

(figure 3) while the fossil horn-core shows well-defined alternate layers of black (pigment ?) and light colours (figure 4) which may signify the layers of epithelium cells known as epithelial squames³ as observed in the transverse section of the present day mammalian horn-core. There is overall similarity in the microstructures of Dinosaurian horn-core and mammalian horn-core.

On reconstruction the horn-core appears to be about 1.2 m in length (figure 2). The horn-core is probably a part of brow-horn (supra orbital horn-core). The recorded size of brow horn-core varies from 1.3 to 2 m in different species⁴.

The present discovery of Dinosaurian horn-core from the locality is of great importance as it signifies the presence of family Ceratopsidae of sub-order Ornithischia of the Ornithischian Dinosaurs⁵, which appeared during the late Cretaceous period and where the last phase of Dinosaurian evolution⁶ occurred.

8 May 1984; Revised 21 July 1984

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MARINE NATURAL PRODUCTS—II: CHARACTERISATION OF LIPID FRACTION FROM THE STONY CORAL *PORITES* *LUTEA*

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MARINE flora and fauna contain complex and interesting steroid mixture¹. Until the introduction of refined techniques such as gas liquid chromatography (GLC) and more recently the combined use of GLC and mass spectrometry, many of the sterols were inseparable and thus not detectable in pure form; this led to confusion in the characterisation of certain sterols. Using the new techniques it is easier to identify steroids from few milligrams of the mixture.

We have earlier² discussed the isolation of batyl alcohol and a sterol, brassicasterol. The sterols from *Porites lutea* could not be identified due to the lack of sample. The present communication deals with the characterisation of different sterols and fatty acid constituents by GC-MS, IR, NMR and MS techniques.

The lipid fraction on repeated column chromatography yielded the sterol mixture³, fatty acids and their methyl esters. The sterol mixture when subjected to GLC on 3% OV-17 (270°) and mass-spectra run on MAT-44, showed it to be a mixture of seven sterols corresponding to molecular ions M⁺ 384, 386, 398, 400 and 412; 414 and 412 representing respectively GLC peaks I to VII. Wyllie *et al*⁴ examined mass spectrometric fragmentation of a number of sterols observing diagnostically important and mechanistically interesting cleavage associated with the presence of a side chain double bond. These findings help natural product chemists in the structural elucidation of steroids.

Mass spectral fragmentation of compounds corresponding to GLC peak Nos. I (M⁺ 384), III (M⁺ 398), V (M⁺ 412) and VII (M⁺ 412) showed major fragment ion at m/e 271 corresponding to the loss of side chain plus two hydrogens, indicating that these compounds have side chain double bond and probably have Δ^5 , 3-OH moiety. Sterols corresponding to peak Nos. I, III & V show fragment ion at m/e 273 by an allylic cleavage and strong peak at m/e 300 indicating Δ^{22} double bond. Besides, these fragment ions, peak Nos. V has base peak m/e 69, which is characteristic of 4-demethyl, 5-dehydrodinosterol, peak No. VII show intense fragment ion m/e 314 formed by McLafferty type rearrangement corresponding to fucosterol with

characteristic triplet of low intensity at m/e 299, 300 and 301. Based on these observations and comparison of fragmentations of 22-dehydrocholesterol (2), brassicasterol (3), 4-demethyl-5-dehydrodinosterol (5) and fucosterol (7) with compounds corresponding to peak Nos. I, III, V and VII respectively establishes their identity.

The compounds corresponding to the remaining peak Nos. II, IV and VI do not show m/e 271, hence absence of side-chain unsaturation, but prominent fragment ions at m/e 273, 255, 231 and 213 demonstrate the presence⁵ of conventional cholesterol nucleus. These observations compelled us to check the identity of peak Nos. II, IV and VI with cholesterol (2), dihydrobrassicasterol (4) and 24-ethyl cholesterol (6) respectively and were found identical.

The sterols were finally confirmed based on relative retention times compared with authentic samples* and co-injection on HPLC (RP-8, 95:5, MeOH-H₂O).

The relatively less polar constituents of the lipid fraction mostly contained methyl esters (ν , 1745 cm^{-1}) which were separated on silver nitrate-silica gel column (pet. ether-methylene chloride gradient elution) to give methyl palmitate (M^+ 270; NMR δ 0.9 (t, 3H), δ 1.2 (s, 26H) δ 2.3 (m, 2H) and δ 3.7 (s, 3H) methyl heptadecanoate M^+ 284, NMR: δ 0.9 (t, 3H), δ 1.2 (s, 28H), δ 2.3 (m, 2H) and δ 3.7 (s, 3H), methyl stearate M^+ 298 NMR: δ 0.85 (t, 3H), δ 1.2 (s, 30H), δ 2.3 (m, 2H) and δ 3.7 (s, 3H) and methyl oleate M^+ 296; NMR δ 0.85 (t, 3H), δ 1.255 (s, 22H), δ 1.7–2.5 (m, 6H) δ 3.7 (s, 3H) and δ 5.3 (m, 2H). The fatty acids were methylated with diazomethane and the methyl esters formed were found identical with the above fatty esters. The final confirmation was made by comparing the literature values of authentic samples^{6a-c}.

We are grateful to Dr V. V. R. Varadachari, Director, for his keen interest in the work. Our thanks are due to P. J. Scheuer for authentic sample of dihydrobrassicasterol and to Dr W. Fenical for GC-MS data.

31 May 1984

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SOME NEW HOST RECORDS OF THE ROOT-KNOT NEMATODE, *MELOIDOGYNE INCOGNITA* (KOFOID & WHITE, 1919) CHITWOOD, 1949

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It is now established that root-knot nematodes (*Meloidogyne* spp.) cause enormous losses to many economically important crops and they are ranked as number one nematode pests. These nematodes are polyphagous and have a very wide host range in India. However, their potentiality to cause damage to the medicinal and aromatic plants remains unknown. Therefore, a survey was conducted in the farm of CIMAP Headquarters, Lucknow to identify the prevailing species of the nematode and to assess the incidence and severity of the disease amongst the medicinal plants and to locate hitherto unrecorded hosts.

The female nematode specimens were taken out from root galls and their perennial patterns were cut, stained in hot acid fuchsin (0.01%) and mounted in lactophenol for specific identification. The root infection was noted as: + = light, ++ = moderate, +++ = heavy, ++++ = severe; with the size of root galls as small (S), medium (M) and large (L) were also noted.

* We were unable to get authentic sample of (5) for comparison.