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NOTE

Phytochemical Analysis of *Kigelia pinnata*

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The stem bark part of the plant, *Kigelia pinnata*, was analyzed phytochemically and a compound was isolated from the petroleum ether extract. The compound was characterized, employing chemical and spectral methods, and found to be a β-sitosterol.

Key Words: ***Kigelia pinnata*, Extraction, Chromatography.**

Kigelia pinnata, a plant belonging to family Bignoniaceae, colloquially called sausage tree on account of its large fruits, has a variety of uses throughout Africa where it grows as an endemic species in many areas[1]. It is cultivated in many parts of India as an ornamental and roadside tree. The literature survey reveals the presence of quercetin, kaempferol, naphthaquinones, iridoids and flavonoids[2-5]. The stem, bark and fruit extract show activity against melanoma and carcinoma cell lines[6]. Extracts of root bark and stem bark exhibit antitrypnosomal activity[7]. Besides, it is also found to possess antiulcer and antirheumatic activity.

The compound was isolated by chromatographic separation technique from petroleum ether extract. Later, it was analyzed chemically and spectroscopically to identify the steroid compound.

The stem bark was collected from Nashik, India and authenticated by a botanist from the Botany Department, K.T.H.M. College, Nashik.

The stem bark was dried and powdered. The powder was extracted with petroleum ether using Soxhlet extractor. The extract was evaporated under vacuum. Petroleum ether extract contains waxy and other components along with sterol, triterpenes and as these compounds are unsaponifiable, it can be fractionated from waxy saponifiable matter by saponification with alcoholic KOH and solvent ether. The petroleum ether extract thus obtained was chromatographed by TLC using chloroform as eluent and silica gel (100 micron) as stationary phase.

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Several compounds were found to separate out. One of these compounds was isolated and taken for the present study. It was a colourless solid about 700 mg in yield, and was labelled PEF-II.

The compound PEF-II was recrystallized from alcohol. Then it was chromatographed on a silica gel coated glass plate using eluent chloroform to get a single spot. The R_f was found to be 0.55.

The solubility of the compound was tested in different solvents like acetone, ethanol and ethyl acetate. The melting point of the compound was found to be 127–129°C.

About 20 mg of the compound, when treated with concentrated sulphuric acid, gives red coloration known as Salkowski test representing the sterol.

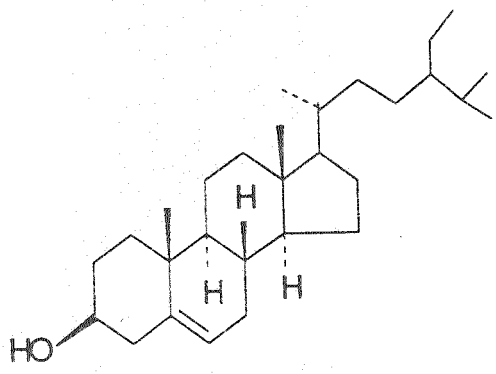
UV-Vis, IR, proton NMR and mass spectral studies were done for this compound PEF-II at the University of Pune. The UV-Vis spectrum was taken using the instrument UV-Vis spectrophotometer model 1601. Spectroscopic grade methanol was used. The IR spectrum was recorded on 8400 FTIR spectrophotometer by the pellet with KBr. For the ^{1}H NMR spectrum, DMSO solvent was used to prepare the solution. Tetramethyl silane (TMS) was the standard.

The colourless compound (m.p. 127–129°C, m.w. 414) gave positive test for steroids. The compound when treated with concentrated sulphuric acid gave red coloration. This confirmed the presence of sterol group.

The UV spectrum of PEF-II showed at λ_{max} 251, 265, 290 and 315. In IR spectrum, a very intensely broad band at 3300 cm^{-1} and moderately intense bands at 1250 and 670 cm^{-1} were observed for the O—H bond vibrations of hydroxyl group. The out-of-plane C—H vibrations of the unsaturated part were observed at 870 cm^{-1}. The corresponding (C=C) vibrations were shown around 1690 cm^{-1} as weakly intense band. The stretching and bending vibrations of methyl part were noticed by an intense band at 2925 cm^{-1} and medium intensity band at 1475 cm^{-1}. The vibration of the methylenic part was shown by the band at 2825 cm^{-1} and the medium band at 1460 cm^{-1}. The moderately intense band at 720 cm^{-1} was attributed to the rocking movement of methylenic part. The bending vibrations of the same (C=C) bond were identified with the moderately intense band around 670 cm^{-1}. The corresponding (C—C) vibration was shown as weak intense band at 1060 cm^{-1}.

^{1}H NMR spectrum showed that two singlet signals at 1.0 and 1.23 might be due to the presence of two methyl groups of an unsaturated part. The multiplet signal at 3.45–3.5 was shown by an olefinic proton. The singlet signal at 5.25–5.4 was shown by the hydroxyl group. The doublet at 2.27 ppm was shown by a methylenic proton. The singlet peak at 7.2 ppm was shown by the two aromatic protons.

From these experimental evaluations the compound PEF-II was identified to be β-sitosterol. The proposed structure was further confirmed by mass spectroscopy (Table-1).



β-sitosterol

TABLE-1
EXPERIMENTAL DATA OF PEF-II

Type of experiment	Data
Cryoscopic method	Molecular mass 414
UV-Vis spectroscopy, λ_{max} (nm)	251, 265, 290, 315
IR spectroscopy, ν (cm^{-1})	3300, 2925, 2825, 1690, 1475, 1460, 1250, 1060, 870, 720, 670
^1H NMR spectroscopy δ (ppm)	1.0 s, 1.23 s, 2.27 d, 3.45–3.55 m, 5.25–5.4 s, 7.2 s
Mass spectroscopy, M/z	396, 381, 354, 329, 314, 255, 241, 229, 213, 199, 173, 159, 158, 145, 135, 119, 105, 95, 81, 69, 65

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