	1.62	Unidentified 4	58.28	2.60
Heptadecane	50.63	5.87	1-Nonadecene	59.29	7.77
1-Ethyl-1-methylcyclohexane	51.64	3.63	Unidentified 5	59.35	4.23
(<i>Z</i>)-9-Tricosene	52.16	14.21	Docosane	76.95	5.17
Artemisia ketone	53.87	5.48	2,6,10-Trimethyltetradecane	79.16	4.98
Unidentified 2	55.18	5.34	Total		99.99
Unidentified 3	55.38	6.95			

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Mass spectra of unidentified components (EI-MS, 70 eV, m/z , I_{rel} , %): **1**: 252 (100), 235 (62), 219 (27), 201 (29), 188 (33), 159 (60), 145 (31), 131 (5), 118 (29), 105 (51), 91 (62), 79 (33), 67 (23), 55 (21); **2**: 355 (2), 336 (4), 281 (3), 252 (100), 235 (38), 219 (23), 201 (19), 191 (15), 173 (5), 161 (13), 148 (18), 138 (13), 121 (9), 109 (14), 98 (17), 83 (46), 69 (26), 55 (64); **3**: 252 (100), 235 (42), 218 (24), 203 (13), 187 (10), 175 (17), 163 (8), 149 (7), 132 (8), 121 (7), 105 (9), 100 (26), 82 (36), 69 (18), 60 (13), 55 (58); **4**: 322 (8), 279 (6), 265 (4), 252 (100), 235 (39), 219 (21), 202 (9), 187 (6), 158 (13), 149 (40), 135 (16), 123 (9), 115 (58), 97 (25), 82 (35), 69 (37), 55 (65); **5**: 351 (10), 307 (3), 281 (3), 252 (100), 235 (34), 219 (23), 201 (19), 196 (8), 163 (3), 135 (5), 137 (7), 121 (10), 111 (13), 96 (45), 84 (48), 71 (59), 55 (60).

Thus, the component composition of the CO₂ extract of *S. viscosus* was studied for the first time by GC–MS and its principal components were determined.

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