



PHYTOCHEMICAL INVESTIGATION OF *PAVETTA INDICA*

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ABSTRACT

The phytochemical studies on the leaves of *Pavetta indica* resulted in isolation of linoleic acid, (9z,12z,15z)-octadeca- 9,12,15-trienoic acid, proanthocyanadin, epicatachein and fercilic acid are being reported for the first time from this plant. These compounds have been characterized on the basis of spectral and other data.

Key words: Phytochemical, *Pavetta indica*.

INTRODUCTION

Pavetta indica linn. is available at the greater part of India ascending to an altitude of 1500 m in the Himalayas; it has also recorded from the Andaman. It belongs to the family *Rubiaceae*. A shout bushy shrub 0.6-1.2 m high; bark thin, smooth, yellowish; young branches terete, glabrous. Leaves 7.5-15 by 2.5-6.3 cm, membranous, variable in shape and size, elliptic - oblong or elliptic - lanceolate, sometimes obovate - oblong, obtuse, acute or acuminate, glabrous on both sides, base tapering; main nerves 8-10 pairs; petioles 6-13 mm long; stipules connate, triangular, acute, thin, deciduous. Flowers white, odourous, in terminal sessile corymbose pubescent cymes; pedicles 4-6 mm long, densely pubescent; bracts broad, membranous, the lower copular; buds oblong- clavate. Calys densely pubescent, 3 mm long; tube narrowly campanulate; teeth 1.25 mm long, triangular, acute, slightly reflexed at the tip. Corolla - tube 13 mm long; lobes 6-8 by 2.5 mm, linear - oblong, subacute. Style white, glabrous or nearly so; stigma green, narrowly clavate, puberulous. Fruit 6-14 mm diameter, glabose, black, smooth. The leaves and roots are employed in the

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preparation of poultices for boils and itches¹; decoctions of leaves are used as a lotion for ulcerated nose and for haemorrhoids². Root is used for anticephalagic³. Leaf is used in haemorrhoidol pain and ulcerated nose. Wood is used as antirheumatic. Fruits are used as anthelmintic^{4,5}. Yellow pleasant seed oil (18.9 %w/w DWB) of *pavetta indica* was saponified and the unsaponifiable matter (0.9%) was found to contain myristic (2.7), palmitic (34.3), stearic (95.5), oleic (26.4), linoleic (21.3), linolenic (1.5), arachidic (3.8) and behenic (4.6) acids based on GLC studies by Srivastava et al.⁶

EXPERIMENTAL

All the melting points were taken in Veego-Vmp 1 melting point apparatus are uncorrected. IR spectra were recorded on Perkin-Elmer FT-IR spectrometer. NMR spectra were recorded on Bruker spectrospeir 200 MHz; the chemical shifts referenced to TMS.

Materials and methods

The aerial parts of *Pavetta indica linn* were collected from Madurai during May 2008. It was authenticated in the Department of Botany, The American College, Madurai-2. These aerial parts were dried, crushed into a coarse form and extracted.

Extraction

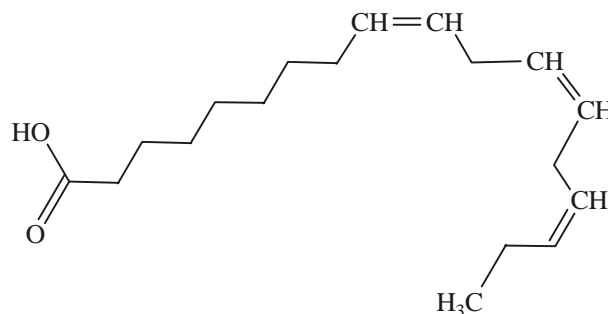
The aerial parts powder was extracted with petroleum ether (60-80°C); solvent was removed under vacuum and a crude mass was obtained. The marc was then re-extracted with chloroform and the solvent was removed under vacuum and a crude semisolid mass was obtained. These dried crude extracts, petroleum ether, chloroform were stored in a desiccator and used for further experiment after suspending in sodium carboxy methyl-cellulose (1% w/w) solution. The chemical constituents of the extract were identified by preliminary qualitative analysis and confirmed by thin layer chromatography (TLC) for the presence of carbohydrates, glycosides, alkaloids, phytosterols and flavonoids.

Column chromatography

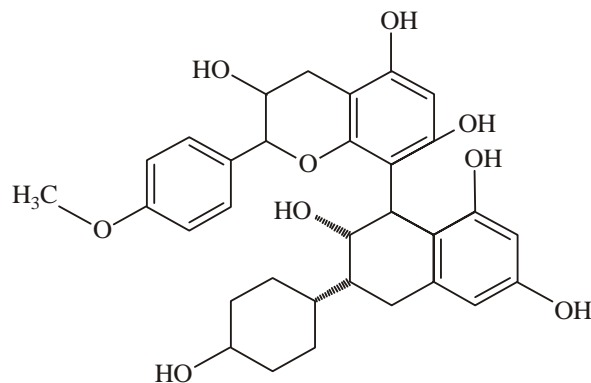
Chloroform extract obtained from the aerial parts of *Pavetta indica linn* was adsorbed on silica gel (60-120 mesh) for column chromatography. The slurry was air dried to remove any adsorbed moisture on surface and loaded on the top of the column of silica gel packed with disappearance or appearance of the existing /new spot, visualized on TLC. Various compounds isolated from the extract are listed below along with their spectral data.

Phytochemical investigations⁷⁻⁹**Pavetta indica**

Compound A (9z,12z,15z -Octadeca-9-12-15-trienoic acid): This was obtained from petroleum ether, benzene fraction (5 : 5) (120 mg). R_f : 0.42 (chloroform : Methanol 9 : 1) M.P-130⁰C⁶. Its I.R spectrum showed the band at 3403 cm⁻¹ -O-H stretching; 2925, 2855 cm⁻¹ -C-H stretching; 1707 cm⁻¹ -C=O stretching; 1444, 1378 cm⁻¹ -C-H bending , NMR-singals (CDCl₃) (δ ppm) 0.711-0.996 -R-CH₃ ; 1.000-1.253 -R-CH₂; 1.260-1.289 -R-CH₂ - Protons attached to alkyl group; 1.301-1.720 CH proton attached to C=C, 2.005 CH₂ proton attached to C=O, 3.207-3.388 CH₂ proton attached to hydroxyl, alkoxy, 3.579-3.904 CH proton attached to hydroxyl, alkoxy, 7.237 aromatic proton. The UV-absorption spectra showed peaks at 245, 260, 280, 290, 300, 320, and 330 nm. In UV, λ max was observed at 290 nm in compound A.

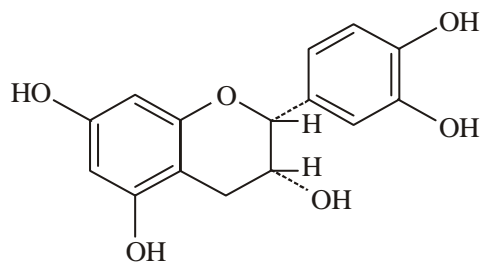
**Linoleic acid (9z, 12z, 15z) – Octadeca – 9, 12, 15 – trienoic acid**

Compound B (Proanthocyanidin): This was obtained from benzene, chloroform fraction (7 : 3) (100 mg). R_f : 0.51 (chloroform : Methanol 9 : 1) M.P-200⁰C^{10,11}.

**Proanthocyanidin**

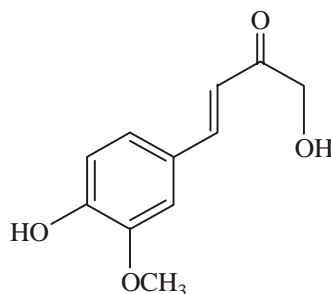
Its I.R spectrum showed the band at 3445 cm^{-1} -O-H stretching; 2928 cm^{-1} -C-H stretching; 2365 ether type of linkage, 1690 cm^{-1} -C=O stretching; $1458, 1380\text{ cm}^{-1}$ -C-H bending, NMR-singals (CDCl_3) (δ ppm) $0.785\text{-}0.987$ -R- CH_3 ; 0.996 multiple O heterocyclic proton, 1.091 R- CH_2 ; $1.234\text{-}1.263$ -R- CH_2 – Protons attached to alkyl group; $1.294\text{-}1.739$ CH proton attached to C=C, $2.180\text{-}2.204$ ester proton, 2.315 benzylic proton, 3.173 ethereal proton, 4.849 ethylenic proton, 6.954 aromatic proton, 9.544 aldehydic proton. The UV-absorption spectra showed peaks at $245, 260, 280, 290, 300, 320,$ and 330 nm . In UV, λ max was observed at 290 nm in compound B.

Compound C (Epicatachein): This was obtained from chloroform, ethyl acetate fraction (7 : 3) (90 mg). R_f : 0.47 (chloroform : ethylacetate 1 : 9) M.P- 180°C ^{12,13}. Its I.R spectrum showed the band at 3431 cm^{-1} -O-H stretching; $2928, 2363\text{ cm}^{-1}$ -C-H stretching; $1691, 1278\text{ cm}^{-1}$ -C=O stretching; 1460 cm^{-1} -C-H bending, NMR-singals (CDCl_3) (δ ppm) $0.734\text{-}1.041$ -R- CH_3 ; $1.065\text{-}1.293$ -R- CH_2 ; 1.306 CH proton, 1.617 allylic proton, 2.111 ester proton, 2.287 benzylic proton, 3.222 CH_2 proton attached to hydroxy, alkoxy, 3.635 CH proton attached to hydroxy, alkoxy, 4.848 ethylenic proton, 6.078 aromatic proton. The UV-absorption spectra showed peaks at $245, 260, 280, 290, 300, 320,$ and 330 nm . In UV, λ max was observed at 290 nm in compound C.



(-) - Epicatechin

Compound D (Fercilic acid): This was obtained from ethyl acetate, methanol fraction (8 : 2) (85 mg). R_f : 0.40 (chloroform : ethylacetate 3 : 7) M.P- 170°C ¹⁴. Its I.R spectrum showed the band at 3448 cm^{-1} -O-H stretching; $2926, 2855\text{ cm}^{-1}$ -C-H stretching; 1734 cm^{-1} -C=O stretching; 1378 cm^{-1} -C-H bending, NMR-singals (CDCl_3) (δ ppm) $0.821\text{-}0.942$ -R- CH_3 ; $1.002\text{-}1.265$ -R- CH_2 ; $1.296\text{-}1.593$ -R-CH protons, 1.694 allylic proton, 2.319 carbonyl group, 3.679 -OR proton, 7.274 aromatic proton. The UV-absorption spectra showed peaks at $245, 260, 280, 290, 300, 320,$ and 330 nm . In UV, λ max was observed at 290 nm in compound D.

**Fercilic acid**

RESULTS AND DISCUSSION

The melting point of the isolated compounds were found out by open capillary tube method and the results were uncorrected. The purity of the compounds was checked by TLC using silica gel G as an adsorbent, ethyl acetate and chloroform (9 : 1) were used as mobile phase. The spot was visualized by iodine vapour or dinitrophenylhydrazine solution. The structure of the isolated compounds was characterized by its IR, HNMR spectral analysis in which coincides with the normal values.

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