In conclusion, the assessment of biopharmaceutical evaluation was successfully applied to the microcapsule formulations of verapamil hydrochloride. The rate of absorption appeared to be more sustained, resulting in a relatively more uniform plasma concentration profile of the drug about at least 12 h. About twice and more bioavailabilities were noted with sustained release formulations even though the drug has substantial first pass metabolism. The results indicate that it is possible to make a once a day oral controlled release dosage form for verapamil hydrochloride.

ACKNOWLEDGEMENTS

We are thankful to Torrent Pharmaceuticals Ltd., for their gift sample of verapamil hydrochloride. We also sincerely express gratefulness to Sri Kunal Roy, Lecturer, SIPS (Orissa) for co-operation in necessary computational work.

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Chemical Components of *Melia azedarach* Stems

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Accepted 29 March 2000
Revised 21 March 2000
Received 16 October 1999

***Melia azedarach* stems have been shown to contain melianin B, sendanolactone, ohchinin acetate, surianol and 3α-hydroxy-4,4,14 α -trimethyl-5α-pregn-8-en-20-one. The first three have already been reported from this plant. The last two compounds have already been reported from *Suriana maritama* and *Fomes officinalis* respectively.**

Melia azedarach, known as bakain, drek and mahanimb, belongs to the family Meliaceae. It resembles neem in many respects and possesses antimicrobial, insecticidal and nematicidal properties. An aqueous extract of its leaves increases haemoglobin[1]. Its stems have been reported to contain melianin A, melianin B, nimbolin A and nimbolin B[2,3]. We have undertaken a reinvestigation of its stems.

The dry stems of *Melia azedarach* (12 kg) were procured from the Landscape, CCSHAU, Hisar and extracted with hot methanol. The methanolic extract (300 g) was subjected to silica gel (60-120 mesh) column chromatography. Elutions with petroleum ether, benzene, ethyl acetate, methanol and their mixtures in the order of their

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increasing polarity afforded five compounds which were characterised on the basis of their spectral data. ^{1}H NMR was recorded on a Bruker AC-300F 300 MHz NMR spectrometer in $CDCl_3$ using TMS as the internal standard. The other instruments used are Hitachi 570 infrared spectrophotometer and VG-705 11-250J GCMS-DS Mass Spectrometer.

Surianol was crystallised from hexane as colourless solid (12 mg), m.p. 170° (lit[4] m.p. 173-174.5°). The compound was acetylated with Ac_2O/Py; m.p. 131° (lit[4] m.p. 132-134°). IR (cm^{-1}, KBr) 3463, 3060, 2960, 2360, 1604,1095, 1026, 802, 702. ^{1}H NMR (δ, $CDCl_3$) 0.13 (d, 1H, J = 4 Hz, cyclopropane H), 0.46 (d, 1H, J = 4 Hz, cyclopropane H), 0.91 (s, 3H, CH_3), 0.99 (s, 6H, 2xCH_3), 1.03 (d, J = 6.5 Hz, 6H, 2 x CH_3), 3.08 (t, 1H, J = 9 Hz, CHOH), 3.39 (m, 1H, CHOH), 4.65 (br s, 1H, = CH-), 4.70 (br s, 1H, = CH).

MS (m/z, rel. int.) 429 (M^+ + 1, 1.51), 428 (M^+, $C_{29}H_{48}O_2$, 0.1), 274 (10.03), 259 (16.12), 244 (10.94), 231 (26.07), 121 (14.23), 109 (11.30), 107 (20.84), 93 (7.38), 55 (100), 43 (64.24), 41 (92.38).

Melianin B was crystallised from benzene as a colourless solid (13 mg), m.p. 195° (lit[2] mp 198°). It readily formed an acetate with Ac_2O/Py, m.p. 268° (lit[2] mp 268-270°). IR (cm^{-1}, KBr) 3463, 2954, 2360, 1712, 1380,1026, 810. ^{1}H NMR (δ $CDCl_3$) 0.92 (s, 3H, CH_3), 1.03 (s, 9H, 3xCH_3), 1.15 (s, 6H, 2xCH_3), 1.27 (s, 3H, CH_3), 1.64 (s, 3H, OAc), 2.04 (s, 3H, OAc), 4.64 (m, 1H, H-1), 4.94 (m, 1H, H-3), 5.22 (m, 1H, H-7), 5.35 (m, 1H, H-15), 7.50 (m, 3H, Ar-H), 8.07 (m, 2H, Ar-H). MS (m/z, rel. int.) 694 (M^+, $C_{41}H_{58}O_9$, 2.0), 680 (M^+-14, 0.23), 472 (0.32), 438 (0.98), 424 (1.73), 409 (1.83), 299 (1.91), 245 (2.96), 161 8.98), 133 (15.99), 107 (23.22), 95 (35.36), 69 (58.81), 55 (100), 43 (90.87).

Sendanolactone was crystallised from benzene as solid mass (15 mg), m.p. 208° (lit[5] m.p. 208-209°). IR (cm^{-1}, KBr) 1780, 1712, 1674, 1380, 1049, 732. ^{1}H NMR (δ, $CDCl_3$) 0.98 (s, 3H, CH_3), 1.10 (s, 3H, CH_3), 1.33 (s, 3H, CH_3), 1.39 (s, 6H, 2xCH_3), 1.64 (s, 3H, CH_3), 1.70 (s, 3H, CH_3), 4.16 (m, 1H, H-17), 5.10 (m, 1H, = CH-) 5.34 (m, 1H, = CH-) MS (m/z, rel. int.) 466 (M^+, $C_{30}H_{42}O_4$0.42), 438 (0.89), 410 (6.54), 396 (13.14), 313 (8.84), 269 (24.75), 253 (9.92), 229 (23.01), 147 (30.05), 124 (100), 107 (39.20).

3α-Hydroxy- 4,4,14 α-trimethyl- 5α-pregn-8-en-20-one was crystallized from benzene as pale yellow solid (18 mg), m.p. 230° (lit[6] m.p. 230-232°). Acetylation of the compound with Ac_2O/pyridine afforded acetate having m.p. 250° (lit[6] m.p. 250-252°). IR (cm^{-1}, KBr) 3787, 3456, 1728, 1458, 1380, 1049, 810. ^{1}H NMR (δ, $CDCl_3$) 0.75 (s, 3H, Me), 0.90 (s, 3H, Me), 0.99 (s, 9H, 3 Me), 2.05 (s, 3H, Me). MS (m/z, rel. int). 359 (M^++1, $C_{24}H_{38}O_2$ + 1, 53.40), 135 (39.52), 121 (69.42), 107 (65.70), 93 (67.14), 78 (66.62), 44 (100).

Ohchinin acetate was crystallised from ethyl acetate as a pale coloured compound (25 mg), m.p. 220° (lit[7] m.p. 223-226°). IR (cm^{-1} , KBr) 1728, 1604, 1512, 1380, 1033, 810. ^{1} H NMR (δ, $CDCl_3$) 0.98 (s, 3H, Me), 1.20 (s, 3H, Me), 1.31 (s, 3H, Me), 1.68 (d, J = 1.4 Hz, 3H, Me), 1.95 (s, 3H, CH_3COO), 3.74 (s, 3H, COOMe), 1.70-5.51 (m, 16 H, 3 x CH, 2 x CH_2,5 x CHO-, CH_2O-, CH_2COO), 6.32 - 7.70 (m,10 H, furan, olefinic and phenyl protons). MS (m/z, rel. int.) 644 (M^+, $C_{38}H_{44}O_9$ 27.59), 168 (6.83), 149 (6.21), 119 (9.39), 97 (13.96), 84 (15.28), 69 (24.93), 45 (100).

It may be mentioned here that there are several reports[8-10] on the stem bark of this plant.

ACKNOWLEDGEMENTS

We are thankful to Mr. Dubey, Landscape, HAU, Hisar, for the supply of the plant material.

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