

PYRROLIZIDINE ALKALOIDS FROM FIVE *SENECIO* SPECIES

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In previous papers we have described the pyrrolizidine alkaloids isolated from roots of *Senecio subulatus* (1), *Senecio glandulosus* (1), *Senecio uspallatensis* (2), and *Senecio gilliesiano* (3).

As a part of our continuing investigation of Argentine *Senecio* species, we now report the isolation and identification of the pyrrolizidine alkaloids obtained from the roots of *Senecio argentino* Baker (*vira-vira* Hieron), *Senecio filaginoides* (H. et A.) DC, *Senecio seratophiloides* Griseb, *Senecio leucostachys* Baker, and *Senecio ragonesei* Cabr.

The alkaloidal content of the studied species as well as those reported previously (1-3) is summarized in Table 1. The common alkaloids, senecionine or retrorsine, have been isolated from almost all the species studied. Uspallatine, which was recently reported (2), has been isolated from four of the species studied. The rare alkaloid, senecivernine, previously isolated only from *Senecio vernalis* (4), has been tentatively identified from *Senecio seratophiloides*.

EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—Mps were recorded on a Leitz hot-stage apparatus, the ms were recorded in a Varian MAT 112 S, the ¹H-nmr spectra were recorded on a Varian EM 360 A (60 MHz) in CDCl₃, the ¹³C-nmr spectra were recorded in a Bruker WR-80 (20 MHz) in CDCl₃. Column chromatography was carried out on silica gel 60 H. The solvent system used was CHCl₃-MeOH-NH₃ (85:14:1). Tlc was carried out on silica gel 60 HF₂₅₄ with the solvent system, CHCl₃-MeOH-NH₃ (85:14:1).

PLANT MATERIAL.—*S. argentino* was collected in September 1984 by M.J. Pestchanker near San Luis City, Argentina, and identified by L.A. Del Vitto (MERL No. 848).

TABLE 1. Pyrrolizidine Alkaloids Isolated from Nine *Senecio* Species

Species	Isolated Compound	Percentage ^a
<i>S. argentino</i> (roots)	senecionine	0.0010
	uspallatine	0.10
<i>S. filaginoides</i> ((roots)	senecionine	0.0435
	retrorsine	0.0643
<i>S. seratophiloides</i> (roots)	senecionine	0.035
	senecivernine	0.0070
	usaramine	0.0036
	retrorsine	0.037
	uspallatine	0.0185
<i>S. leucostachys</i> ((roots)	senecionine	0.0038
	integerrimine	0.0024
	uspallatine	0.0432
<i>S. ragonesei</i> (roots)	senecionine	0.021
	integerrimine	0.018
	retrorsine	0.019
<i>S. subulatus</i> (1)	1,2-dihydroretrorsine	0.0018
	senecionine	0.0030
	retrorsine	0.0376
<i>S. glandulosus</i> (1)	integerrimine	0.0191
	retrorsine	0.0352
	usaramine	0.0325
<i>S. uspallatensis</i> (2)	uspallatine	0.0078
	retrorsine	0.0090
<i>S. gilliesiano</i> (3)	retrorsine	0.0306
	senecionine	0.0206

^aBased on dry weight of the plant material.

S. flaginoides was collected in June 1984 by L.A. Del Vitto in La Crucecita, Mendoza, Argentina and identified by L.A. Del Vitto (MERL No. 897).

S. seratophiloides was collected in November 1984 by M.J. Pestchanker in El Volcan, San Luis, Argentina and identified by D.L. Anderson (INTA, Villa Mercedes, San Luis No. 2379-B).

S. leucostachys was collected in November 1984 by L.A. Del Vitto in Lujan Mendoza, Argentina, and identified by L.A. Del Vitto (MERL No. 592).

S. ragonesei was collected in November 1984 near Cacheuta, Mendoza, Argentina, by L.A. Del Vitto and identified by L.A. Del Vitto (MERL No. 918).

EXTRACTION AND ISOLATION.—Air-dried roots of all five species were extracted three times with hot MeOH. The resulting extract was concentrated in vacuo and the residue taken up in 30% citric acid solution and extracted several times with *n*-hexane and CHCl₃. The acidic extract was made alkaline to pH 10.5 with NH₄OH and extracted several times with CHCl₃. After drying and evaporation, the combined CHCl₃ extracts gave a viscous mass containing the total alkaloids. The aqueous alkaline solution was carried to pH 2 with HCl, zinc dust was added, and the mixture was stirred for 24 h to reduce *N*-oxides that might be present. The extraction procedure of alkaloids thus obtained was carried out as described above.

The isolated alkaloids were identified by comparison with authentic samples and by comparison with previously reported data (4-8).

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