

CONSTITUENTS OF *GEUM ELATUM*¹

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A 50% EtOH extract of the aerial parts of *Geum elatum* Hook (Rosaceae) has shown antifertility activity, LD₅₀ 375 mg/kg ip in mice (1). It is also an astringent (2,3). We report here the presence of hentriacontanol, hentriacontanone, β -sitosterol, tetra-*O*-methyl ellagic acid, ellagic acid, and isoquercetrin from *Geum elatum*.

EXPERIMENTAL

PLANT MATERIAL.—Plants and vouchers were collected from Kedarnath, Uttar Pradesh. Voucher specimens are deposited in the Botany Division, CDRI, Lucknow, India.

EXTRACTION AND ISOLATION.—Air-dried, powdered aerial parts of *G. elatum* (3.5 kg) were extracted with 50% EtOH. The concentrate was fractionated with hexane, CHCl₃, and *n*-BuOH, successively. The hexane-soluble fraction (15 g) on chromatography over silica gel gave hentriacontanol (333 mg) (4), hentriacontanone (106.6 mg) (4), and β -sitosterol (240 mg) (5).

Full details of isolation and identification of compounds are available on request to senior author.

Chromatography of the CHCl₃ fraction (10 g) over silica gel yielded tetra-*O*-methyl ellagic acid (300 mg). The *n*-BuOH extract (30 g) on chromatography over silica gel gave ellagic acid (180 mg) (6) and isoquercetrin (280 mg) (7). Isoquercetrin on hydrolysis gave quercetin and glucose. All the compounds were identified by standard data as well as by authentic sample comparison.

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ALKALOIDS OF *COPTIS* RHIZOME

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Coptis rhizome is well known in Japan and other east Asian countries as a crude drug. Previous work has established the presence of the protoberberinium salts berberine, coptisine, palmatine, worenine, jatrorrhizine, and columbamine, as well as the quaternary aporphine salt magnoflorine (1-6).

We now wish to report on a reexamination of the alkaloidal content of *Coptis* rhizome and the isolation of the additional five protoberberinium salts, epiberberine, groenlandicine, berberastine, thalifendine, and oxyberberine. These compounds, except for groenlandicine, are reported for the first time from *Coptis* species.

EXPERIMENTAL

PLANT MATERIAL.—*Coptis* rhizome was obtained from a drugstore of crude drugs in Tokyo, Japan.

EXTRACTION AND ISOLATION OF ALKALOIDS.—A sample of crude drug (340 g) was pulverized and extracted with MeOH until the extract gave a negative test for alkaloids with Dragendorff's reagent. The

MeOH solution was concentrated *in vacuo* to a syrup. This material was shaken with Et₂O and H₂O, and the aqueous solution was concentrated *in vacuo*. The extract was then divided into two parts. One was chromatographed on silica gel. The solvent was C₆H₆-EtOAc-PrOH (4:2:1) with the polarity gradually increased by adding MeOH and EtNH₂, and gave a mixture of epiberberine, berberastine, thalifendine, and oxyberberine. The other solution was chromatographed on Al₂O₃ (neutral) with a solvent of CHCl₃-MeOH (containing 0.5% NH₃) (6:1) with the polarity of the eluting solvent gradually increased to MeOH and yielding groenlandicine. These compounds were separated finally on preparative tlc plates with C₆H₆-EtOAc-PrOH-MeOH-EtNH₂ (8:4:2:1:1) as solvent system for epiberberine, berberastine, and thalifendine, CHCl₃-MeOH-NH₃ (75:30:5) for groenlandicine and C₆H₆-EtOAc (1:1) for oxyberberine, respectively. The isolated alkaloids were identified by their nmr, ms, ir, and uv spectral data and were further clarified by physical data of tetrahydro-derivatives. In addition, the minor compounds thalifendine and oxyberberine were identified by comparison with authentic samples on si gel tlc plates.

Full details of the isolation and identification of the compounds are available upon request to the author.

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DITERPENIC ALKALOIDS OF *ACONITUM NApELLUS* ROOTS FROM SWITZERLAND¹

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As part of our chemical study on *Aconitum* roots (1,2), we performed the characterization of the diterpenic alkaloids of *Aconitum napellus* L. from Switzerland. Five of the alkaloids (14-acetylneoline, aconosine, hokbusine A, senbusine A, and senbusine C) have been isolated for the first time from this plant.

EXPERIMENTAL

EXTRACTION AND ISOLATION OF THE DITERPENIC ALKALOIDS.—The dried roots of *A. napellus* (10 kg) collected in Switzerland and purchased from Siegfried Zofingen, Switzerland, were extracted with MeOH to give the extract (950 g) which was fractionated in the customary manner (1) to obtain the alkaloid portion (11 g). Chromatography over alumina and silica gel afforded aconitine (10 mg), mesaconitine (15 mg), 14-acetylneoline (30 mg) (3), aconosine (30 mg) (4), hokbusine A (45 mg) (2), neoline (506 mg) (5), senbusine A (140 mg) (1), and senbusine C (32 mg) (1).

Six of the diterpenic alkaloids were identified by spectral methods and comparison with authentic samples. Aconosine was identified by physicochemical data comparison. 14-Acetylneoline was identified by spectral data comparison and alkaline hydrolysis.

The LD₅₀ value of hokbusine A was greater than 1 mg/kg (std: ddY mice, ip).

Full details of the isolation and identification of the constituents are available on request to the corresponding author.

¹Pharmaceutical studies on *Aconitum* roots, Part 17.