Pakistan J. Pharm. Sci. Vol.2(No.2), 1989.

STUDIES ON ACHRAS SAPOTA L; PART III. ISOLATION AND IDENTIFICATION OF SOME TRITERPENOIDS FROM THE LEAVES OF ACHRAS SAPOTA L.

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ABSTRACT

The triterpenoids present in the leaves of Achras sapota L belongs mainly to α/ß-Amyrin and Lupenol series. A long straight chain hydrocarbon, tritriaromane was also found to be present in the n-Hexane extract of the leaves.

Introduction

Achras sapota L. belongs to the sapotaceae family and is commonly known as lichu. Its various parts are reputed to possess medicinal properties. The bark of the ant is reported to contain certian active principles which have tuberculostatic properties (Mirimanoff and Thanes; 1961). In the unnani and Indian systems of divine, the fruits and seeds of chichu have been used as drugs for the treatment of ions diseases; thus the fruit is claimed to prevent billiousness and febrile attacks, whereas seeds helps in diuresis (Dymock, 1893). The chief mercantile product of the e is the milky latex, commercially known as chicle (Hill 1952). The fruit beside being a popular table fruit is also used for the preparation of jams and sherbets Gianai, 1968).

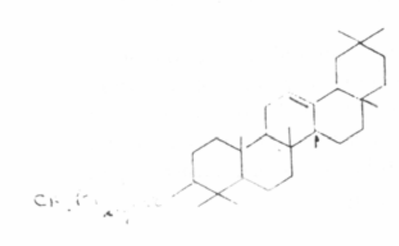
We have earlier reported about the nature and composition of various amino Is and sugars present in the leaves of Achras sapota (Ifzal et. at, 1982). Various no acids, carbohydrates and polysaccharides present in the fruits have also been reported by us (Ifzal, Ahmed & Prevez,1982). In the present communication we wish Tort the presence of various types of triterpenoids in the leaves of Achras sapota fined by repeated column and thin layer chromatography.

Results and Discussion

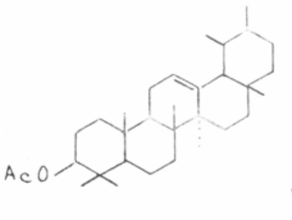
Fresh leaves of Achras sapota (2Kg) collected in the month of March were washed and dried at room temperature. The leaves were percolated and extracted with n-Hexanc. The extract was concentrated to one third its volume and methanol added, whereupon a white sticky prescipitate consisting mainly of latex separated out. The mixture was filtered and the precipitate kept aside. The resulting n-hexane/methanol filtrate on examination by tlc was found to be a mixture of several compounds and was, therefore, concentrated to dryness under reduced pressure and chromatographed over a column of neutral alumina. The column was eluted with neat pet. ether (40-60°) and mixture of pet. ether/benzene (in increasing order of polarity). Fractions eluted from neat petroleum ether gave a yellow gum which on tlc examination showed it to be a mixture of four major compounds.

The yellow gum was therefore rechromatographed over a column of silica gel. the first twenty fractions of 10ml. each eluted with hexane: ethyl acetate (40:1) yielded a white waxy solid, m.p. 62-66°, which on repeated recrystalisation from dichloromethane/ methanol afforded a solid m.p. 64-66°. Mass spectrum of the compound gave a molecular ion peak at M + = 464 with a base peak at m/e = 71. All other peaks from 71 to 464 were in order of decreasing intensity. The infrared and 100MHz proton nmr spectrum were typical of a long straight chain hydrocarbon. On the basis of m.p. and spectral data the compound was identified as tritriacontane.

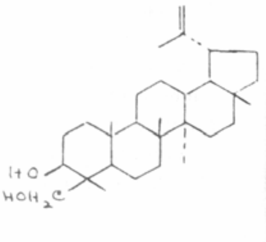
The next twenty fractions eluted with pet.ether/benzene (80:20) yielded a whitish gum which solidified on cooling. This on recrystallisation from ether: MeOH (1:1) gave a pure crystalline compound (l60mg) m.p. 82-84°. FAB mass spectrum showed M + at 566 with a base peak at m/e = 218 indicative of a triterpeniod belonging to a/J3-amyrin series. Infrared spectrum showed υ_{max} at 2910 and 2850 due to CH strechings with sharp absorptions at 1710 and 1235cm^{-l} due to ester group. The presence of peaks at m/e = 408 and 409 indicated the loss of (M^+-158) and (M^+-157) due to $CH_3(CH_2)_7COOH$ and $CH_3(CH_2)_7COO$ moieties. The infred spectrum in the 1400-1250cm^{-l} region resembled the characteristic IR-absorption for the Oleanic acid series of compounds (Tschese, et. al., 1962). On the basis of the spectral data available, the compound is probably β-Amyrin pelargonate [pelargonoic acid =$CH_3(CH_2)_7COOH$] having the structure I shown below:



I



II



III

Fractions 41 to 80 eluted with' pet. ether/benzene (70:30) were found to be mixture of three compounds on examination by tlc [solvent systems: n-hexane/EtOac (40: 1); n-hexane/benzene (1:1); pet. ether/benzene (7:3)]. The fractions were therefore combined and concentrated to dryness under reduced pressure, whereupon a this buff white solid (210mg) was obtained. Separation of compounds in this buff white solid was achieves by PLC using silica gel 1mm thick layer plates (20x20cm). Three distinct bands were observed in UV light which were scraped off and extracted with chloroform to yield two compounds RL-2 and RL-3. The compound RL-1 from the third band could not be extracted in appreciable quantity for spectral analysis.

The compound RL-2; m.p. 219-222° showed the molecular ion peak, M^+ at 468 with a base peak at m/e=218. Its infrared spectrum showed strong absorption at υ_{max} =2915, 2870cm^{-1} due to CH stretch and 1725 and 1235 due to ester group. The peak at m/e=408 in the mass spectrum arise due to loss of M^+-60 indicating the presence of CH_3OO^- group. This was further confirmed by the presence of a sharp singlets at &= 2.01 ppm (3H's) in the 100MHz proton nmr spectrum. The nmr spectrum also showed eight methyl singlets at δ=0.77 (1xCH_3); 0.80 (3xCH_3); 0.83(1XCH_3); 0.92(lxCH_3; 0.95 (1xCH_3) and 1.00 (1xCH_3). A distorted triplet at δ=5-01 ppm is due to proton at C_{12} i.e. ^{H}C=C while a broad signal at δ=4.62 accounted for C_3 hydrogen which also bears the Ac0-group. On the above basis the compound RL-2 was identified as α amyrinacetate, shown by structure II.

The compound RL-3, m.p. 256-260°, gave positive Libermann-Burchart test. The molecular formula $C_{30}H_{48}O_2$ was predicted on the basis of mass spectra which showed the mol. ion peak m/e=440 and a base peak at m/e 204. The infrared spectrum exhibited υ_{max}. at 3640cm^{-1} (-OH str); 2950. 2860 (-CH str); 1640 (weak, C = C); 1452 (broad, CH_2 sissoring and CH_3 anti. symn. deformation); 1381, 1360 (CCH_3 deformation) 1381, 1360 (C-CH_3 deform)1090 (sec.-OH) 1040 (primary -OH); 970 and 880 due to isopropenyl group. The 100 MHz proton nmr showed methyl singlets at δ=0.78 (1xCH_3); 0.83 (1xCH_3) 0.91 (1xCH_3); 0.94 (2xCH_3); 1.02 (1xCH_3) and 1.68 due to CH_3 of the isopropenyl group. The olefinic protons of the isopropenyl group appeared at δ=4.59 and 4.73 as doublets with small coupling constant of 1Hz. On the basis of above the compound was shown to be Lup-20(29)-en-3. 23-diol; shown by structure III.

Recently Australian workers (Hart, Lamberton & Triffett, 1973) have identified four triterpene acids from the wood of Achras sapota. Several triterpenoids have also been isolated from the fruits of Achras sapota by us details of which will be communicated soon.

Acknowledgement

We wish to thank the University of Karachi for providing the necessary facilities to carry out the above studies.

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