SUMMARY

The aerial parts of Sophora jaubertii Spach have been investigated for their alkaloid content. Matrine, allomatrine, sophocarpine, sophocarpine N-oxide, sophoranol, sophoridine and anagyrine were isolated from the plant.

ÖZET

Bu çalışmada Sophora jaubertii Spach bitkisinin topraküstü kısımlarının alkaloid içeriği araştırıldı. Bitkinin bu kısımlarından matrin, allomatrin, sofokarpin, sofokarpin N-oksit, soforanol, sofordan ve anagyrin isimli alkaloidler elde edildi.
INTRODUCTION

The genus *Sophora* (Leguminosae) consists of about 80 species (1). *Sophora* species are known to contain quinolizidine alkaloids, flavonoids. The species are used as anthelmintic (2), antipyretic (3), antitumoral (4).

*Sophora joubertii* Spach is a perennial herb. The plant grows in the north of Turkey and Romania, Crimea.

From the aerial parts of *S. joubertii* cytisine, rutinoside, quercetin (5) and from the roots sparteine, sophocarpine, sophoridine (6), matrine (7) had been isolated in previous works.

MATERIALS AND METHODS

**Plant Material** Aerial parts of *S. joubertii* were collected from Bolu (Turkey) in July 1991. A voucher specimen is deposited in the Herbarium of Faculty of Pharmacy, University of Istanbul (ISTE 63490).

**Extraction of the alkaloids.** After drying and powdering, the aerial parts of *S. joubertii* (500 g) were extracted in a Soxhlet apparatus with ethanol and the solvent was removed. The residue was taken up in 5% HCl and filtered. The acidic filtrate was extracted with petroleum ether and diethyl ether to remove the non-basic substances, and the petroleum ether and diethyl ether layers were discarded. The mother liquor was made basic with 10% NH₃ to pH 8 and extracted with chloroform. The chloroform extracted was dried with anhydrous Na₂SO₄ and evaporated under vacuum to give 4.099 g of a crude alkaloidal mixture.

**Isolation of alkaloids.** Alkaloidal mixture was chromatographed on a Si-gel column (Merck, 70-230 mesh, 200g, 3 x 80 cm) eluting with CHCl₃-MeOH gradients. Fractions were checked by Si-gel TLC: CHCl₃-MeOH-NH₄OH 28% 85:14:1 (v/v).

RESULTS AND DISCUSSION

* S. joubertii aerial parts

In conclusion, quinolizidine alkaloids sophoridine, sophocarpine, N-oxid from *S. joubertii*.

**Matrine.** UV max (1665 cm⁻¹; 1H-NMR (H-17α), 3.7 (1H, m, H-2β), H-10β) MS m/z 177(53), 162(33), 150(100)

**Anagyrine.** UV max (1650, 1547 cm⁻¹; 1H 6.42 (1H, dd, J1,2, 1.2 H-10β), 3.5 (1H, dd, dt, J 4.4 Hz, H-11), 2 H-15α), 2.5 (1H, dt, J 229(19), 215(12), 201(100)

**Sophoridine.** UV max (1H, q, J 4.2 Hz, H-17β, 219(17), 205(51), 192
Identification of alkaloids. Alkaloids were identified by comparison of their UV, IR, $^1$H-NMR, MS spectra with those reported in the literature.

RESULTS AND DISCUSSION

S. jautbertii aerial parts were investigated for their alkaloidal content.

In conclusion quinolizidine alkaloids like matrine (66 mg), anagyrine (99 mg), sophoridine (17 mg), sophoranol (21 mg), sophocarpine (19 mg), sophocarpine N-oxide (31 mg) and allomatrine (30 mg) were isolated from S. jautbertii.

Matrine. UV max (MeOH) 209.8 nm; IR bands (CHCl$_3$) 2934, 2805, 2764, 1665 cm$^{-1}$; $^1$H-NMR (200 MHz, CD$_3$OD) $\delta$ 4.2 (1H, dd, J 3.7, 4.1Hz, H-17(a)), 3.7 (1H, m, H-11(b)), 3.0 (1H, dd, J 4.4, 5Hz, H-17(b)), 2.7 (2H, m, H-2(b), H-10(b)). MS m/z 248 (M$^+$. 93%), 231(7), 219(30), 205(73), 192(40), 177(53), 162(33), 150(75), 136(57), 96(76).

Anagyrine. UV max (MeOH) 307.8, 232.5 nm; IR bands (CHCl$_3$) 2929, 2853, 1650, 1547 cm$^{-1}$; $^1$H-NMR (200 MHz, CD$_3$OD) $\delta$ 7.5 (1H, dd, J 7.7Hz, H-4), 6.42 (1H, dd, J1.2, 1.2Hz, H-3), 6.25 (1H, dd, J 1.1, 1.1Hz, H-5), 3.95 (1H, m, H-10(b)), 3.5 (1H, dd, J2.5, 2.6 Hz, H-10(a)), 3.1 (1H, d, J 2Hz, H-7), 2.9 (1H, dt, J 4.4 Hz, H-11), 2.75 (2H, ddd, J2.7, 2.7, 2Hz, H-15(b)), 2.65 (1H, d, J 2.6Hz, H-15(a)), 2.5 (1H, dt, J 1.1Hz, H-17(b)), 2.2 (1H, s, H-9); MS m/z 244 (M$^+$. 87%), 229 (19), 215(12), 201(9), 188(12), 172(6), 160(43), 146(51), 98 (100).

Sophoridine. UV max (MeOH) 205 nm; IR bands (CHCl$_3$) 2930, 1610, 1460 cm$^{-1}$; $^1$H-NMR (200 MHz, CD$_3$OD) $\delta$ 3.4 (2H, q, J 5Hz, H-17(a)), 3.1 (1H, q, J 4.2Hz, H-17(b)), 2.6 (1H, m, H-11); MS m/z 248 (M$^+$. 92%), 247 (100), 219 (17), 205(51), 192(23), 177(36), 162(18), 150(58), 136(26), 96(52).
Sophoranol. UV max (MeOH) 206.3 nm; IR bands (CHCl₃) 3364(OH), 2935, 2806, 2767, 1663, 1467 (cm⁻¹); ¹ H-NMR (400 MHz, CDCl₃) δ 4.4 (1H, dd, 1.45, 4.3 Hz, H-1α), 3.8 (1H, m, H-11), 3.1 (1H, d, J 5.2 Hz, H-17α); MS m/z 264 (M⁺, 100%), 263(87), 247(28), 219(29), 205(80), 193(35), 166(61), 148(30), 122(24), 96(70).

Sophocarpine. UV max (MeOH) 256 nm; IR bands (CHCl₃) 2939, 1661, 1601 (cm⁻¹); ¹ H-NMR (200 MHz, CD₂OD) δ 6.7 (1H, dd, J 2.6, 5.3 Hz, H-13), 5.9 (1H, dd, J 2.2, 2.5 Hz, H-14), 4.0 (1H, dd, J 6.6, 5.3 Hz, H-17α), 3.46 (1H, dd, J 3.3 Hz, H-11), 3.35 (1H, d, J 2.5 Hz, H-17β); MS m/z 246 (M⁺, 72%), 245(100), 217(11), 203(22), 177(18), 160(23), 148(34), 136(61), 122(21), 96(40).

Sophocarpine N-oxide. UV max (MeOH) 252 nm; IR bands (CHCl₃) 1659, 1594, 1522 (cm⁻¹); ¹ H-NMR (400 MHz, CDCl₃) δ 6.5 (1H, dd, J 2.6, 3.5, 2.6 Hz, H-13), 5.93 (1H, dd, J 1.7, 1.7 Hz, H-14), 4.7 (1H, dd, J 5.6, 5.6, 5.7 Hz, H-11), 4.1 (1H, dd, J 6, 5.9 Hz, H-17β), 3.85 (1H, dd, J 12, 12 Hz, H-17α); MS m/z 262 (M⁺, 2%), 246(68), 245(100), 231(8), 217(14), 203(19), 190(9), 176(22), 160(18), 148(42), 136(42), 122(24), 96(45).

Allostmatrine. UV max (MeOH) 206.5 nm; IR bands (CHCl₃) 2937, 2870, 1614, 1440 (cm⁻¹); ¹ H-NMR (200 MHz, CD₂OD) δ 4.3 (1H, dd, J 4.6, 5Hz, H-17α), 3.3 (3H, m, H-2α, H-10α, H-11β); MS m/z 248 (M⁺, 46%), 247(100), 231(14), 218(13), 205(21), 190(13), 176(21), 162(13), 148(49), 96(26).

REFERENCES

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