Isolation of diterpenoids from *Caesalpinia pulcherrima* wood
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**ARTICLE INFO**

**Article history**
Received 25 NOV 2012
Available online 3 DEC 2012

**Keywords**
Caesalpinia pulcherrima,
furanoditerpenoids,
vouacapen-5α-ol derivatives.

**ABSTRACT**

*Caesalpinia pulcherrima* is also known as peacock flower. *Caesalpinia pulcherrima* (Caesalpiniaceae) is a plant found in West Indies; common throughout Sonaran deserts, naturalized in Texas. Phytochemical study of the plant reveals that the plant contains various phytoconstituents like flavonoids, sterols, triterpines etc. Two caesalpin-type furanoditerpenoids and sitisterol were isolated from the wood of *Caesalpinia pulcherrima*. The chemical structures were elucidated by analysis of their spectroscopic data.

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Please cite this article in press as A. D. Landge et.al. Isolation of diterpenoids from Caesalpinia pulcherrima wood. Indo American Journal of Pharm Research.2013:3(1).
INTRODUCTION

*Caesalpinia pulcherrima* (Caesalpiniceae), a shrub or small tree up to 5 m in height, commonly known as Guleture is distributed throughout India. It has been used as an abortifacient and an emmenagogue in folk medicine. The presence of diterpenoids isovouacapenol C and pulcherrimin A in root, peltogynoids bhonducellin, 6-methoxypulcherrimin and homoisoflavonoids in stem, lupeol, β-sitosterol, flavonoids, and myricetin in flowers, hydrocyanic acid, tannins, and benzoic acid in leaves were reported. Further investigation of the wood led to the isolation of two terpenoids. This study presents the isolation and characterization of two new caesalpin-type diterpenoids, 6β-methoxy-vouacapen-5α-ol (1) and 6β-propanoate-7β-methyl-vouacapen-5α-ol (2), together with sitosterol.

MATERIALS AND METHODS

Collection of Plant Material

The wood of *Caesalpinia pulcherrima* was collected from Nashik, Maharashtra, India. The plant was authenticated by Mr. P. G. Diwakar, Botanical Survey of India, Pune (Voucher no.CRP-2) and preserved in the herbarium of the department.

Extraction and Fractionation

The dried wood (1 kg) was extracted with petroleum ether (60-80°) for 48 h in soxhlet apparatus. The extracts were filtered and concentrated to vacuum under reduced pressure in rotary evaporator and dried in desiccators. Saponification of extract was done and unsaponifiable matter (5 gm), which was dissolved in benzene and chromatographed on a column of silica gel 60 (500 gm) packed in the same solvent. A total of 156 fractions were collected as the solvent was progressively changed to increasingly polar mixture of benzene-ethyl acetate 99:1, 95:5 and 90:10.

Isolation of 6β-methoxy-vouacapen-5α-ol (1) and 6β-propanoate-7β-methyl-vouacapen-5α-ol (2).

Fraction 50-75 (500 mg) obtained from the above column were dissolved in benzene-ethyl acetate (90:10) and chromatographed on a column of silica gel 60 (100 gm) packed in the same solvent. A total of 12 fractions were collected and fraction 3-4 was (200 mg) were applied to preparative TLC plates (developed wit benzene-methanol, 90: 10, and showing two spots) to afford a colourless prism. Which were recrystallized from acetone to afford 1(10 mg) and 2 (8 mg) as needles

6β-methoxy-vouacapen-5α-ol (1) mp 218-221°; UV λ_max (EtOH) nm (logε): 210; IR ν_max (KBr) cm⁻¹: 3462, 2926, 2854, 1658, 1385, 1059, 713; MS m/z: 249, 212, 185, 108, 99, and 55.

6β-propanoate-7β-methyl-vouacapen-5α-ol (2) mp 112-116 °; UV λ_max (EtOH) nm (logε): 220; IR ν_max (KBr) cm⁻¹: 3732, 3464, 2930, 2854, 2395, 1645, 1383, 1018, 823; MS m/z: 187,261, 212, 197, and 108.

Isolation of β-sitosterol. Fraction 21-48 (200 mg) afforded a colorless crystalline compound (50 mg) after crystallization from acetone. The compound was identified in all respect (Co- TLC, ¹ HNMR, MS, IR) with an authentic sample of β-sitosterol.

RESULT AND DISCUSSION

A petroleum ether extract of *Caesalpinia pulcherrima* wood subjected to saponification. Column chromatography of unsaponifiable matter resulted in the isolation of three compounds.
6β-methoxy-vouacapen-5α-ol (1) was isolated as white crystalline compound mp 218-221°, M⁺ m/z 334 for C₂₁H₃₄O₃. Strong absorption in IR at 1658 cm⁻¹ attested to the presence of a 2, 3-disubstituted furan ring. The presence of a hydroxyl group was clear from the IR spectrum (νmax 3462 cm⁻¹) and a mass fragment at m/z 249[M-H₂O]⁺. The hydroxyl group was not readily acetylated under normal conditions, suggesting the presence of a tertiary hydroxyl at C-5, as in all other caesalpins that had previously been isolated from Caesalpiniaeae species[6, 7, 8]. Hence compound 1 was considered to be a tricarbocyclic furanoditerpenoid and was likely to be related to the vouacapen skeleton[9].

6β-propanoate-7β-methyl-vouacapen-5α-ol (2) had a C₂₄H₃₆O₄ molecular formula. A vouacapenol skeleton was suggested when the spectral properties of this compound were compared with 1. The UV spectrum at 220 nm. This spectrum along with the IR νmax 1645, 1383, 1018 and 823 cm⁻¹ and a base-peak in the mass spectrum at M/Z 75 confirmed the presence of a propanoate moiety.

β-sitosterol (3). It was isolated as white crystalline compound. mp 138°

![Compound 1 structure](image1)

1 R¹ = OCH₃, R² = H

2 R¹ = OCOCH₂CH₃, R2 = CH₃
REFERENCES


