STEROIDS FROM *SOLANUM JASMINOIDES*

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The occurrence of diosgenin has been reported in various *Solanum* species (1–14), but it has not been reported from *S. jasminoides* Paxt. The presence of solasonine, solamargine, and the hydrolytic product solasodine has been investigated in different plant parts of this species (15–16). In continuation of earlier findings, we report here the isolation and identification of steroids from flowers, roots, and aerial parts of *S. jasminoides*.

EXPERIMENTAL

PLANT MATERIAL.—*S. jasminoides* Paxt. plants were collected during October 1977 at the Botanical Garden of Maharaja's College, Jaipur, India. A voucher specimen of this collection has been deposited with the herbarium of the Botany Department, University of Rajasthan, Jaipur, India.

EXTRACTION OF STEROIDS.—Dried and powdered flowers, roots, and aerial parts without flowers (10 g each) of *S. jasminoides* were separately defatted in succession with 100 ml of petroleum ether (24 hr) and benzene (16 hr). The defatted plant samples, obtained after filtration, were air-dried, repowdered and separately refluxed for 4 hr with 20 ml/g of 5% HCl in 70% ethanol. Each hydrolyzate solution (approximately 200 ml) obtained after filtration was repeatedly extracted with ethyl acetate (17) for complete extraction of sapogenins. Various fractions were pooled, dried *in vacuo* and taken up in chloroform for further analyses.

ISOLATION AND IDENTIFICATION OF STEROIDS.—Each crude steroid extract was examined by two-dimensional tlc on air-dried silica gel G (wet thickness 250 mμ) using dichloromethane-methanol-formamide (93:6:1) in the first direction and cyclohexane-ethyl acetate-water (600:400:1) in the second direction (18). The steroidal compounds were located by spraying with 50% sulfuric acid and, also separately with anisaldehyde reagent (0.5 ml of anisaldehyde in 50 ml of glacial acetic acid and 1 ml of concentrated sulfuric acid) and then heating at 100° until the characteristic colors developed (18). Five spots were labelled (A to E) in order of decreasing R_f value. In a parallel chromatogram spots C, D, and E in the flowers and roots corresponded to sitosterol, cholesterol and diosgenin respectively, but in the aerial parts spots D and E coincided with sitosterol and cholesterol. Bands C, D, and E were separated by preparative tlc on air-dried silica gel G layers (wet thickness 500 mμ) by using two-fold development in hexane-ethyl acetate (3:1) and spraying with anisaldehyde reagent. Bands coinciding with sitosterol, cholesterol, and diosgenin were marked, scraped from unsprayed plates, eluted with chloroform, tested by tlc for their purity, eluted, and later crystallized (19). Spots A and B in the flowers and roots, and spots A, B, and C in the aerial parts could not be identified due to insufficient quantity.

For the isolated diosgenin we determined: mp 203–204°, mmp undepressed, acetate mp 194–195°, $[\alpha]_D^{25}$ −129°, and the ir spectrum (characteristic peaks at 984, 922, 901 and 866 cm^{-1}). Sitosterol and cholesterol were identified on the basis of the Liebermann-Burchard test, tlc in various solvents, color reactions, mp, and ir spectral studies. Diosgenin was estimated quantitatively in the isolates of flowers and roots.

COLORIMETRIC ESTIMATION OF DIOSGENIN.—Diosgenin was quantitatively estimated by the method of Sanchez *et al.* (20) after tlc on silica gel G with n-hexane-ethyl acetate (3:1). Absorbances measured with a spectrophotometer (Carl Zeiss, Jena DDR, VSU-2 P) set at 405 nm against a blank were referred to a calibration curve which followed the Beer's law. The concentrations of the two extracts (flowers and roots) were determined by taking the mean values of 15 replicates.

RESULTS

Diosgenin and two sterols (sitosterol and cholesterol) not known to occur in the plant species under investigation have been isolated and identified both from flowers and roots, but the other aerial parts were found to lack diosgenin. Higher diosgenin content was present in roots (0.36% dry weight basis) as compared to flowers (0.18% dry weight basis). Since the fruit

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setting is very low in the plant under cultivation, the occurrence of diosgenin in the flowers is noteworthy.

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