nabumetone) into 100 ml methanol. The sample solutions were also treated as above and the absorbances of the complex formed were noted. The amount of the drug in the sample was found out by using the standard calibration curve. The average percentage drug recovery value for the method was found to be 99.9. Lactose, starch and magnesium stearate, the usual excipients and additives did not interfere in the proposed method. Thus, the method can be employed for routine determination of the drug in pure and dosage forms. The blood red color formed is due to complexation of Fe(II) ion [formed by reaction of nabumetone with Fe(III)] with 1,10-Phenanthroline. Three molecules of 1,10-Phenanthroline attach themselves to the metal ion to form a ferroin complex.

TABLE 1: OPTICAL AND PRECISION DATA OF THE METHOD.

Parameters	
Beer's law limit (μg/ml)	1-5
Molar absorptivity (l/mol/cm)	3.2341×10^4
Sandell's sensitivity ($\mu g/cm^2$/0.001 absorbance unit)	0.0070
Regression equation (Y=a+bC)*	
Slope (b)	0.1425
Intercept (a)	-0.0029
Correlation coefficient (r)	0.9999
Relative standard deviation (%)	0.6861
% Range of error	
at 95% confidence limit	0.5736
at 99% confidence limit	0.8487

*where C is concentration (μg/ml) and Y is absorbance.

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REFERENCES

1. Reynolds, J.E.F., Eds. In; Martindale: The Extra Pharmacopoeia, 29th Edn. , The Pharmaceutical Press, London, 1989, 28.
2. Gillgrass, J. and Grahame, R., **Pharmatherapeutica,** 1984, 3, 592.
3. Lee, J.E., **Anal. Lett.**, 1995, 28, 2379.
4. Idress, F.A., **Anal. Lett.**, 1997,30, 2485.
5. Seshagiri Rao, J.V.L.N., Kamalakar Reddy, G., Bhaskara Varma, R.L. and Shankar, D.G., **Indian Drugs**, 2001, 38, 211.

Phytochemical Investigation of Pseudobulbs of *Desmotrichum fimbriatum* Blume.

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The ethanolic extract of the pseudobulbs of *Desmotrichum fimbriatum* Blume yielded four new hydrocarbons along with stearic acid. The structures of the phytoconstituents have been established as 18-cyclohexyl-n-octadecane, 24-cyclohexyl-n-tetracosane, n-heneicosayl-1-propionate, and 23-cyclohexyl n-tricosanyl-1-propionate.

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Desmotrichum fimbriatum Blume (Orchidaceae), popularly known, as '*Jivanti*', is an epiphytic orchid used as astringent, aphrodisiac, expectorant, stimulant, cardio tonic, asthma, bronchitis, and throat troubles[1,2]. The presence of α- and β-jivantic acids from the aerial part of the plant has been reported[3]. This paper describes the isolation and characterization of four new hydrocarbons along with stearic acid. The pseudobulbs of *D. fimbriatum* (2.5 kg) were procured from a local market in Delhi, were extracted exhaustively with 95% ethanol in a Soxhlet apparatus. The air-dried slurry of the dried extract (250 g) was loaded on silica gel column packed in petroleum ether. The column was eluted with petroleum ether and chloroform mixtures in different proportions to isolate the following compounds.

Elution of the column with petroleum ether afforded colourless amorphous mass of compound 1, recrystallized from $CHCl_3$-MeOH, 35 mg (0.02%); mp 57-60; R_f 0.60 (toulene-ethyl acetate 99:1); IR ν_{max} (CCl_4) 2955, 2920, 2851, 1376, 786, 720 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 1.55 (1H, m, CH-19), 1.25 (44H, brs, 22x-CH_2), 0.90 (3H, t, J = 6.0 Hz, and Me-1); ^{13}C NMR (75 MHz, $CDCl_3$): δ 37.45 (CH), 37.13 (CH_2), 36.92 (CH_2), 36.35 (CH_2), 33.43 (CH_2), 32.8 (2xCH_2), 29.71 (6xCH_2), 29.38 (3xCH_2), 28.00 (CH_2), 27.34 (CH_2), 22.70 (CH_2), 21.07 (CH_2), 20.62 (CH_2), 20.35 (CH_2), 19.74 (CH_2), 14.10 (CH_3); EIMS m/z (rel. int.) 336 $[M]^+$ ($C_{24}H_{48}$) (2.1), 321 (2.1), 307 (2.2), 265 (2.0), 251 (2.3), 237 (2.5), 223 (2.7), 209 (3.4), 195 (4.1), 181 (4.6), 167 (4.7), 153 (5.8), 139 (6.7), 127 (8.8), 111 (12.3), 99 (11.3), 97 (10.7), 83 (50.1), 71 (72.6), 57 (100).

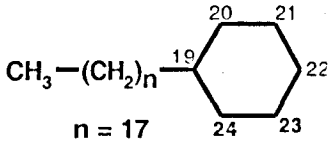
Elution of the column with petroleum ether-chloroform (98:2), gave colourless amorphous mass of 2, recrystallized from $CHCl_3$-MeOH; 40 mg (0.022%); mp 62-65°; R_f 0.5 (petroleum ether-acetone 98:2); IR ν_{max} (CCl_4) 2918, 2854, 2360, 793, 725 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 1.49 (1H, brs, H-25), 1.18 (56H, brs, 28xCH_2); 0.90 (3H, t, J=6.5 Hz, Me-1); EIMS m/z (rel. int.) 420 $[M]^+$ ($C_{30}H_{60}$) (2.6), 405 (2.7), 377 (2.5), 349 (2.6), 321 (2.7), 307 (2.1), 293 (2.2), 265 (3.15), 251 (2.8), 237 (2.9), 223 (3.2), 209 (3.6), 195 (4.0), 181 (4.4), 167 (5.0), 153 (5.9), 139 (6.9), 125 (8.6), 111 (9.7), 97 (11.3), 83 (40.8), 71 (67.2), 57 (100).

Elution of the column with petroleum ether-chloroform (95:5) furnished colourless amorphous solid of 3, crystallized from $CHCl_3$-MeOH; 45 mg (0.025%); mp 71-73°; R_f 0.35 (toulene-ethyl acetate, 95:5); UV λ_{max} ($CHCl_3$) 246 nm (log ε 3.6); IR ν_{max} (CCl_4) 2926, 2854, 1737, 1465, 786, 740 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 4.11 (2H, t, -CH_2OCO, J=7.2 Hz), 2.30 (2H, t, -CH_2CO, J = 7.0 Hz), 1.61 (2H, m, CH_2), 1.46 (2H, m, CH_2), 1.25 (34 H, brs, 17x-CH_2), 1.04 (2H, brs, CH_2), 0.90 (3H, t, J = 6.0 Hz, Me-21), 0.85 (3H, t, J=6.9 Hz Me-3'); ^{13}C NMR (75 MHz, $CDCl_3$): δ 173.01 (COO), 61.21 (CH_2O), 31.96 (CH_2), 29.74 (15 x CH_2), 29.4 (4 x CH_2), 29.19 (CH_2), 22.72 (Me-3'), 14.11 (Me-1); EIMS m/z (rel. int.) 368 $[M]^+$ ($C_{24}H_{48}O_2$) (1.3), 351 (2.6), 337 (1.6), 309 (4.3), 295 (1.5), 284 (15.4), 267 (5.2), 256 (12.8), 253 (6.3), 239 (4.9), 225 (4.7), 211 (5.6), 155 (12.8), 111 (11.3), 101 (30.1), 99 (29.2), 87 (38.6), 73 (53.1), 71 (63.6), 57 (100);

Elution of the column with petroleum ether-chloroform (9:1) yielded colourless crystals of 4, recrystallized from $CHCl_3$-MeOH; 60 mg (0.033%); mp 113-116°; R_f 0.40 (petroleum ether-acetone, 9:1); UV λ_{max} ($CHCl_3$) 246 nm (log ε 3.3); IR ν_{max} (CCl_4) 2959, 2850, 1728, 1273, 1026, 1000, 792, 764, 720 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 4.01 (2H, t, -CH_2OCO, J = 6.6 Hz), 2.29 (2H, t, -H_2CO, J = 5.0 Hz), 1.62 (1H, m, 24H), δ 1.58 (2H, m, CH_2), 1.25 (54H; brs, 27xCH_2), 0.88 (3H, t, J = 6.2 Hz, Me-3'); ^{13}C NMR(75 MHz, $CDCl_3$): δ 171.02 (COO), 61.82 (CH_2O), 40.12 (CH), 39.85 (CH_2), 39.57 (CH_2), 39.29 (CH_2), 39.01 (CH_2), 33.71 (CH_2), 32.35 (CH_2), 31.35 (CH_2), 29.11 (15x-CH_2), 28.78 (CH_2), 28.65 (CH_2), 25.35 (CH_2), 24.44 (CH_2), 22.11 (CH_2), 13.61 (CH_3); EIMS m/z (rel. int.) 478 $[M]^+$ ($C_{32}H_{62}O_2$), 450 (11.0), 447 (10.4), 421 (18.9), 419 (24), 395 (7.7), 391 (9.2), 363 (4.4), 335 (3.6), 307 (3.3), 265 (4.1), 223 (5.5), 209 (6.3), 195 (7.7), 181 (8.8), 167 (12.1), 153 (13.4), 139 (15.4), 125 (20.7), 111 (30.1), 97 (64.8), 83 (71.2), 69 (62.8), 57 (100).

Elution of the column with petroleum ether-chloroform (85:15) yielded colourless amorphous solid of compound 5, crystallized from $CHCl_3$-MeOH; 45 mg (0.025%); mp 70-73°; R_f 0.25 (petroleum ether-acetone, 9:1); IR ν_{max} (CCl_4) 3350, 2917, 2849, 1710, 1470, 1177, 795, 725, 720 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$): δ 1.61 (2H, brs, -$COCH_2$), 1.25 (30H, brs, 15 x -CH_2), 0.88 (3H, t, J = 6.5 Hz); ^{13}C NMR (75 MHz, $CDCl_3$): δ 184.3 (COOH), 31.95 (CH_2), 29.72 (13x-CH_2), 29.38 (CH_2), 22.71 (CH_2), 14.12 (CH_3); EIMS m/z (rel.int.) 284 $[M]^+$ ($C_{18}H_{36}O_2$) (29.0), 256 (22.5), 156 (7.3), 125 (13.2), 111 (20.6), 99 (19.5), 97 (50.1), 83 (53.6), 71 (53.7), 57 (100), 45 (91.0).

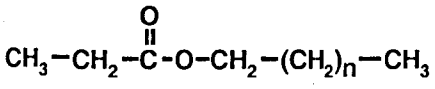
Compound 1 (M^+ m/z 336, $C_{24}H_{48}$), was obtained as colourless amorphous powder from petroleum ether eluents. It did not exhibit any IR absorptions band. Its mass spectrum displayed a large number of fragment ions with a uniform difference of 14 mass units, thereby confirming the presence of a long aliphatic chain[4]. The presence of prominent ion peaks corresponding to C_nH_{2n-1} at m/z 83 and other peaks at m/z 56 (due to loss of C_2H_4), and large peak at m/z 41 in



Compound 1

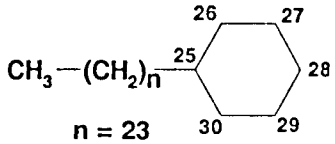
the mass spectrum indicated the existence of a cyclohexyl ring at one of the terminal positions[5], and other ions peak at m/z 111, 125, 139, and 153 with a uniform difference of 14 mass unit for long aliphatic chain with cyclohexyl nucleus. Its mass spectrum indicated one double bond equivalent adjustable to the terminal cyclohexane ring. Its ^{1}H NMR spectrum exhibited proton signals for terminal C-1 primary methyl (δ 0.90), C-19 methine (δ 1.55) and methylene (δ 1.25) groups[4]. The compound did not respond to tetranitromethane and iodine tests for unsaturation and resisted to oxidizing and reducing reagents. Based on these findings, the structure of compound 1 has been established as 18-cyclohexyl-n-octadecane.

Compound 2 (M^+ m/z 420, $C_{30}H_{60}$), was obtained as colourless and amorphous mass from petroleum ether-chloroform (98:2) eluents. Its IR showed absorption bands at 793 and 725 cm^{-1} for long aliphatic chain. Its mass spectrum showed one double bond equivalent adjustable to a terminal cyclohexane ring. The more prominent ion peaks corresponding to C_nH_{2n} at m/z 56, 41, 68, 83, 97, 111, 125, 139, etc. supported the presence of a cyclohexyl ring at one of the terminals[5]. The ^{1}H NMR spectrum of 2 exhibited proton signals for C-1 primary methyl (δ 0.93), C-25 methine (δ 1.49) and methylene (δ 1.18) groups. On the basis of these findings, the structure of 2 has been established as 24-cyclohexyl-n-tetracosane.



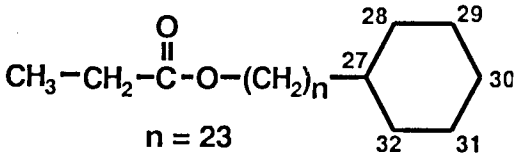
Compound 2

Compound 3, (M^+ m/z 368, $C_{24}H_{48}O_2$), showed characteristics IR absorptions for ester group (1737 cm^{-1}) and long aliphatic chain (786, 740 cm^{-1}). The presence of the base peak at m/z 57 in the mass spectrum and a number of fragmented ions with a uniform difference of 14 mass units and others important fragment ions at m/z 73, 87 and 101 suggested butyroxy moiety at one of the terminal position of the aliphatic ester. The ^{1}H NMR spectrum of 3 displayed proton signals for oxygenated methylene (δ 4.11), C-2' methylene (δ 2.30) adjacent to esteric carbonyl group[6], terminal methyls (δ 0.95, 0.85) and methylene (δ 1.61-1.04)[7] groups. The ^{13}C NMR spectrum of 3 showed signals for ester and oxygenated methylene carbons at δ 173.01 and δ 61.21, respectively. Based on these evidences the structure of 3 has been established as n- heneicosanyl 1-propionate.



Compound 3

Compound 4, (M^+ m/z 478, $C_{32}H_{62}O_2$), showed characteristics IR absorption bands for ester (1728 cm^{-1}) and a long aliphatic chain (792, 764 and 720 cm^{-1}). The EI-mass spectrum exhibited a large number of fragment ions with a uniform difference of 14 mass units, and others ions peaks at m/z 421 $[M-57]^+$, 57 $[C_2H_5CO]^+$, 73 $[C_2H_5COO]^+$, 83 $[C_6H_{11}]^+$, 97, 111, 125 and 139 supported butyroxy moiety at one end and cyclohexyl ring at the other end of the carbon chain. Its ^{1}H NMR spectrum showed proton signals for oxygenated methylene (δ 4.01)[6], C-2' methylene (δ 2.29)[7], C-3' methyl (δ 0.88). A one-proton C-24 methine (δ 1.62) and methylene (δ 1.58, 1.25) groups. The ^{13}C NMR spectrum of 4 exhibited carbon signals at δ 171.02 (ester), 61.82 (CH_2O), 13.61 (CH_3) and 40.12 (CH), besides methylene carbons between δ 39.85 - 22.11. On the basis of these evidences the structure of compound 4 has been established as 23-cyclohexyl n-tricosanyl 1-propionate.



Compound 4

Compound 5, obtained from petroleum ether-chloroform (85:15) eluents, was identified as stearic acid on the basis of melting and mixed melting points, spectral data analysis and chemical reactions[9].

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REFERENCES

1 Kirtikar, K.R., In; Basu, B.D., Eds., Indian Medicinal Plants, 6th Edn., Vol. IV, Shiva Publishers, Dehradun, 1994, 2401.

2 Mukherjee, B., Bhattacharya, S.S. and Sarkar, P.K., **Indian J. Pharm.**, 1973, 5, 252.

3 Gupta, R.C., Ansari, M.S. and Kapoor, L.D., **Bulletin Bot. Surv. India**, 1970, 12, 29.

4 Triguna, N., Mishra, R.S., Singh, H.S., Pandey, C.P. and Bishnu, P.S., **Phytochemistry**, 1993, 33, 221.

5 Silverstein, R.M., In; Webester, F.X., Eds., Spectrometric Identification of Organic Compounds, 6th Edn., John Willy and Sons, New York, 1996, 16.

6 Mehta, B.K., Jain, P. and Shrilaxmi, K.T., **Indian J. Chem.**, 1999, 38B, 1304.

7 Manoranjani, M., Kotra, S., and Mehta, B.K., **Indian J. Chem.**, 1999, 8B, 1148.

8 Jain, P., Singh, N. and Mehta, B.K., **Indian J. Chem.**, 37B, 1998, 618.

9 Gunstone, F.D. and Lie Ken Jie, M., **Chemistry Phys. Lipids.**, 1970, 1, 4.

Antiinflammatory Activity of *Sarcostemma brevistigma* in Rats

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The effect of ethyl acetate extract of *Sarcostemma brevistigma* was investigated in rat to evaluate the antiinflammatory activity. Carrageenin-induced rat paw edema model and cotton pellet granuloma methods were employed to test antiinflammatory activity. The ethyl acetate extract (650 mg/kg) produced the inhibition of carrageenin-induced rat paw edema and also found to be effective in cotton pellet granuloma studies. The result indicated that the ethyl acetate extract produced significant (P<0.001) antiinflammatory activity when compared to control.

Sarcostemma brevistigma Wight, a plant belonging to the family Asclepiadaceae, grows throughout India and other tropical regions of the world. It is found to be active in rheumatic disease and was also used as an antiallergenic, emetic and branchodialator[1]. Phytochemical evaluation revealed the presence of bregenin, brevine, brevinine, sarcogenin and sarcobiose[2-4]. Prolonged use of both steroidal and non-steroidal antiinflammatory drugs are well known to be associated with peptic ulcer formation[5]. Hence, search for new antiinflammatory agents that retain therapeutic efficacy and yet are devoid of these adverse effects are justified. In this context the present study is focused to evaluate antiinflammatory activity of *S. brevistigma*.

*For correspondence

The stems of *S. brevistigma* were collected from Perundurai, Erode district and were authenticated at the Botanical survey of India, Coimbatore. The stems were dried in shade and powdered. The powder was extracted successively with ethyl acetate using a Soxhlet apparatus. The extract was evaporated under vacuum. Extractive value (% w/w) of ethyl acetate dry extract was 5.4.

Male Wistar rats weighing between 150-175 g bred in King Institute, Guindy, Chennai were selected for antiinflammatory studies. The rats were divided into 3 groups, each group consisting of 6 animals. One group served as negative control (received 5 % gum acacia 5 ml/kg), second group served as positive control (received indomethacin 10 mg/kg), while third groups received ethyl acetate extract of *S.*