

**SOPHORA JAUBERTII SPACH BİTKİSİNDEN ELDE EDİLEN
ALKALOİTLER**

ALKALOIDS FROM *SOPHORA JAUBERTII* SPACH

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SUMMARY

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

ÖZET

Bu çalışmada *Sophora jaubertii* Spach bitkisinin topraküstü kısımlarının alkaloit içeriği araştırıldı. Bitkinin bu kısımlarından matrin, allomatrin, sofokarpin, sofokarpin N-oksit, soforanol, soforidin ve anagirin isimli alkaloitler elde edildi.

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

From the aerial parts of *S.jaubertii* cytosine, rutoside, 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. jaubertii* 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. jaubertii* (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 filtration was extracted with petroleum ether and diethyl ether to remove the non-basic substances, and the petroleum ether and diethylether 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 × 80 cm) eluting with CHCl₃ - MeOH gradients. Fractions were checked by Si-gel TLC: CHCl₃ - MeOH- NH₄OH 28 % 85:14:1 (v/v).

Identification of alkaloids. Alkaloids were identified by comparison of their UV, IR, $^1\text{H-NMR}$, MS spectra with those reported in the literature.

RESULTS AND DISCUSSION

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

In conclusion quinolizidine alkaloids like matrine (66 mg), anagryrine (69 mg), sophoridine (17 mg), sophoranol (21 mg), sophocarpine (19 mg), sophocarpine N - oxide (31 mg) and allomatrine (30 mg) were isolated from *S. jaubertii*.

Matrine. UV max (MeOH) 209.8 nm; IR bands (CHCl_3) 2934, 2805, 2764, 1665 cm^{-1} ; $^1\text{H-NMR}$ (200 MHz, CD_3OD) δ 4.2 (1H, *dd*, J 3.7, 4.1Hz, H-17 α), 3.7 (1H, *m*, H-11 β), 3.0 (1H, *dd*, J 4.4, 5Hz, H-17 β), 2.7 (2H, *m*, H-2 β , H-10 β); MS *m/z* 248 (M^+ , 93%), 231(7), 219(30), 205(73), 192(40), 177(53), 162(33), 150(75), 136(57), 96(76).

Anagryrine, UV max (MeOH) 307.8, 232.5 nm; IR bands (CHCl_3) 2929, 2853, 1650, 1547 cm^{-1} ; $^1\text{H-NMR}$ (200 MHz, CD_3OD) δ 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 β), 3.5 (1H, *dd*, J2.5, 2.6 Hz, H-10 α), 3.1 (1H, *d*, J 2Hz, H-7), 2.9 (1H, *dt*, J 4,4 Hz, H-11), 2.75 (2H, *ddd*, J2.7, 3, 2Hz, H-15 β), 2.65(1H, *d*, J 2.6Hz, H-15 α), 2.5 (1H, *dt*, J 1.1Hz, H-17 β); 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} ; $^1\text{H-NMR}$ (200 MHz, CD_3OD) δ 3.4 (2H, *q*, J 5Hz, H-17 α), 3.1 (1H, *q*, J 4.2Hz, H-17 β), 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, 1467cm⁻¹; ¹H-NMR (400 MHz, CDCl₃) δ 4.4 (1H, *dd*, J 4.3, 4.3Hz, H-17α), 3.8 (1H, *m*, H-11), 3.1 (1H, *d*, J 5.2 Hz, H-17β); 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; ¹H-NMR (200 MHz, CD₃OD) δ 6.7 (1H, *ddd*, J 2.6,2.5,3Hz, H-13), 5.9(1H, *dd*, J 2.2, 2.5Hz, H-14), 4.0 (1H, *dd*, J 6.6,5Hz, H-17α), 3.46 (1H, *dd*, J 3.3Hz, H-11), 3.35(1H, *d*, J 2.5Hz, 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, 1522cm⁻¹; ¹H-NMR (400 MHz, CDCl₃) δ 6.5 (1H, *ddd*, J 2.6, 3.5, 2.6Hz, H-13), 5.93 (1H, *dd*, J 1.7, 1.7Hz, H-14), 4.7 (1H, *ddd*, J 5.6, 5.6, 5.7Hz, H-11), 4.1 (1H, *dd*, J 6, 5.9Hz, H-17β), 3.85 (1H, *dd*, J 12, 12Hz, 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).

Allomatrine. UV max(MeOH) 206.5 nm; IR bands (CHCl₃) 2937, 2870,1614, 1440 cm⁻¹; ¹H-NMR (200MHz, CD₃OD) 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).

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