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ALKALOIDS OF *PAPAVERACEAE* (XIV) [1]. ALKALOIDS OF *GLAUCIUM FIMBRILLIGERUM* BOISS., POPULATION GADUK

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Abstract

Glaucium fimbrilligerum Boiss. population Gaduk of Abbasabad contained three major alkaloids, bulbocapnine (0.5%), isocorydine (0.12%), proptopine (0.2%), and three minor alkaloids, salutaridine (0.01%), N-methyllindcarpine (0.02%) and thaliporphine (0.003%). Bulbocapnine, salutaridine and thaliporphine were detected for the first time in *G. fimbrilligerum* Boiss.

Introduction

In continuation of phytochemical studies of Iranian wild species of the *Papaveraceae* family, the alkaloids of *G. fimbrilligerum* Boiss. [3] population Gaduk of Abbasabad were studied. *G. fimbrilligerum* Boiss. [4] is a biennial plant found scattered throughout the Alborz mountains at an altitude of about 2200-2600 m. The plant blooms from May until the end of July. The four petals are yellowish-red with no spot on the base. The height of the plant is 30-60 cm.

Results and Discussion

The following alkaloids were isolated from *Glaucium fimbrilligerum* Boiss. population Gaduk, through column chromatography and preparative TLC (Fig. 1).

The m.p. and spectral data of the alkaloids were similar to those already reported [5-11]. Bulbocapnine, salutaridine and thaliporphine were detected for the first time in *G. fimbrilligerum* Boiss.

Experimental Section

Melting points were taken on a Kofler hot stage apparatus and are uncorrected. The UV spectra were recorded using a Perkin-Elmer Model 550 SE. The IR spectra were obtained using a Perkin-Elmer Model 781 spectrograph (potassium bromide disks). ^{1}H NMR spectra were recorded on a Bruker FT-80 or Varian FT-400 unity plus spectrometer and chemical shifts (δ) are in ppm relative to internal tetramethylsilane. The mass spectra were run on a Varian Model MAT-311 spectrometer at 70 eV.

Keywords: Alkaloids of *Papaveraceae; Glaucium fimbrilligerum; Papaveraceae*

Plant Material

The aerial parts of *Glaucium fimbrilligerum* Boiss. were collected in April 1992, air dried in the shade and then at 60°C to a constant weight and powdered so that all the material could be passed through a mesh not larger than 0.5 mm.

Extraction Procedure

Starting from 1000 g powdered plant material, the alkaloids were extracted as reported [1] to give 17.7 g (1.77%) of a crude mixture of alkaloids.

Column Chromatography

The crude extract (17.7 g) was dissolved in chloroform (40 ml) and placed on a chromatographic column (4.5 cm diameter, 500 g) with silica gel (mesh 230-400) as the absorbent. The column was eluted as reported [1].

Preparative TLC

Similar fractions obtained from column chromatography were combined. After evaporation of the solvent under reduced pressure the residue was purified by

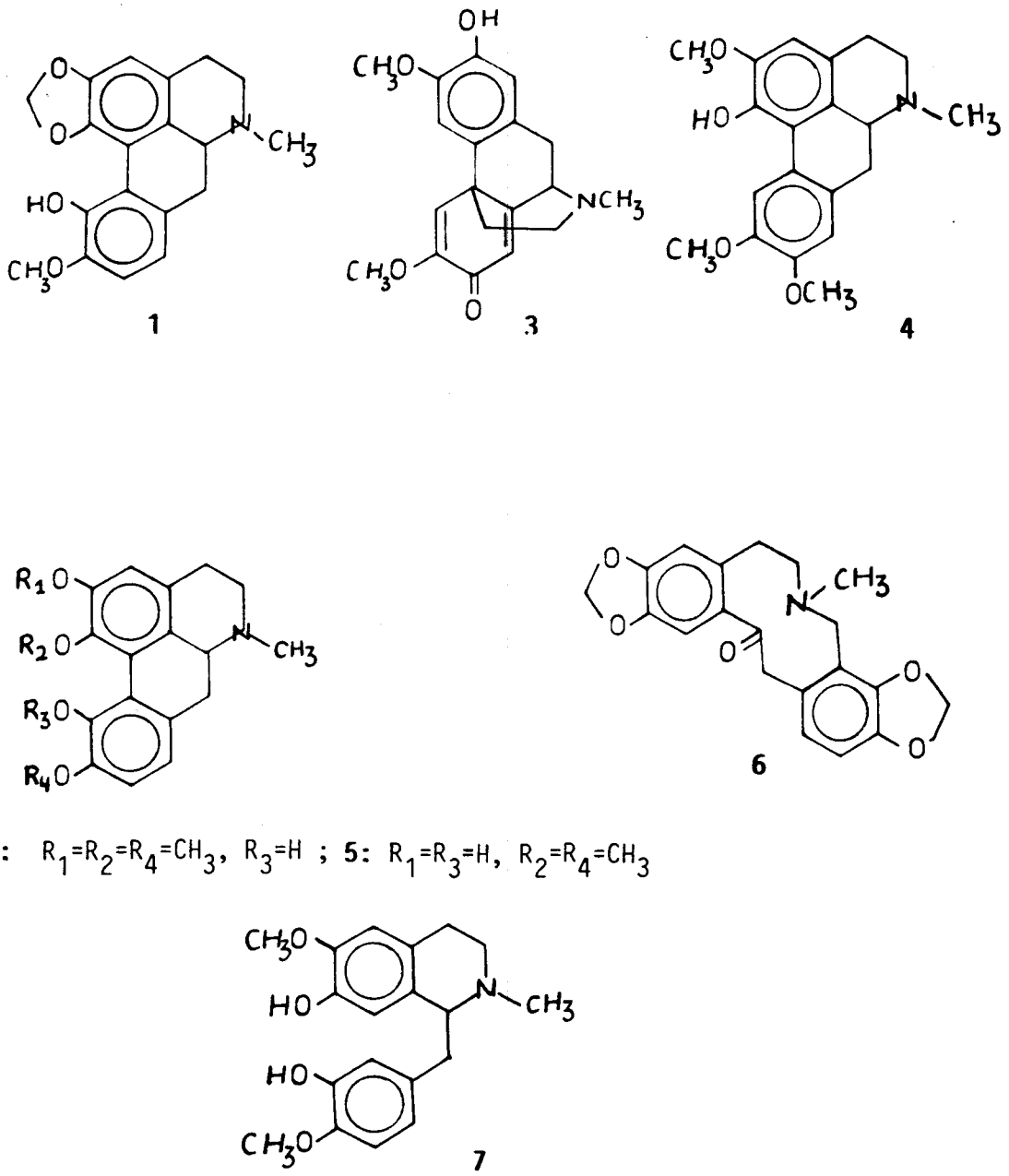

Figure 1.

reparative TLC using silica gel and solvent system ethyl cetate-methanol-ammonia (85:10:5).

ulbocapnine (1) and Isocorydine (2)

The first four fractions which were eluted with hloroform contained two alkaloids. They were separated y preparative TLC (silica gel, solvent system ethyl acetate-ethanol-ammonia 85:10:5).

The fast moving fraction (R_f= 0.71) was crystallized from ethanol to give bulbocapnine m.p. 199°-200° [lit. [5] m.p. 199°-200°].

The slow moving fraction (R_f= 0.61) was crystallized from methanol to give isocorydine: m.p. 185°-186° [lit. [2] m.p. 185°].

Salutaridine (3)

Fractions five to ten which were eluted with chloroform contained salutaridine and bulbocapnine. They were

separated by preparative TLC (silica gel, solvent system ethyl acetate-methanol-ammonia 85:10:5).

The slow moving fraction (R_f= 0.44) was crystallized from ethanol to give salutaridine: m.p. 197°-199° [lit. [6], m.p. 197°-199°].

The fast moving fraction (R_f= 0.71) was bulbocapnine.

Thaliporphine (4)

Fractions ten to fifteen which were eluted with chloroform showed one spot on TLC. It was crystallized from ethanol to give thaliporphine: m.p. 170-172° [lit. [7], m.p. 170-172°]; UV (CH_3OH): λ_{max} 308 nm; NMR ($CDCl_3$): 8.04 (s, 1H, H_{11}), 6.78 (s, 1H, H_8), 6.55 (s, 1H, H_3), 3.87 (s, 9H, OCH_3) and 2.69 ppm (s, 3H, NCH_3); ms: m/z 341 (M^+). The m.p. and spectral data were similar to those reported for thaliporphine [7, 8].

N- Methyllindcarpine (5)

Fractions sixteen and seventeen which were eluted with chloroform contained almost pure N-methyllindcapine which was crystallized from ethanol: m.p. 198-200° [lit. [9] m.p. 198°-200°].

Protopine (6)

Fractions eighteen to twenty-two which were eluted with chloroform contained mainly one alkaloid which was purified by preparative TLC and crystallized from ethanol to give protopine: m.p. 205°-207° [lit. [10] m.p. 207°].

Reticuline (7)

Combined fractions which were eluted with 10% methanol in chloroform contained mainly one alkaloid, which was purified by preparative TLC. It was a heavy oil that could not be crystallized; UV (methanol): λ_{max} 283 nm: NMR ($CDCl_3$): 2.46 (s, 3H, NCH_3), 3.8 (s, 6H, 2xOCH_3), 6.26 (s, 1H, aromatic), 6.5, 6.7 (m, 4H, aromatic); ms: m/z 192 [M-137]; IR ($CHCl_3$): 3460 cm^{-1}. The spectral data were similar to those reported for reticuline [11].

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