Root-heartwood : Dried chipps of heartwood was extracted with hot petroleum ether (60-80°). The concentrated extract when chromatographed over silica-gel gave β-amyrin and β-sitosterol only.

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Chemical Constituents of *Dillenia indica* Linn. and *Vitex negundo* Linn.

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DILLENIA indica Linn[1]. *(Dilleniaceae)* commonly known as "Chalta" is a large evergreen tree occurring throughout India and the alcoholic extract of its leaves was found to cause depression of central nervous system[2]. Literature survey revealed that some work has been done on the stem bark[3] and fruits[4] of this plant. We now report the results of chemical examination of the leaves of this plant on which no work has been done so far.

Vitex negundo Linn. *(Verbenaceae)* is reported to have medicinal importance[5]. Its roots used as expectorant and febrifuge while the leaves are applied in the removal of foetid discharges and in rheumatic pains of joints. The leaves and seeds of this plant have been investigated earlier[6-12]. A chemical investigation of the root of the plant has, therefore, been undertaken.

D. indica : The air dried powdered leaves were successively extracted with petroleum ether (60-80°) and chloroform. The petroleum ether (60-80°) extract was concentrated and separated into acidic and neutral fractions after following usual procedure.

Experimental

The acidic fraction was esterified with CH_2N_2 and the product on chromatography over silica gel furnished a solid m.p. 216°, identified as methyl betulinate (m.m.p. and CO – IR).

The neutral fraction was subjected to chromatographic separation over silica gel. Elution of the column with petroleum ether (60-80°) and benzene (1 : 1) mixture afforded a solid crystallised from methanol in shining flakes, m.p. 108°, ν_{max}^{KBr} 1700 cm^{-1} (carbonyl), oxime, m.p. 170° ; NMR in $CDCl_3$ (δ) 0.65, 2H, bs (cyclopropyl methylene), four singlets of 3 protons each at 0.85, 0.95, 1.00 and 1.01 (for tert. $-\overset{|}{C}-CH_3$) ; 1.21, 3H, d (J = 6 cps) ($-CH-CH_3$) ; 1.65, 3H, s, 1.70, 3H, s for the vinylic methyls and 5.15, 1H, m (olefinic proton).

The mass spectrum of the compound exhibits, a close resemblance to cycloartenone[14] showing significant peaks at m/e 424 (M^+), 409, 340, 313 and 286. Finally this compound was identified as cycloartenone by usual comparison (m.m.p., CO – TLC and superimposable IR spectra) with authentic sample.

Further elution of the column with the same solvent furnished two compounds : one having m.p. 88°, ν_{max}^{KBr} 3300 cm^{-1}, MS : 452 (M^+), 434, 421 and another compound, m.p. 137°, the m.p. of its acetate is 127-8°. These two compounds were identified as *n*-hentriacontanol and β-sitosterol respectively by comparative studies (m.m.p., Co – TLC and CO – IR) with the authentic samples.

The fraction eluted with benzene-chloroform (1 : 1) yielded a triterpene crystallised from methanol, m.p. 252°, ν_{max}^{KBr} 3480 cm^{-1}, acetate, m.p. 217°, identified as betulin by usual comparison (m.m.p., Co – TLC and CO – IR).

The chloroform extract on usual chromatography over silica gel yielded β-sitosterol and betulinic acid.

V. negundo : The dried and powdered root was successively extracted with petroleum ether (60-80°) and benzene. The petroleum ether (60-80°) extract was chromatographed over Brockmann alumina. Elution of the column with petroleum ether (60-80°) gave a solid which on repeated crystallisation from petroleum ether furnished colourless needles, m.p. 68°. It does not respond to Liebermann-Burchardt test for sterol or triterpene. The IR spectrum of this compound shows absorption peaks at 2920 and 2850 (C – H stretching), 1465, 1460, 1370 ($-\overset{|}{C}-CH_3$ bending), 730, 720 cm^{-1} [$(CH_2)_n$ bending]. The NMR spectrum (100 MHz, $CDCl_3$) showed signals

at δ 0.90 (6 protons) and δ 1.25 (58 protons) indicating it to be a saturated aliphatic hydrocarbon. The identity of this hydrocarbon as *n*-hentriacontane has been confirmed by m.m.p.,Co – TLC and CO – IR with authentic specimen of the compound.

Elution of the column with benzene gave a white solid, m.p. 125-30° which responds to positive Liebermann-Burchardt test for sterol. The mass spectrum of the compound registered two molecular ion peaks at m/e 414 and 412 respectively along with other peaks at m/e 396 (414-H_2O), 394 (412-H_2O), 255 (396-side chain $C_{10}H_{21}$ or 394-side chain $C_{10}H_{19}$). These data reveals that this compound is a mixture of β-sitosterol and stigmasterol. Further separation of this mixture was not possible due to paucity of the material.

The fraction eluted with benzene yielded a white solid crystallising from methanol as colourless needles, m.p. 126°, ν_{max}^{KBr} 1725, 1160 cm^{-1} (ester-carbonyl). It responds positive to Liebermann-Burchardt tast for sterol and was identified as β-sitosterol acetate from the mass spectrum [M^+ 456, m/e 414 ($M-CH_2CO$), 396 ($M-CH_3COOH$), 255 (396-$C_{10}H_{21}$)], m.m.p. determination, Co – TLC and CO – IR with authentic sample of β-sitosterol acetate.

The benzene extract on chromatographic resolution afforded only β-sitosterol.

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Studies on Carbohydrates and Amino Acids of Some Non-Cultivated Leguminous Seeds

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PRELIMINARY analysis for proximate principles of nine non-cultivated leguminous seeds of *Cassia fistula, C. occidentalis, C. tora, Indigofera glandulosa, I. hirsuta, I. trifoliata, Mucuna capitata, M. prurita* and *Trigonella occulta* showed them as appreciably rich sources of carbohydrate and proteins, suggested their possible inclusion in animal nutrition. Before including them in dietary, it was considered pertinent to evaluate their adequacy, both qualitative as well as quantitative, as complete proteins with respect to their essential amino acids listed for normal growth and maintenance[1]. The total water soluble carbohydrate and total reducing substances were analysed at room temperature ($27 \pm 3°$) as well as at 100°.

Materials and Methods :

Healthy and dry mature seeds were collected, botanically identified, powdered to 100 mesh, defatted with petroleum ether (b.p. 60-80°) and employed in all investigations.

The total soluble carbohydrate estimation was carried out by the method of Trevelyn and Harrison[2] and total soluble reducing substances were estimated by the method of Hagedorn and Jensen as described by Hawk, Oser and Summerson[3] and modified by Howden and Kilby[4]. The results are shown in Table 1.

The presence and distribution of soluble carbohydrates like glucose, fructose, sucrose, raffinose,