PHYTOCHEMICAL INVESTIGATION OF *Schleichera trijuga* WILLD. LEAVES*

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Dedicated to late Dr G. S. Gupta.

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Chromatographic and spectrometric methods were employed during the chemical investigation of the light petroleum extract of the leaves (2·6%) of the *Schleichera trijuga* WILLD. Neutral portion afforded n-alkanes (18·7%; C_{26}—C_{35}), free alcohols (35·3%; C_{26}—C_{34}) and phytosterols (43%) (stigmasterol 58·4%; β-sitosterol 19·6%; campesterol 18·6%; cholesterol 1·9%; brassicasterol 1·5%). Amino acids, glucose and fructose along with tartaric and oxalic acids have also been characterised in various plant extracts employing co-paper chromatography.

Schleichera trijuga WILLD. syn. *S. oleosa* (LOUR.) MERR. (*Sapindaceae*) is well known evergreen tree and useful medicinal plant of India[1-3]. Since no work appeared to have been done on the leaves so far, they were subjected to investigation by solvent extraction followed by chromatographic and spectroscopic methods.

EXPERIMENTAL

Extract. The air-dried and powdered leaves (1 kg, The University Campus, Aligarh) were extracted successively with light petroleum (60—80°C), benzene and ethanol and aqueous ethanol (50%) (5 l each) at room temperature and their boiling point respectively. The plant material was then subjected to steam-distillation which afforded a steam-volatile oil (3·0%). The defatted leaves were treated with water, NaOH (0·2%) and aqueous ethanol (80%) for the isolation of proteins, sugars and acids.

Chromatography. The silica gel and alumina for column and thin layer chromatography and the experimental technique were the same as reported[4]. Elution of the plate with benzene and light petroleum (8 : 2) gave the following R_F values: Alkanes 1·00, alcohols 0·60; elution with benzene showed R_F 0·37 for phytosterols. Amino acids and free sugars were identified using descending paper chromatography[5,6], while the ascending technique was used for non-volatile carboxylic

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acids[6]. Gas chromatography was performed on PYE series 104 chromatograph Model 124 as described[4]. Graphical method[7] and co-injection of standards were utilized in identification.

Spectroscopy. PYE Model 104 chromatograph connected[8] with a mass spectrometer A.E.I. MS 9 were used for providing the mass spectra of phytosterols in form of trimethylsilyl ethers[8]. IR spectra were recorded in a Perkin Elmer Spectrometer in KBr discs.

Separation and identification. The light petroleum extract (2·6%) was dissolved in diethyl ether and treated with aqueous KOH (10%). No significant product could be isolated from the alkali-soluble part. The gummy residue, left after the steam-distillation of the alkali insoluble part was taken in chloroform and diethyl ether (1 : 1) and subjected to column chromatography on alumina. Light petroleum eluted a crude product (18·7% of the alkali insoluble part) which was further purified by chromatography on silica gel (+10% $AgNO_3$). A waxy solid had m.p. 58–60°C and IR spectrum exhibited bands at 2941, 2885 cm^{-1} (C—H), 1471, 1464 cm^{-1} (C—CH_3) and 730, 718 cm^{-1} $(CH_2)_n$. The subsequent fraction (35·5% of the alkali insoluble part) was obtained on elution with light petroleum–benzene (1 : 1), m.p. 84–86°C; it showed IR absorption bands at 3450, 1058 cm^{-1} (OH), 2899, 2967 cm^{-1} (C—H), 1471, 1464 cm^{-1} (C—CH_3) and 730, 719 cm^{-1} $(CH_2)_n$. Elution with benzene–chloroform (1 : 1) yielded a fraction (43·0% of the alkali insoluble part), m.p. 154–155°C, which showed positive Liebermann–Burchardt reaction and with tetranitromethane. IR spectrum revealed the presence of OH group (3450, 1055 cm^{-1}), double bond (1640, 840 cm^{-1}) and geminal methyl grouping (1381, 1370 cm^{-1}). Spectral data along with microtests and melting points of derivatives (acetate 130 to 131°C, benzoate 158–160°C) indicated a mixture of sterols which could be separated and identified by GLC and GLC-MS[8,9].

RESULTS

The leaf wax showed the presence of a homologous series of n-alkanes (C_{26}—C_{35}); odd members predominated[10,11] with abundance of C_{31} and C_{29} (Table I). The homologous series of free alcohols (C_{26}—C_{34}) was also identified, with the preponderance of even numbered homologues[4,10], mainly C_{32}, C_{30} and C_{34} (Table I).

TABLE I
n-Alkanes and Free Alcohols

Number of C atoms	Hydrocarbons[a]	Alcohols[a]	Number of C atoms	Hydrocarbons	Alcohols
26	traces	traces	31	75·0	0·4
27	0·6	0·3	32	3·0	57·0
28	1·7	2·5	33	3·7	5·6
29	10·6	0·9	34	0·5	9·3
30	4·7	19·8	35	0·2	—

[a] Percent by weight, obtained by GLC (triangulation).

The mixture of phytosterols contains stigmasterol (58·4%), β-sitosterol (19·6%), campesterol (18·6%), cholesterol (1·9%) and brassicasterol (1·5%). The presence of five amino acids was identified in the hydrolysates. Ethanolic extract have indicated the presence of glucose and fructose in the ether insoluble part while non-volatile tartaric and oxalic acids have been identified in the alcoholic and aqueous–ethanolic (50%) extracts.

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