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A PHYTOCHEMICAL ANALYSIS OF THE MEDICINAL PLANT: *HELICTERES ISORA*

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Abstract: The stem bark part of the plant, Helicteres isora was analyzed phytochemically and a compound was isolated from the petroleum ether extract. The compound was characterized, employed chemical and spectral methods found to be a β – sitosterol.

Key Words: Helicteres isora, Extraction, Chromatography, β – sitosterol

Introduction

Helicteres isora is belongs to family Sterculiacae is a sub-deciduous shrub or small tree of having spreading habit with stem 1-5 inches in diameter, reaching a height of 5-15 feet. The species is native to Asia and Australia[1]. It occurs, throughout India, from Jamuna eastwards to Nepal, Bihar and Bengal and southern India and Andaman Islands. It occurs as undergrowth, especially as a secondary growth in forests.

The literature survey reveal the presence of flavones[2], triterpenoids[3], cucurbitacin[4], phytosterols, saponins, sugars and phlobatannins[5].

The root and stem barks are considered to be expectorant, demulcent, astringent and anti-galactagogue and are useful in colic, scabies, empyema, gastropathy, diabetes, diarrhea and dysentery[6].

The fruits are astringent, acrid, refrigerant, demulcent, constipating, stomachic, vermifuge, vulnerary, haemostatic and urinary astringent. They are useful in vitiated conditions of pitta ophthalmitis, colic, flatulence, diarrhea, dysentery, verminosis, wounds, ulcers, hemorrhages, epistaxis and diabetes[6].

The fruit extract of possess weak anti-HIV (I) activity[7]. The ethanolic root extract possess cytotoxicity in the 9 KB (human nasopharyngeal carcinoma) cell culture assay[8]. The fruits were also found to possess significant antispasmodic activity[9].

Materials and Methods (Experimental)

Plant Material: The stem bark was collected from Anjaneri (Nashik) (MS) and authenticated by a botanist from Botany department of K.T.H.M.college, Nashik.

Extraction: 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 technique using chloroform as eluent and silica gel (100 micron) as stationary phase. Several compounds were found to separate out. One of these compounds was isolated and taken for the present study. It was a colorless solid about 500 mg in yield, and was labeled PHI- E.

The compound PHI- E was recrystallized from alcohol. Then it was chromatographed on silica gel coated glass plate using the eluent chloroform to get single spot. The Rf was found to be 0.52.

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 ^{0}C.

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

The UV –Vis., IR, proton NMR studies were done for this compound PHI- E at University of Pune. The UV-Vis spectrum was taken using the instrument UV-Visible spectrophotometer model 1601. Spectroscopic grade methanol was used. The IR spectrum was recorded on 8400 FTIR spectrophotometer by the pellet with KBr. For the proton NMR spectrum DMSO solvent was used to prepare the solution. Tetramethyl silane (TMS) was the standard.

Results And Discussion

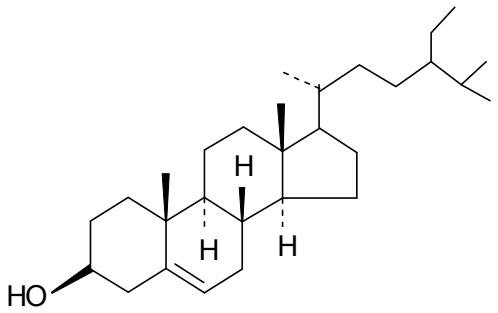
The colorless compound (m. p. 125-127 ^{0}C) gave positive test for the steroids. The compound treated with concentrated sulphuric acid fives red coloration. This confirmed the presence of sterol group.

The UV spectrum of PHI-E showed at λ_{max} 251,265,290 and 315

In the IR spectrum a very intensely broad band at 3308 cm^{-1} and moderately intense band at 1241 and 667 cm^{-1} were observed for the O-H bond vibrations of hydroxyl group. The out of plane C-H vibrations of the unsaturated part was observed at 838 cm^{-1}. The corresponding C=C vibrations was shown around 1690 cm^{-1} as weakly intense band. The stretching and bending vibrations of methyl part were noticed by the intense band 2881 cm^{-1} and medium intensity band at 1464 cm^{-1}. The vibration of the methylenic part was shown by the band at 2853 cm^{-1} and the medium band at 1381 cm^{-1}. The moderately intense band at 738 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 1022 cm^{-1}.

The proton- NMR spectrum showed that two singlet signals at 1.0 and 1.23 might be due to the presence of two methyl group of an unsaturated part. The multiplate at 3.45-3.55 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 evaluation the compound PHI-E was identified to be β – sitosterol.



β – sitosterol

Table I: Experimental Data of PHI-E

Type of Experiment	Data
UV-Vis spectroscopy, λ_{max}(nm)	251,265,290,315
IR spectroscopy, ν (cm^{-1})	3308, 2881, 1690, 1464, 1381, 1241, 1022, 838 , 738, 670, 667
^{1}H – NMR spectroscopy δ (ppm)	1.0s, 1.23s, 2.27d, 3.45-3.55m, 5.25-5.4s, 7.2s
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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