PHYTOCHEMICAL INVESTIGATION OF PROSOPIS JULIFLORA D. C. I. FLAVONOIDS AND FREE SUGARS

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ABSTRACT

Patulitrin was the only flavonoid component detected in the fruits of *Prosopis juliflora D. C.* The free sugar constituents of the fruits are glucose and sucrose.

Prosopis juliflora D. C. (family *Leguminoseae*) is a native plant from tropical America and naturalized in Egypt. Some species of *Prosopis* (e.g. *P. spicigera* Linn.) are used in Indian indigenous system of medicine as a remedy in rheumatism and scorpion sting. The flowers, powdered and mixed with sugar, are eaten by women during pregnancy as a safeguard against miscarriage. Its ash when rubbed over the skin removes the hair (Chopra et al., 1956).

The ripe pods of *Prosopis chilensio, P. juliflora, P. dulcis* and *P. africana* are used as a food in Brazil and Northern Nigeria (Aykroyd & Joyee Doughty, 1964).

The present work deals with the study of the flavonoids and the free sugars of the fruits of the acclimatized *Prosopis juliflora* D. C.

EXPERIMENTAL AND RESULTS

Material: Green pods of *Prosopis juliflora* are collected in March, dried in oven at 50°C and powdered.

A. Flavonoids

Preparation of the Flavonoids:

Two kg. of the defatted powdered fruits were extracted with 70% alcohol. The extract was filtered, concentrated invacuo at 50°C, left at 0°C, for 48 hours, filtered from the precipitated resinous matter and then divided into three portions:

a. The first portion was kept at 0°C for few days when a crystalline yellow substance precipitated.
b. The second portion was treated with a 10% solution of basic lead acetate. The yellow? precipitate obtained, after centrifugation, was suspended in

water and, after removal of lead by H_2S, the solution was concentrated in vacuo and left for few days at room temperature when a crystalline yellowish material was separated.

c. The third portion was evaporated and placed on the top of a chromatographic column filled with polyamide. Elution was carried out first with water then with water-methanol mixtures (10–80%). The flavonoid compound was detected in eluates containing 30–60% methanol. Inspection of the eluted fractions by TLC using silica gel G and applying the solvent system methanol-chloroform (20:80) revealed the presence of one flavonoid component having the same R_f (0.04) as the crystalline substances obtained from a and b.

Upon examining the flavonoid obtained from the portions a, b and c, by paper chromatography using Whatman No. 1 and the solvent systems: tertiary butanol-acetic acid-water (3:1:1) and n-butanol-acetic acid-water (4:1:5) only one spot was detected (R_f 0.25 and 0.28 respectively) and was identical with the authentic patulitrin.

The flavonoid component, after crystallization from methanol-water gave small yellow needles which melted at 250–252°C. Its solution gave red colour with Shinoda reaction (1928) and fawn green with ferric chloride. The Tauböck reaction (1942) indicated the presence of free hydroxyl group at C 3. The colour of the spot on the chromatograms is yellow in day light, dull yellow under UV before and after exposure to NH_3 gas. The UV spectra of the isolated flavonoid is identical with those of patulitrin (Table I). The IR spectrum is identical with the authentic, showing bands at 1642 cm^{-1} (C=O), 840 cm^{-1} (substituents in ring B) and 3300–3400 cm^{-1} (–OH). Moreover, the NMR spectrum in DMSO (deuterated) shows a similar pattern as that of patulitrin (Mabry et al., 1970).

Table I
Absorption maxima (nm) of the flavonoid

Additions to solvent (Methanol)	Absorption maxima
None	259, 375
Sodium acetate	258, 343, 397
Aluminium choride	276, 349, 462
Sodium ethylate	242, 292, 382
Aluminium chloride + HCl	269,302, 380
Sodium acetate + Boric acid	265, 394

Hydrolysis of the isolated glycoside (by refluxing with 20% H_2SO_4 for 6 hours) afforded the aglycone which was identified as patuletin (m.p. 261–

262°C, UV and R_f in different solvents). The sugar moiety was identified by paper chromatography (using n-butanol-acetic acid-water 4:1:5 and aniline oxalate reagent (Hais & Macek, 1963) as a spraying reagent) as glucose.

B. Free Sugars

The aqueous extract of about 50 gm. fruits, prepared by heating on a boiling water bath for about 8 hours, was filtered from the ballast materials (precipitated by acetone), concentrated in vacuo to about 25 ml. Paper chromatography using the above technique and using other solvents (ethyl acetate-pyridine-water 2:1:2) revealed the presence of only glucose and sucrose.

ZUSAMMENFASSUNG

Patulitrin ist der einzige Flavonoid-Bestandteil in *Prosopis juliflora D.C.* Früchten. Die freien Zucker sind Glucose und Saccharose.

RÉSUMÉ

Patulitrin est la seule substance d'origine flavonique qui a pu être décelé dans les fruits du *Prosopis juliflora D. C.*, les sucres libres sont glucose et sucrosé.

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