Reviews

Bisbenzylisoquinoline Alkaloids

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The first comprehensive tabular review of the bisbenzylisoquinoline alkaloids was published by Guha *et al.* in this journal in early 1979.[1] This was followed by a second review published in 1983[2] (covering the literature from 1978 through 1981), a third review in 1987[3] (covering the literature from 1982 through 1985), and a fourth review in 1991[4] (covering the literature from 1986 through 1989).

The present review is concerned with the literature from 1990 through 1995 (some 1996 references are included) and is presented principally in a tabular form as before.[1−4] The numbers of the alkaloids and the structural-type nomenclature have been retained according to the previous reviews[1−4] in order to preserve a sense of literary consistency. Since the publication of the last tabular review of 1991,[4] 38 new bisbenzylisoquinoline alkaloids have been isolated and characterized. This number of about 40 new alkaloids in this time period is considerably less than the 120 or so new alkaloids reported in the 1991 review[4] but rather similar to the numbers reported in each of the preceding two reviews.[2,3] The single most powerful technique continuing to be utilized by scientists in the elucidation of structure of these alkaloids remains one- and two-dimensional high-resolution ^{1}H and ^{13}C magnetic resonance spectrometry. The utilization of heteronuclear shift correlations, heteronuclear multiple quantum coherence, pulsed field gradients, gradient-enhanced experiments, and micro inverse-detection probes has become both mandatory and routine, and this has led to the solution of problems with only micromolar amounts of alkaloid in hand. Each alkaloid in the tabular section is described according to its name, molecular formula, molecular weight, melting point, specific rotation, and available spectral data, the last of which may include UV, IR, ^{1}H-NMR, ^{13}C-NMR, CD, and MS. Unless otherwise stated, the

Table 1. Additional Physical and Spectral Data on Previously Reported Bisbenzylisoquinoline Alkaloids

	36 Cycleapeltine ($C_{37}H_{40}O_6N_2$: 608.2886)
^{1}H NMR	NMe 2.48 (N-2′), 2.57 (N-2); OMe 3.34 (C-6), 3.75 (C-6′), 3.94 (C-12); AlH 2.50 (1H, d, J = 7.8, 13.4 Hz, H-α), 2.60 (1H, m, H-4), 2.63 (1H, m, H-4′), 2.66 (1H, m, H-3), 2.77 (1H, dd, J = 9.8, 12.7 Hz, H-α′), 2.78 (1H, m, H-4), 2.84 (1H, m, H-3′), 2.93 (1H, m, H-4′), 2.97 (1H, m, H-3), 3.05 (1H, d, J = 13.4 Hz, H-α), 3.13 (1H, dd, J = 1.6, 12.7 Hz, H-α′), 3.37 (1H, m, H-3′), 3.45 (1H, d, J = 7.7 Hz, H-1), 4.19 (1H, br d, J = 9.8 Hz, H-1′); ArH 6.41 (H-5), 6.44 (H-8), 6.60 (1H, d, J = 2.2 Hz, H-10), 6.84 (2H, dd, J = 2.2, 8.4 Hz, H-10′), 6.88 (1H, dd, J = 2.2, 8.4 Hz, H-14), 6.94 (1H, d, J = 8.4 Hz, H-13), 7.06 (1H, br d, J = 2.2 Hz, H-13′), 7.30 (1H, br d, J = 2.2 Hz, H-14′)[6]
^{13}C NMR	65.31 (C-1), 46.78 (C-3), 26.59 (C-4), 127.92 (C-4a), 112.38 (C-5), 149.12 (C-6), 144.15 (C-7), 120.73 (C-8), 131.31 (C-8a), 40.38 (C-α), 133.90 (C-9), 120.46 (C-10), 148.58 (C-11), 148.50 (C-12), 112.77 (C-13), 123.45 (C-14); 60.22 (C-1′), 44.26 (C-3′), 22.70 (C-4′), 122.95 (C-4a′), 105.82 (C-5′), 146.42 (C-6′), 134.91 (C-7′), 143.06 (C-8′), 122.95 (C-8a′), 43.99 (C-α′), 136.46 (C-9′), 131.69 (C-10′), 120.38 (C-11′), 155.42 (C-12′), 121.55 (C-13′), 129.78 (C-14′); 41.54 (2′-NMe), 42.36 (2-NMe), 55.21 (6-OMe), 55.82 (6′-OMe), 56.22 (12-OMe)[6]
	42 Homoaromoline ($C_{37}H_{40}O_6N_2$: 608.2886)
^{1}H NMR	NMe 2.43 (N-2′), 2.53 (N-2); OMe 3.60 (C-6), 3.76 (C-6′), 3.88 (C-12); AlH 2.40 (2H, m, H-4), 2.55 (1H, m, H-3′), 2.61 (1H, m, H-α′), 2.68 (1H, m, H-α), 2.73 (2H, m, H-3 + H-4′), 2.86 (1H, m, H-3′), 2.94 (1H, dd, J = 4, 14.1 Hz, H-α), 3.02 (1H, m, H-3), 3.08 (1H, m, H-4′), 3.22 (1H, d, J = 13.8 Hz, H-α′), 3.63 (1H, dd, J = 2.6, 4 Hz, H-1), 4.13 (1H, d, J = 6.5 Hz, H-1′); ArH 5.54 (1H, br s, H-10), 6.20 (H-5′), 6.33 (H-5), 6.40 (1H, dd, J = 2.2, 8.4 Hz, H-11′), 6.66 (H-8), 6.70 (1H, dd, J = 2.3, 8.4 Hz, H-14), 6.74 (1H, d, J = 8.4Hz, H-13), 6.91 (1H, dd, J = 2.2, 8.4 Hz, H-13′), 6.95 (1H, dd, J = 2.2, 8.4 Hz, H-10′), 7.33 (1H, dd, J = 2.2, 8.4 Hz, H-14′)[6]
^{13}C NMR	64.26 (C-1), 51.10 (C-3), 28.45 (C-4), 130.56 (C-4a), 111.10 (C-5), 148.50 (C-6), 143.96 (C-7), 116.93 (C-8), 128.02 (C-8a), 38.32 (C-α), 130.95 (C-9), 117.00 (C-10), 148.70 (C-11), 146.64 (C-12), 110.71 (C-13), 123.65 (C-14); 60.46 (C-1′), 44.96 (C-3′), 24.96 (C-4′), 122.99 (C-4a′), 104.50 (C-5′), 147.61 (C-6′), 133.39 (C-7′), 142.37 (C-8′), 122.91 (C-8a′), 38.20 (C-α′), 138.17 (C-9′), 131.49 (C-10′), 121.12 (C-11′), 152.74 (C-12′), 121.90 (C-13′), 128.34 (C-14′); 41.50 (NMe-2′), 43.72 (NMe-2), 55.21 (OMe-6), 55.68 (OMe-6′), 55.79 (OMe-12)[6]
	64 Limacine ($C_{37}H_{40}O_6N_2$: 608.2886)
^{1}H NMR	NMe 2.32 (N-2), 2.59 (N-2′); OMe 3.33 (C-6′), 3.70 (C-6), 3.91 (C-12); AlH 2.39 (1H, m, H-4), 2.57 (1H, d, J = 13.9 Hz, H-α), 2.69 (1H, dd, J = 10, 13.9 Hz, H-α), 2.72 (1H, m, H-4′), 2.75 (1H, dd, J = 10.9, 12.5 Hz, H-α′), 2.83 (1H, m, H-3′), 2.85 (1H, m, H-3), 2.90 (1H, m, H-4), 2.94 (1H, m, H-4′), 3.22 (1H, dd, J = 5.6, 12.5 Hz, H-α′), 3.49 (2H, m, H-3 + H-3′), 3.75 (1H, dd, J = 2.5, 10 Hz, H-1), 3.87 (1H, dd, J = 5.6, 10.9 Hz, H-1′); ArH 6.05 (H-8′), 6.27 (H-5), 6.30 (1H, dd, J = 2.3, 8.2 Hz, H-10′), 6.51 (H-5′), 6.57 (1H, d, J = 2.2 Hz, H-10), 6.79 (1H, dd, J = 2.3, 8.2 Hz, H-11′), 6.83 (1H, d, J = 8.2 Hz, H-13), 6.85 (1H, dd, J = 2.2, 8.2 Hz, H-14), 7.12 (1H, dd, J = 2.3, 8.2 Hz, H-13′), 7.32 (1H, dd, J = 2.3, 8.2 Hz, H-14′)[6]
^{13}C NMR	61.19 (C-1), 43.91 (C-3), 21.81 (C-4), 127.72 (C-4a), 105.55 (C-5), 151.18 (C-6), 137.63 (C-7), 148.19 (C-8), 122.64 (C-8a), 41.70 (C-α), 134.68 (C-9), 115.99 (C-10), 149.12 (C-11), 146.83 (C-12), 111.33 (C-13), 122.56 (C-14); 63.64 (C-1′), 45.00 (C-3′), 25.92 (C-4′), 127.72 (C-4a′), 112.50 (C-5′), 148.39 (C-6′), 143.57 (C-7′), 119.96 (C-8′), 127.84 (C-8a′), 37.93 (C-α′), 134.91 (C-9′), 132.42 (C-10′), 121.63 (C-11′), 153.58 (C-12′), 121.63 (C-13′), 129.90 (C-14′); 42.05 (NMe-2), 42.32 (NMe-2′), 55.55 (OMe-6), 55.56 (OMe-6′), 55.87 (OMe-12), 59.99 (OMe-7)[6]

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Table 1 (Continued)

76 Tetrandrine ($C_{38}H_{42}O_6N_2$: 622.3043)

^{1}H NMR NMe 2.30 (N-2), 2.58 (N-2′); OMe 3.15 (C-7), 3.33 (C-6′), 3.70 (C-6), 3.88 (C-12); AlH 2.39 (1H, m, H-4), 2.48 (1H, dd, J = 1.8, 14 Hz, H-α), 2.67 (1H, dd, J = 10, 14 Hz, H-α), 2.69 (1H, m, H-4′), 2.75 (1H, dd, J = 11.0, 12.3 Hz, H-α′), 2.83 (1H, m, H-3′), 2.87 (1H, m, H-3), 2.89 (1H, m, H-4), 2.91 (1H, m, H-4′), 3.22 (1H, dd, J = 5.9, 12.3 Hz, H-α′), 3.39 (1H, m, H-3′), 3.47 (1H, m, H-4), 3.72 (1H, d, J = 9.5 Hz, H-1), 3.84 (1H, dd, J = 5.9, 11 Hz, H-1′); ArH 5.96 (H-8′), 6.26 (H-5), 6.27 (1H, dd, J = 2.3, 8.2 Hz, H-10′), 6.48 (H-5′), 6.52 (1H, d, J = 2.2 Hz, H-10), 6.76 (1H, dd, J = 2.3, 8.2 Hz, H-11′), 6.82 (1H, d, J = 8.2 Hz, H-13), 6.86 (1H, dd, J = 2.2, 8.2 Hz, H-14), 7.10 (1H, dd, J = 2.3, 8.2 Hz, H-13′), 7.30 (1H, dd, J = 2.3, 8.2 Hz, H-14′)[6]

^{13}C NMR 61.19 (C-1), 43.91 (C-3), 21.81 (C-4), 127.72 (C-4a), 105.55 (C-5), 151.18 (C-6), 137.63 (C-7), 148.19 (C-8), 122.64 (C-8a), 41.70 (C-α), 134.68 (C-9), 115.99 (C-10), 149.12 (C-11), 146.83 (C-12), 111.33 (C-13), 122.56 (C-14); 63.64 (C-1′), 45.00 (C-3′), 25.92 (C-4′), 127.72 (C-4a′), 112.50 (C-5′), 148.39 (C-6′), 143.57 (C-7′), 119.96 (C-8′), 127.84 (C-8a′), 37.93 (C-α′), 134.91 (C-9′), 132.42 (C-10′), 121.63 (C-11′), 153.58 (C-12′), 121.63 (C-13′), 129.90 (C-14′); 42.05 (NMe-2), 42.32 (NMe-2′), 55.55 (OMe-6), 55.56 (OMe-6′), 55.87 (OMe-12), 59.99 (OMe-7)[6]

78 Tetrandrine 2′β-*N*-Oxide ($C_{38}H_{42}O_7N_2$: 638.2992)

$[\alpha]_D$ +157° (c 0.24, $CHCl_3$)[7]

^{1}H NMR NMe 2.34 (N-2), 3.36 (N-2′); OMe 3.21 (C-7), 3.41 (C-6′), 3.75 (C-6), 3.93 (C-12); AlH 2.45 (1H, m, H-4), 2.49 (1H, br d, J = 11 Hz, H-α), 2.70 (1H, dd, J = 4.8, 12.3 Hz, H-α′), 2.74 (1H, dd, J = 11, 14 Hz, H-α), 2.93 (2H, m, H-3 + H-4), 3.13 (1H, m, H-4′), 3.30 (1H, m, H-4′), 3.51 (1H, m, H-3), 3.72 (1H, br d, J = 11 Hz, H-1), 3.76 (1H, m, H-3′), 4.13 (1H, m, H-3′), 4.29 (1H, dd, J = 11.3, 12.3 Hz, H-α′), 4.44 (1H, dd, J = 4.8, 11.3 Hz, H-1′); ArH 6.05 (H-8′), 6.28 (1H, dd, J = 2.5, 8.2 Hz, H-10;), 6.33 (H-5), 6.49 (1H, d, J = 1.8 Hz, H-10), 6.59 (H-5′), 6.83 (1H, dd, J = 2.5, 8.2 Hz, H-11′), 6.87 (1H, d, J = 8.2 Hz, H-13), 6.92 (1H, dd, J = 1.8, 8.2 Hz, H-14), 7.19 (1H, dd, J = 2, 8.2 Hz, H-13′), 7.49 (1H, dd, J = 2, 8.2 Hz, H-14′)[7]

^{13}C NMR 61.4 (C-1), 44.0 (C-3), 21.9 (C-4), 128.6 (C-4a), 106.0 (C-5), 151.3 (C-6), 137.4 (C-7), 144.9 (C-8), 122.5 (C-8a), 41.7 (C-α), 134.7 (C-9), 116.2 (C-10), 149.1 (C-11), 147.2 (C-12), 111.7 (C-13), 123.0 (C-14); 77.5 (C-1′), 59.0 (C-3′), 26.3 (C-4′), 122.9 (C-4a′), 112.1 (C-5′), 150.5 (C-6′), 147.9 (C-7′), 119.6 (C-8′), 124.3 (C-8a′), 38.1 (C-α′), 132.3 (C-9′), 132.8 (C-10′), 122.2 (C-11′), 154.6 (C-12′), 122.4 (C-13′), 130.5 (C-14′); 42.2 (NMe-2), 56.2 (NMe-2′), 55.7 (OMe-6 + OMe-6′), 56.1 (OMe-12), 60.2 (OMe-7)[7]

EIMS $[M]^+$ 638 (16), 637 (16), 636 (15), 622 (100), 621 (67), 608 (28), 607 (34), 396 (22), 395 (42), 381 (25), 198 (27), 174 (10)[7]

79 Thalrugosine ($C_{37}H_{40}O_6N_2$: 608.2886)

^{1}H NMR NMe 2.28 (N-2), 2.45 (N-2′); OMe 3.72 (C-6), 3.86 (C-6′), 3.88 (C-12); AlH 2.32 (1H, dd, J = 4.7, 15Hz, H-4), 2.61 (1H, dd, J = 10.9, 14.8 Hz, H-α), 2.74 (2H, m, H-3 + H-3′), 2.76 (1H, m, H-α′), 2.79 (1H, m, H-4), 2.88 (1H, m, H-4′), 2.90 (1H, m, H-4′), 2.90 (1H, dd, J = 2.5, 14.8 Hz, H-α), 3.18 (1H, m, H-α′), 3.21 (1H, m, H-3), 3.31 (1H, m, H-3′), 3.58 (1H, dd, J = 5.0, 11.5 Hz, H-1′), 3.98 (1H, dd, J = 2.5, 10.9 Hz, H-1); ArH 6.04 (H-8′), 6.26 (1H, d, J = 2.2 Hz, H-10), 6.32 (H-5), 6.41 (1H, dd, J = 2.2, 8.3 Hz, H-10′), 6.60 (1H, dd, J = 2.2, 8.3 Hz, H-14), 6.70 (H-5′), 6.76 (1H, d, J = 8.3 Hz, H-13), 6.80 (1H, dd, J = 2.2, 8.3 Hz, H-11′), 7.02 (1H, dd, J = 2.2, 8.3 Hz, H-13′), 7.28 (1H, dd, J = 2.2, 8.3 Hz, H-14′)[6]

^{13}C NMR 60.09 (C-1), 43.72 (C-3), 22.34 (C-4), 122.14 (C-4a), 107.46 (C-5), 146.84 (C-6), 136.32 (C-7), 144.20 (C-8), 124.22 (C-8a), 39.06 (C-α), 133.17 (C-9), 114.77 (C-10), 150.10 (C-11), 146.51 (C-12), 111.35 (C-13), 121.78 (C-14); 64.92 (C-1′), 45.80 (C-3′), 25.39 (C-4′), 130.57 (C-4a′), 112.18 (C-5′), 148.96 (C-6′), 143.17 (C-7′), 121.15 (C-8′), 130.77 (C-8a′), 37.93 (C-α′), 135.17 (C-9′), 131.85 (C-10′), 122.79 (C-11′), 154.36 (C-12′), 122.49 (C-13′), 129.93 (C-14′); 42.13 (NMe-2), 42.89 (NMe-2′), 55.84 (OMe-6), 55.89 (OMe-6′), 56.07 (OMe-12)[6]

120 Tiliamosine ($C_{36}H_{36}O_6N_2$: 592.2573)

^{1}H NMR ($CDCl_3$ + CD_3OD) NMe 2.23 (N-2); OMe 3.72 (C-5), 3.82 (C-12), 3.87 (C-6); AlH 3.36 (1H, m, H-1), 3.99 (1H, m, H-1′); ArH 6.58 (H-5′), 6.88 (2H, d, J = *o*, H-13 + H-13′), 7.27 (1H, dd, J = *o,m*, H-14′), 7.32 (1H, dd, J = *o,m*, H-14), 7.51 (1H, d, J = *m*, H-10), 7.48 (1H, d, J = *m*, H-10′), 8.04 (H-8′)[8]

153 Cocsuline ($C_{35}H_{34}O_5N_2$: 562.2468)

^{1}H NMR NMe 2.40 (N-2), 2.59 (N-2′); OMe 3.86 (C-6′); AlH 2.53 (1H, dd H-α), 2.69 (1H, dd, H-α′), 2.91 (1H, m, H-α), 3.30 (1H, br s, H-1), 3.36 (1H, br d, H-α′), 4.02 (1H, dd, H-1′); ArH 6.15 (H-8), 6.33 (H-5′), 6.53 (1H, s, H-10), 6.62 (H-5), 6.90 (1H, d, H-13), 6.92 (1H, dd, H-14), 6.96 (1H, dd, H-11′), 7.17 (1H, dd, J = 2.5, 8.5 Hz, H-13′), 7.59 (1H, dd, 2.0, 8.5 Hz, H-14′)[9]

157 Isotrilobine ($C_{36}H_{36}O_5N_2$: 576.2624)

^{1}H NMR NMe 2.41 (N-2), 2.60 (N-2′); OMe 3.86 (C-6′), 3.98 (C-12); AlH 3.24 (1H, br s, H-1), 4.04 (1H, br s, H-1′); ArH 6.13 (H-8), 6.32 (H-5′), 6.58 (1H, s, H-10), 6.62 (H-5), 6.87 (2H, s, H-13 + H-14), 7.00 (1H, dd, H-11′), 7.22 (1H, dd, H-13′), 7.59 (1H, dd, H-14′)[9]

288 Dehatrine ($C_{37}H_{38}O_6N_2$: 606.2730)

X-ray crystallographic analysis of dehatrine demonstrated that two rotamers are incorporated in a single crystal in a 1:1 ratio.[10] The complex NMR spectrum of dehatrine has been defined as a mixture of two rotamers via extensive use of 2D (COSY and COLOC) techniques.[10] Measurement of the spectra at different temperatures produced responses that suggested that the alkaloid may exist as thermally exchangeable conformers in solution.[10]

^{1}H NMR (Rotamer 1): NMe 2.44; OMe 3.50 (C-7), 3.69 (C-6′), 3.89 (C-6), 3.92 (C-12); AlH 2.41−2.50 (H-α), 2.58−2.72 (H-4′), 2.75 (H-α), 3.68−3.86 (H-3′), 3.94 −3.96 (H-1), 4.06−4.13 (H-α′), 4.10−4.13 (H-3′); ArH 6.03 (H-10), 6.39 (H-5), 6.62 (H-5′), 6.74 (H-14), 6.78−6.81 (H-11′ + H-13′), 6.98 (H-10′), 7.36 (H-14′).[10] (Rotamer 2): NMe 2.22; OMe 3.30 (C-7), 3.52 (C-6′), 3.78 (C-6), 3.91 (C-12); AlH 2.24−2.30 (H-α), 2.58−2.72 (H-4′), 2.66−2.70 (H-α), 2.87 (H-3), 3.68−3.86 (H-3′), 4.10−4.13 (H-3′), 4.20 (H-α′); ArH 6.32 (H-5), 6.53 (H-5′), 6.78−6.81 (H-10 + H-13 + H-14 + H-8′ + H-10′ + H-11′), 7.18 (H-13′), 7.49 (H-14′)[10]

^{13}C NMR (Rotamer 1): 59.7 (d, C-1), unidentified (C-3), unidentified (C-4), 129.9 (s, C-4a), 106.9 (d, C-5), 151.3 (s, C-6), 138.7 (s, C-7), 147.4 (s, C-8), 123.0 (s, C-8a), 39.1 (t, C-α), 135.0 (s, C-9), 114.1 (d, C-10), 150.0 (s, C-11), 146.5 (s, C-12), 110.7 (d, C-13), 122.7 (d, C-14); 166.0 (s, C-1′), 47.1 (t, C-3′), 25.7 (t, C-4′), 133.5 (s, C-4a′), 110.6 (d, C-5′), 150.5 (s, C-6′), 143.7 (s, C-7′), unidentified (C-8′), 121.1 (s, C-8a′), 44.2 (t, C-α′), 135.6 (s, C-9′), 130.0 (d, C-10′), 123.1 or 123.6 or 123.7 (d, C-11′), 153.3 (s, C-12′), 123.1 or 123.6 or 123.7 (d, C-13′), 130.7 (d, C-14′); 42.8 (q, NMe-2), 55.7 (q, OMe-6′), 55.8 (q, OMe-6), 55.9 (q, OMe-12), 60.2 (q, OMe-7).[10] (Rotamer 2): 62.1 (d, C-1), 43.8 (t, C-3), 22.4 (t, C-4), 129.9 (s, C-4a), 105.8 (d, C-5), 151.1 (s, C-6), 137.1 (s, C-7), 147.4 (s, C-8), 120.1 (s, C-8a), 40.4 (t, C-α), 132.4 (s, C-9), 116.3 (d, C-10), 149.2 (s, C-11), 146.4 (s, C-12), 111.1 (d, C-13), 123.0 (d, C-14); 166.8 (s, C-1′), 47.1 (t, C-3′), 25.8 (t, C-4′), 134.4 (s, C-4a′), 110.0 (d, C-5′), 151.6 (s, C-6′), 143.2 (s, C-7′), 117.9 (d, C-8′), 120.5 (s, C-8a′), 43.8 (t, C-α′), 135.8 (s, C-9′), 130.0 (d, C-10′), 123.1 or 123.6 or 123.7 (d, C-11′), 153.1 (s, C-12′), 123.0 (d, C-13′), 131.3 (d, C-14′); 42.4 (q, NMe-2), 55.3 (q, OMe-6′), 55.8 (q, OMe-6), 55.9 (q, OMe-12), 60.4 (q, OMe-7)[10]

323 *N*-Methyltiliamosine ($C_{37}H_{38}O_6N_2$: 606.2730)

^{1}H NMR ($CDCl_3$ + CD_3OD) NMe 2.20 (N-2), 2.51 (N-2′); OMe 3.72 (C-5), 3.82 (C-6), 3.89 (C-12); AlH 3.20 (1H, m, H-1), 3.35 (1H, m, H-1′); ArH 6.54 (H-5′), 6.88 (1H, d, J = *o*, H-13), 6.91 (1H, d, J = *o*, H-13′). 7.17 (1H, dd, J = *o,m*, H-14′), 7.27 (1H, dd, J = *o,m*, H-14), 7.50 (1H, d, J = *m*, H-10′), 7.59 (1H, d, J = *m*, H-10), 7.99 (H-8′)[8]

Table 2. Known Natural Bisbenzylisoquinoline Alkaloids Reisolated from New Sources

1 Berbamunine ($C_{36}H_{40}O_6N_2$: 596.2886)

Berberis amurensis (Berberidaceae),[11,12] *B. brachypoda*,[12] *B. circumserrata*,[12] *B. dasystachya*,[12] *B. diaphana*,[12] *B. dictyoneura*,[12] *B. dubia*,[12] *B. ferdinandi-coburgii*,[12] *B. fracisci-ferdinandi*,[12] *B. gyalaica*,[12] *B. henryana*,[12] *B. heteropoda*,[13−15] *B. iliensis*,[16] *B. jamesiana*,[12] *B. julianae*,[12] *B. kansuensis*,[12] *B. nummularia*,[17] *B. poiretii*,[12] *B. polyantha*,[12] *B. prattii*,[12] *B. sargentiana*,[12] *B. silva-taroucana*,[12] *B. soulieana*,[12] *B. turcomanica*,[18] *B. vernae*,[12] *B. virgetorum*,[12] *B. vulgaris*[12]

3 Dauricine ($C_{38}H_{44}O_6N_2$: 624.3199)

Cardiopetalum calophyllum (Annonaceae),[20] *Menispermum dauricum* (Menispermaceae),[21−23] *M. dauricum* DC. (cultured roots)[24]

29 Liensinine ($C_{37}H_{42}O_6N_2$: 610.3043)

Nelumbo nucifera (Nymphaeaceae)[25,26]

31 Aromoline ($C_{36}H_{38}O_6N_2$: 594.2730)

Berberis heteropoda (Berberidaceae),[13] *B. nummularia*,[17] *B. waziristanica*,[27] *Stephania cepharantha* (Menispermaceae),[28,29] *Thalictrum fortunei* (Ranunculaceae)[30]

33 Cepharanoline ($C_{36}H_{36}O_6N_2$: 594.2573)

Stephania cepharantha (Menispermaceae),[28,31] *S. epigaea*[32]

34 Cepharanthine ($C_{37}H_{38}O_6N_2$: 606.2730)

Stephania cepharantha (Menispermaceae),[28,31,33] *S. erecta*[34]

35 Coclobine ($C_{37}H_{38}O_6N_2$: 606.2730)

Anisocycla cymosa (Menispermaceae)[35]

36 Cycleapeltine ($C_{37}H_{40}O_6N_2$: 608.2886)

Cyclea barbata (Menispermaceae)[6]

37 Daphnandrine ($C_{36}H_{38}O_6N_2$: 594.2730)

Anisocycla cymosa (Menispermaceae),[35] *Cyclea barbata* (Menispermaceae),[7] *Stephania erecta* (Menispermaceae)[34]

38 Daphnoline ($C_{35}H_{36}O_6N_2$: 580.2573)

Pachygone dasycarpa (Menispermaceae)[9]

42 Homoaromoline ($C_{37}H_{40}O_6N_2$: 608.2886)

Anisocycla jollyana (Menispermaceae),[36] *Cyclea barbata* (Menispermaceae),[6] *Stephania cepharantha* (Menispermaceae),[28,31] *S. erecta*,[34] *S. excentrica*[37]

46 Obaberine ($C_{38}H_{42}O_6N_2$: 622.3043)

Berberis heterobotrys (Berberidaceae),[38] *B. iliensis*,[16] *B. koreana*,[39] *B. valdiviana*,[40] *Stephania erecta* (Menispermaceae),[34] *Thalictrum minus* var. *majus* (Ranunculaceae)[41]

46dvt 2-Norobaberine ($C_{37}H_{40}O_6N_2$: 608.2886)

Anisocycla cymosa (Menispermaceae),[35] *Stephania erecta* (Menispermaceae)[34]

48 Oxyacanthine ($C_{37}H_{40}O_6N_2$: 608.2886)

Berberis amurensis (Berberidaceae),[11] *B. heterobotrys*,[38] *B. heteropoda*,[13−15] *B.* iliensis,[16] *B. integerrima*,[42,43] *B. nummularia*,[17,43,44] *B. oblonga*,[45] *B. sibirica*,[46] *B. turcomanica*,[18] *B. vulgaris*,[19] *Dehaasia incrassata* (Lauraceae),[47] *Thalictrum minus* var. *majus* (Ranunculaceae)[41]

49 Repandine ($C_{37}H_{40}O_6N_2$: 608.2886)

Cyclea barbata (Menispermaceae)[7]

52a Thaligosine ($C_{38}H_{42}O_7N_2$: 638.2992)

Thalictrum foetidum (Ranunculaceae),[48] *T. minus* var. *majus*[41]

52b Thaligosinine ($C_{39}H_{44}O_7N_2$: 638.2992)

Thalictrum foetidum (Ranunculaceae),[49] *T. fargesii*[50]

53 Thalisopidine ($C_{37}H_{40}O_7N_2$: 624.2836)

Thalictrum fargesii (Ranunculaceae),[50] *T. isopyroides*[51]

55 Thalrugosaminine ($C_{39}H_{44}O_7N_2$: 638.2992)

Thalictrum foetidum (Ranunculaceae)[49]

56 Atherospermoline ($C_{36}H_{38}O_6N_2$: 594.2730)

Pachygone dasycarpa (Menispermaceae)[9]

57 Berbamine ($C_{37}H_{40}O_6N_2$: 608.2886)

Berberis aggregata (Berberidaceae),[52] *B. dictyoneura* (Berberidaceae),[52] *B. francisci-ferdinandi*,[52] *B. heterobotrys*,[38] *B. iliensis*,[16] *B. pseudothunbergii*,[52] *B. sibirica*,[46] *B. vulgaris*,[19] *Cyclea barbata* (Menispermaceae),[7] *Stephania cepharantha* (Menispermaceae)[28,31,33]

60 Cycleanorine ($C_{37}H_{40}O_6N_2$: 608.2886)

Cyclea barbata (Menispermaceae)[7]

61 Fangchinoline ($C_{37}H_{40}O_6N_2$: 608.2886)

Pachygone dasycarpa (Menispermaceae),[9] *Stephania tetrandra* (Menispermaceae),[53] *Strychnopsis thouarsii* (Menispermaceae)[54]

Table 2 (Continued)

62 Isotetrandrine ($C_{38}H_{42}O_6N_2$: 622.3043)

Berberis heteropoda (Berberidaceae),[14] *B. koreana*,[39] *B. nummularia*,[17,44] *B. valdiviana*,[40] *Cocculus pendulus* (Menispermaceae),[55] *Laurelia sempervirens* (Monimiaceae),[56] *Stephania cepharantha* (Menispermaceae),[28,31] *S. erecta*[34]

64 Limacine ($C_{37}H_{40}O_6N_2$: 608.2886)

Anisocycla jollyana (Menispermaceae),[36] *Cyclea barbata* (Menispermaceae),[6] *Phaeanthus crassipetalus* (Menispermaceae),[57] *Spirospermum penduliflorum* (Menispermaceae)[54]

66a 2′-*N*-Methylberbamine ($C_{38}H_{46}O_6N_2$: 623.3121)

Berberis turcomanica (Berberidaceae)[18]

71 Obamegine ($C_{36}H_{38}O_6N_2$: 594.2730)

Stephania cepharantha (Menispermaceae)[28]

71a dvt *N*-Methyl-7-*O*-Demethylpeinamine ($C_{36}H_{38}O_6N_2$: 594.2730)

Pachygone dasycarpa (Menispermaceae)[9]

72 Penduline ($C_{37}H_{40}O_6N_2$: 608.2886)

Cocculus pendulus (Menispermaceae),[55,58] *Pachygone dasycarpa* (Menispermaceae)[9]

74 Phaeanthine ($C_{38}H_{42}O_6N_2$: 622.3043)

Cyclea burmanni (Menispermaceae),[59] *Phaeanthus crassipetalus* (Menispermaceae)[57]

76 Tetrandrine ($C_{38}H_{42}O_6N_2$: 622.3043)

Cocculus pendulus (Menispermaceae),[58] *Cyclea barbata* (Menispermaceae),[6] *Cyclea burmanni* (Menispermaceae),[59] *Pachygone dasycarpa* (Menispermaceae),[9] *Stephania tetrandra* S. Moore (Menispermaceae)[53,60]

79 Thalrugosine ($C_{37}H_{40}O_6N_2$: 608.2886)

Cyclea barbata (Menispermaceae),[6] *Stephania erecta* (Menispermaceae),[34] *S. sutchuenensis*[61]

81 Hernandezine ($C_{39}H_{44}O_7N_2$: 652.3149)

Cocculus pendulus (Menispermaceae),[58] *Thalictrum delavayi* (Ranunculaceae),[62] *T. flavum*,[63] *T. foetidum*,[48] *T. glandulosissimum*[64,65]

82 Isothalidezine ($C_{38}H_{42}O_7N_2$: 638.2992)

Thalictrum glandulosissimum (Ranunculaceae)[65]

83 Thalidezine ($C_{38}H_{42}O_7N_2$: 638.2992)

Thalictrum flavum (Ranunculaceae),[63] *T. foetidum*,[48] *T. glandulosissimum*[64,65]

95 *O*-Methylthalicberine ($C_{38}H_{42}O_6N_2$: 622.3043)

Berberis turcomanica (Berberidaceae),[18] *Thalictrum flavum* (Ranunculaceae),[63] *T. foetidum*,[48] *T. minus*,[66] *T. minus* var. *majus*[41]

96 *O*-Methylthalmethine ($C_{37}H_{38}O_6N_2$: 606.2730)

Thalictrum minus (Ranunculaceae)[66]

97 Thalicberine ($C_{37}H_{40}O_6N_2$: 608.2886)

Thalictrum minus (Ranunculaceae),[66] *T. minus* var. *majus*[41]

98 Thalmethine ($C_{36}H_{36}O_6N_2$: 592.2573)

Thalictrum minus (Ranunculaceae)[66]

99 Thalfoetidine ($C_{38}H_{42}O_7N_2$: 638.2992)

Thalictrum fargesii,[50,67] *T. flavum*[63]

100 Thalidasine ($C_{39}H_{44}O_7N_2$: 652.3149)

Thalictrum fargesii (Ranunculaceae),[50,67] *T. flavum*,[63] *T. foetidum*[49]

116 Nortiliacorinine A ($C_{35}H_{34}O_5N_2$: 562.2468)

Tiliacora racemosa (Menispermaceae)[68]

119 Tiliacorinine ($C_{36}H_{36}O_5N_2$: 576.2624)

Tiliacora racemosa (Menispermaceae)[68]

120 Tiliamosine ($C_{36}H_{36}O_6N_2$: 592.2573)

Tiliacora racemosa (Menispermaceae)[8]

121 Cycleanine ($C_{38}H_{42}O_6N_2$: 662.3042)

Stephania cepharantha (Menispermaceae)[28,31,33]

122 Isochondodendrine ($C_{36}H_{38}O_6N_2$: 594.2730)

Cyclea sutchuenensis (Menispermaceae),[69] *Stephania epigaea* (Menispermaceae)[32]

125 (−)-Norcycleanine ($C_{37}H_{40}O_6N_2$: 608.2886)

Stephania cepharantha (Menispermaceae)[28]

133 (−)-Curine ($C_{36}H_{38}O_6N_2$: 594.2730)

Cyclea barbata (Menispermaceae),[7] *Stephania epigaea* (Menispermaceae)[32]

152 Cocsoline ($C_{34}H_{32}O_5N_2$: 548.2311)

Cocculus pendulus (Menispermaceae)[55]

153 Cocsuline ($C_{35}H_{34}O_5N_2$: 562.2468)

Cocculus pendulus (Menispermaceae),[55,58] *Pachygone dasycarpa* (Menispermaceae)[9]

155 12′-*O*-Demethyltrilobine ($C_{34}H_{32}O_5N_2$: 548.2311)

Cocculus pendulus (Menispermaceae)[55]

Table 2 (Continued)

157 Isotrilobine ($C_{36}H_{36}O_5N_2$: 576.2624)

Anisocycla jollyana (Menispermaceae),[36] *Cocculus hirsutus* (Menispermaceae),[70] *Cocculus pendulus*,[55] *Pachygone dasycarpa* (Menispermaceae)[9]

161 Tricordatine ($C_{34}H_{32}O_5N_2$: 548.2311)

Pachygone dasycarpa (Menispermaceae)[9]

163 Trilobine ($C_{35}H_{34}O_5N_2$: 562.2468)

Anisocycla jollyana (Menispermaceae),[36] *Cocculus hirsutus* (Menispermaceae)[70]
Cocculus pendulus (Menispermaceae)[55]

164 Cocsulinine ($C_{35}H_{34}O_6N_2$: 578.2417)

Cocculus pendulus (Menispermaceae)[55]

164 dvt *O,O*-Dimethylcocsulinine ($C_{37}H_{38}O_6N_2$: 606.2730)

Cocculus pendulus (Menispermaceae)[55]

169 Insulanoline ($C_{37}H_{38}O_6N_2$: 606.2730)

Cyclea sutchuenensis (Menispermaceae)[69,71]

170 Insularine ($C_{38}H_{40}O_6N_2$: 620.2886)

Cyclea sutchuenensis (Menispermaceae)[71]

178 Pendine ($C_{35}H_{34}O_6N_2$: 578.2417)

Cocculus pendulus (Menispermaceae)[55]

179 Pendulinine ($C_{35}H_{34}O_6N_2$: 578.2417)

Cocculus pendulus (Menispermaceae)[55]

190 Calafatine ($C_{39}H_{44}O_7N_2$: 652.3149)

Berberis horrida (Berberidaceae)[72]

191 Daphnine ($C_{37}H_{32}O_7N_2$: 616.2209)

Daphnandra dielsii (Monimiaceae)[73]

192 Daurisoline ($C_{37}H_{42}O_6N_2$: 610.3043)

Menispermum dauricum (Menispermaceae)[21,23]

194 1,2-Dehydrotelobine ($C_{35}H_{32}O_5N_2$: 560.2311)

Anisocycla jollyana (Menispermaceae),[36] *Stephania erecta* (Menispermaceae)[34]

209 *O*-Methylthalibrine ($C_{39}H_{42}O_8N_2$: 666.2941)

Thalictrum glandulosissimum (Ranunculaceae)[65]

238 Malekulatine ($C_{39}H_{46}O_8N_2$: 670.3254)

Hernandia sonora (*H. ovigera*) (Hernandiaceae)[74]

265 Punjabine ($C_{35}H_{32}O_7N_2$: 592.2210)

Cocculus pendulus (Menispermaceae)[58]

286 Cycleaneonine ($C_{38}H_{42}O_6N_2$: 622.3043)

Cyclea racemosa (Menispermaceae)[75]

288 Dehatrine ($C_{37}H_{38}O_6N_2$: 606.2730)

Beilschmiedia madang (Lauraceae)[10]

317 Limacine 2′β-*N*-oxide ($C_{37}H_{40}O_7N_2$: 624.2836)

Anisocycla jollyana (Menispermaceae)[36]

323 *N*-Methyltiliamosine ($C_{37}H_{38}O_6N_2$: 606.2730)

Tiliacora racemosa (Menispermaceae)[8]

328 2-Norcepharanthine ($C_{36}H_{36}O_6N_2$: 592.2573)

Stephania erecta (Menispermaceae)[34]

329 2′-Norcocsuline ($C_{34}H_{32}O_5N_2$: 548.2311)

Pachygone dasycarpa (Menispermaceae)[9]

334 2-Norisotetrandrine ($C_{37}H_{40}O_6N_2$: 608.2886)

Stephania erecta (Menispermaceae)[34]

336 2-Norlimacine ($C_{36}H_{38}O_6N_2$: 594.2730)

Anisocycla jollyana (Menispermaceae)[36]

344 2-Northalrugosine ($C_{36}H_{38}O_6N_2$: 594.2730)

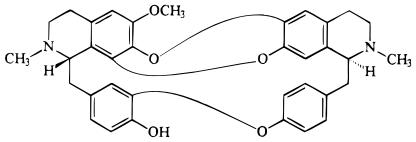
Stephania erecta (Menispermaceae)[34]

375 Stephibaberine ($C_{37}H_{40}O_6N_2$: 608.2886)

Stephania erecta (Menispermaceae)[34]

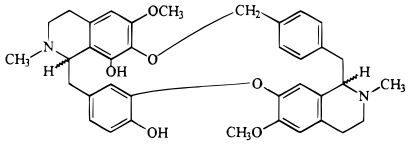
Table 3. New Bisbenzylisoquinoline Alkaloids (not reported in the reviews by Guha et al.[1] and Schiff[2−4])

394 Angchibangkine
type XXVIII (*S*,*S*) 6,7*,8^{+}11$^{\#}$,12−6*,7^{+},12$^{\#}$



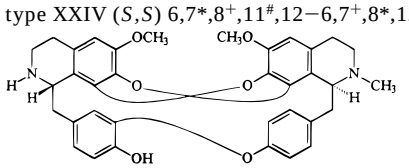
$C_{35}H_{34}O_5N_2$: 562.2468
mp: amorphous residue[9]
$[\alpha]_D$: +450° (*c* 0.1, $CHCl_3$)[9]
UV: 206 (4.90), 234 (sh) (4.67), 290 (3.71)[9]
^{1}H NMR: NMe 2.16 (N-2), 2.65 (N-2′); OMe 3.84 (C-6); AlH 2.52 (1H, dd, *J* = 10.5, 13.3 Hz, H-α), 2.66 (1H, t, *J* = 11.5 Hz, H-α), 2.67 (1H, t, *J* = 11.5 Hz, H-α′), 3.48 (1H, br d, *J* = 10.4 Hz, H-1), 3.54 (1H, d, *J* = 12.7 Hz, H-α′), 3.68 (1H, d, *J* = 11.4 Hz, H-1′); ArH 5.33 (H-8′), 6.28 (H-5), 6.68 (H-5′), 6.54 (1H, d, *J* = 1.7 Hz, H-10), 6.76 (1H, dd, *J* = 1.7, 8.1 Hz, H-14), 6.88 (1H, d, *J* = 8.1 Hz, H-13), 7.14 (1H, dd, *J* = 2.1, 8.1 Hz, H-13′), 7.15 (1H, dd, *J* = 2.1, 8.1 Hz, H-10′), 7.21 (1H, dd, *J* = 2.1, 8.1 Hz, H-11′), 7.49 (1H, dd, *J* = 2.1, 8.1 Hz, H-14′)[9]
EIMS: [M]$^{+}$ 562 (94), 561 (43), 400 (43), 386 (51), 372 (50), 358 (34), 356 (34), 350 (33), 349 (100), 335 (44), 224 (30), 197 (45), 191 (100), 175 (66)[9]
source: *Pachygone dasycarpa* (Menispermaceae)[9]
derivatives: 12-*O*-methylangchibangkine (angchibangkine + CH_2N_2)[9]
mp: amorphous residue[9]
$[\alpha]_D$: +392° (*c* 0.05, $CHCl_3$)[9]
^{1}H NMR: NMe 2.17 (N-2), 2.68 (N-2′); OMe 3.88 (C-6), 4.01 (C-12); AlH 2.52 (1H, dd, *J* = 10.3, 12.5 Hz, H-α), 2.68 (2H, m, H-α + H-α′), 3.47 (1H, br d, *J* = 10.3 Hz, H-1), 3.58 (1H, d, *J* = 13.9 Hz, H-α′), 3.70 (1H, d, *J* = 10.4 Hz, H-1′); ArH 5.44 (H-8′), 6.31 (H-5), 6.71 (H-5′), 6.60 (1H, d, *J* = 1.8 Hz, H-10), 6.82 (1H, dd, *J* = 1.7, 8.1 Hz, H-14), 6.91 (1H, d, *J* = 8.2 Hz, H-13), 7.17 (1H, br d, *J* = 8.1 Hz, H-10′), 7.23 (2H, br d, *J* = 8.1, 8.9 Hz, H-11′ + H-13′), 7.53 (1H, br d, *J* = 8.1 Hz, H-14′)[9]
EIMS: [M]$^{+}$ 576 (47), 561 (2), 350 (27), 349 (100), 335 (41), 175 (54)[9]

395 Cissampentin
type XXIIa (*?*,*?*)6,7,8,11*,12−6,7*[7−12]



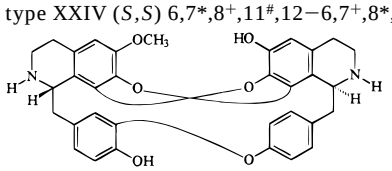
$C_{37}H_{40}O_6N_2$: 608.2886
mp: yellow oil[76]
$[\alpha]^{25}_D$: 0.0° (*c* 0.002, $CHCl_3$)[76]
^{1}H NMR: NMe 2.27 (N-2), 2.48 (N-2′); OMe 3.79 (C-6′), 3.87 (C-6); AlH 2.55 (1H, m, H-3′), 2.63 (1H, dd, *J* = 2.6, 14.8 Hz, H-4′), 2.71 (2H, m, H-α), 2.81 (1H, m, H-3), 2.86 (1H, m, H-4), 2.88 (1H, m, H-4), 3.04 (1H, dd, *J* = 4.1, 16.8 Hz, H-α′), 3.09 (2H, m, H-3′ + H-4′), 3.25 (1H, td, *J* = 4.7, 12.1 Hz, H-3), 3.36 (1H, dd, *J* = 4.1, 16.8 Hz, H-α′), 3.58 (1H, br d, *J* = 8.2 Hz, H-1), 3.65 (1H, br s, H-1′), 4.58 (1H, d, *J* = 12.1 Hz, H-15′), 5.06 (1H, d, *J* = 12.1 Hz, H-15′); ArH 6.21 (H-5), 6.63 (H-5′), 6.78 (H-10), 6.79 (H-8′), 6.85 (1H, d, *J* = 7.9 Hz, H-13), 6.91 (1H, d, *J* = 7.9 Hz, H-14), 7.08 (2H, d, *J* = 7.8 Hz, H-11′ + H-13′), 7.31 (2H, d, *J* = 7.8 Hz, H-10′ + H-14′)[76]
^{13}C NMR: 61.26 (d, C-1), 44.99 (t, C-3), 24.16 (t, C-4), 119.23 (s, C-4a), 102.80 (d, C-5), 150.46 (s, C-6), 132.39 (s, C-7), 146.54 (s, C-8), 129.66 (s, C-8a or C-4a′), 40.50 (t, C-α), 134.69 (s, C-9), 117.97 (d, C-10), 144.23 (s, C-11), 144.85 (s, C-12), 115.01 (d, C-13), 124.40 (d, C-14); 63.62 (d, C-1′), 52.47 (t, C-3′), 29.40 (t, C-4′), 129.50 (s, C-4a′ or C-8a), 112.37 (d, C-5′), 148.50 (s, C-6′), 143.33 (s, C-7′), 117.01 (d, C-8′), 139.49 (s, C-8a′), 36.28 (t, C-α′), 134.82 (s, C-9′), 130.19 (d, C-10′), 128.64 (d, C-11′), 139.49 (s, C-12′), 128.64 (d, C-13′), 130.19 (d, C-14′), 77.66 (t, C-15′); 42.86 (q, NMe-2), 43.65 (q, NMe-2′), 55.64 (q, OMe-6′), 55.72 (q, OMe-6)[76]
EIMS: M^{+} 608 (1), 400 (3), 298 (100), 266 (15), 206 (29), 161 (20), 132 (7), 104 (3), 77 (2)[76]
source: *Cissampelos fasciculata* (Menispermaceae)[76]
note: this is a new class that supplements class XXII as presented in the review of Guha et al.[1]

396 Cocsiline
type XXIV (*S*,*S*) 6,7*,8^{+},11$^{\#}$,12−6,7^{+},8*,12$^{\#}$



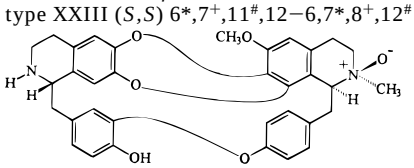
$C_{35}H_{34}O_6N_2$: 578.2417
mp: >257 °C dec[55]
$[\alpha]_D$: +297° [55]
UV: 223, 273 (sh), 280[55]
IR: 3340, 2940, 1622, 1540, 1260[55]
^{1}H NMR: NMe 2.47; OMe 3.75, 3.93[55]
MS: [M]$^{+}$ 578, 366, 365, 351, 183[55]
source: *Cocculus pendulus* (Menispermaceae)[55]
note: these data do not exclude the possibility of N-2 = CH_3 and N-2′ = H
derivatives: *N*-methylcocsiline (cocsiline + CH_2O + HCOOH)[55]
O,*O*-dimethylcocsulinine (*N*-methylcocsiline + CH_2N_2)[55]
mp: 144−145 °C
$[\alpha]_D$: +296°

397 Cocsilinine
type XXIV (*S*,*S*) 6,7*,8^{+},11$^{\#}$,12−6,7^{+},8*,12$^{\#}$



$C_{33}H_{30}O_6N_2$: 550.2104
mp: amorphous residue, >295 °C dec[55]
UV: 289[55]
IR: 3340, 2932, 2870, 1620, 1590, 1242[55]
^{1}H NMR (TFA): OMe 3.84[55]
MS: [M]$^{+}$ 550, 338, 337, 328, 169[55]
source: *Cocculus pendulus* (Menispermaceae)[55]
derivatives: cocsulinine (cocsilinine + CH_2O + HCOOH)[55]
mp: 260−262 °C[55]
$[\alpha]_D$: +309° [55]

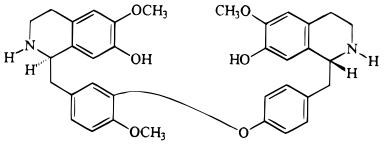
398 Cocsoline 2′*β*-*N*-oxide
type XXIII (*S*,*S*) 6*,7^{+},11$^{\#}$,12−6,7*,8^{+},12$^{\#}$



$C_{34}H_{32}O_6N_2$: 564.2260
mp: amorphous residue[77]
UV: 235, 287[77]
^{1}H NMR: $CDCl_3$−CD_3OD: NMe 3.22 (N-2′); OMe 3.89 (C-6′); AlH 3.62 (1H, m, H-1); 3.95 (1H, m, H-1′); ArH 6.28 (H-8), 6.43 (H-5′), 6.50 (1H, br s, H-10), 6.69 (H-5), 6.77 (1H, dd, *J* = 2.5, 8.5 Hz, H-11′), 6.92 (2H, br s, H-13 + H-14), 7.05 (1H, dd, *J* = 2.0, 8.3 Hz, H-10′), 7.20 (1H, dd, *J* = 2.0, 8.2 Hz, H-13′), 7.94 (1H, dd, *J* = 1.9, 8.4, Hz, H-14′)[77]
MS: [M]$^{+}$ 564 (28), 548 (72), 349 (82), 336 (35), 335 (100), 321 (44), 175 (76), 168 (80)[77]
source: *Anisocycla cymosa* (Menispermaceae)[77]

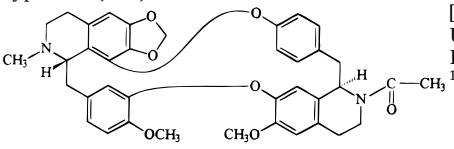
Table 3 (Continued)

399 Costaricine
type I (*S*,*R*) 6,7,11*,12−6,7,12*



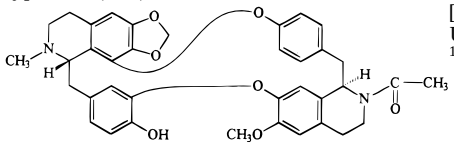
$C_{35}H_{38}O_6N_2$: 582.2730
mp: amorphous residue[78]
$[\alpha]_D$: +46.4° (*c* 0.248, $CHCl_3$)[78]
UV: 210 (4.73), 224 (sh) (4.53), 284 (4.12)[78]
IR (film): 2926, 2843, 1609, 1591, 1507, 1449, 1272, 1223, 1127, 1028, 802[78]
^{1}H NMR: OMe 3.81 (C-6), 3.82 (C-6′), 3.84 (C-12); AlH 2.63 (1H, m, H-4), 2.64 (1H, m, H-3), 2.72 (1H, m, H-3′), 2.76 (1H, m, H-4′), 2.80 (1H, dd, *J* = 3.7, 13.5 Hz, H-α′), 2.85 (1H, m, H-α), 2.88 (1H, m, H-4), 2.92 (1H, m, H-4′), 3.04 (1H, dd, *J* = 3.5, 14.0 Hz, H-α), 3.14 (1H, m, H-α′), 3.16 (1H, m, H-3), 3.23 (1H, m, H-3′), 4.05 (1H, dd, *J* = 3.5, 9.0 Hz, H-1), 4.08 (1H, dd, *J* = 3.7, 10.0 Hz, H-1′); ArH 6.51 (H-5), 6.56 (H-5′), 6.69 (H-8), 6.73 (2H, d, *J* = 2.0 Hz, H-10 + H-8′), 6.86 (2H, br d, *J* = 8.5 Hz, H-11′ + H-13′), 6.92 (1H, d, *J* = 8.5 Hz, H-13), 6.96 (1H, dd, *J* = 2.0, 8.5 Hz, H-14), 7.13 (2H, br d, *J* = 8.5 Hz, H-10′ + H-14′)[78]
^{13}C NMR: 56.4 (C-1), 40.9 (C-3), 29.3 (C-4), 126.3 (C-4a), 111.2 (C-5), 145.4 (C-6), 144.0 (C-7), 112.6 (C-8), 130.3 (C-8a), 41.1 (C-α), 131.4 (C-9), 120.9 (C-10), 145.4 (C-11), 149.6 (C-12), 112.6 (C-13), 125.1 (C-14); 56.7 (C-1′), 40.6 (C-3′), 29.2 (C-4′), 126.1 (C-4a′), 111.2 (C-5′), 145.5 (C-6′), 143.9 (C-7′), 112.5 (C-8′), 130.5 (C-8a′), 41.7 (C-α′), 133.1 (C-9′), 130.4 (C-10′), 117.9 (C-11′), 155.9 (C-12′), 117.9 (C-13′), 130.4 (C-14′); 55.7 (OMe-6 + OMe-6′), 56.0 (12 OMe)[78]
EIMS: 581 (0.4) $[M - H]^+$, 405 (9), 403 (9), 192 (55), 179 (10), 178 (100)[78]
source: *Nectandra salicifolia* (Lauraceae)[78]

400 Curicycleatjenine
type XXI (*S*,*R*) 6,7,8*,11$^+$,12−6,7$^+$,12*



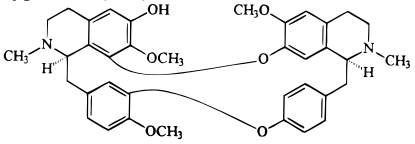
$C_{38}H_{38}O_7N_2$: 634.2679
mp: amorphous residue[79]
$[\alpha]_D$: −120° (*c* 0.3, $CHCl_3$);[79] −101° (*c* 0.3, MeOH)[79]
UV: 232 (sh) (4.62), 283 (4.08)[79]
IR: 3025, 2995, 1625, 1605, 1495[79]
^{1}H NMR: two isomeric species (ratio of about 3.5:1) were clearly distinguished (500 MHz) due to geometric isomerism around the amide bond.[79] Major isomer: NMe 2.31 (N-2); NCOMe 2.13 (N-2′); OMe 3.68 (C-12), 3.95 (C-6′); AlH 2.36 (1H, m, H-4′), 2.55 (1H, dd, *J* = 4.7, 12.5 Hz, H-α′), 3.21 (1H, m, H-4′), 3.25 (1H, dd, *J* = 11.3, 12.5 Hz, H-α′), 3.42 (1H, m, H-3′), 3.90 (1H, m, H-3′), 4.20 (1H, d, H-1), 5.05 (1H, dd, *J* = 4.7, 11.3 Hz, H-1′); CH_2O_2 5.86 (1H, d, *J* = 1.4 Hz), 5.91 (1H, d, *J* = 1.4 Hz); ArH 5.52 (H-8′), 6.11 (1H, dd, *J* = 2.1, 8.4 Hz, H-10′), 6.53 (H-5), 6.56 (1H, d, *J* = 2.0 Hz, H-10), 6.71 (1H, dd, *J* = 2.1, 8.4 Hz, H-13′), 6.77 (1H, d, *J* = 8.3 Hz, H-13), 6.80 (H-5′), 6.93 (1H, dd, *J* = 2.0, 8.3 Hz, H-14 and 1H, dd, *J* = 2.1, 8.4 Hz, H-11′), 7.25 (1H, dd, *J* = 2.1, 8.4 Hz, H-14′). Minor isomer: NMe 2.31 (N-2); NCOMe 2.25 (N-2′); OMe 3.71 (C-12), 3.95 (C-6′); AlH 2.88 (1H, m, H-α′), 3.06 (1H, dd, H-α′), 4.16 (1H, d, H-1), 4.45 (1H, dd, H-1′); CH_2O_2 5.88 (1H, d, *J* = 1.4 Hz), 5.91 (1H, d, *J* = 1.4 Hz); ArH 5.55 (H-8′), 6.18 (1H, dd, *J* = 2.2, 8.4 Hz, H-10′), 6.54 (1H, d, *J* = 2.1 Hz, H-10), 6.55 (H-5), 6.73 (1H, dd, *J* = 2.2, 8.4 Hz, H-13′), 6.81 (1H, d, *J* = 8.3 Hz, H-13), 6.81 (H-5′), 6.98 (1H, dd, *J* = 2.1, 8.3 Hz, H-14 and 1H, dd, *J* = 2.1, 8.4 Hz, H-11′), 7.05 (1H, dd, *J* = 2.2, 8.4 Hz, H-14′)
MS: $[M]^+$ 634 (81), 633 (76), 620 (19), 619 (36), 591 (3), 341 (15), 340 (68), 339 (2), 298 (12), 297 (14), 295 (49), 294 (8), 282 (20), 190 (14), 189 (100), 187 (14), 159 (48)[79]
CD: 0 (307), −2.6 sh (294), −4.7 (286), −3.2 (281), −3.4 (278), −0.9 (254), −9.8 (240), 0 (235), positive tail below 230[79]
source: *Cyclea atjehensis* (Menispermaceae)[79]

401 Curicycleatjine
type XXI (*S*,*R*) 6,7,8*,11$^+$,12−6,7$^+$,12*



$C_{37}H_{36}O_7N_2$: 620.2523
mp: amorphous residue[79]
$[\alpha]_D$: −193° (*c* 0.27, $CHCl_3$);[79] −122° (c 0.27, MeOH)[79]
UV: 230 (sh) (4.62), 283 (4.11); (MeOH + OH^-) 233 (sh), 284, 309 (sh)[79]
^{1}H NMR: two isomeric species (ratio of about 3.5:1) were clearly distinguished (500 MHz) due to geometric isomerism around the amide bond.[79] Major isomer: NMe 2.37 (N-2); NCOMe 2.16 (N-2′); OMe 3.93 (C-6′); AlH 2.5 (1H, dd, *J* = 4.3, 12.3 Hz, H-α′), 3.28 (1H, dd, *J* = 11.3, 12.3 Hz, H-α′), 5.19 (1H, dd, *J* = 4.3, 11.3 Hz, H-1′); CH_2O_2 5.87 (1H, d, *J* = 1.4 Hz), 5.93 (1H, d, *J* = 1.4 Hz); ArH 5.81 (H-8′), 6.11 (1H, dd, *J* = 2.2, 8.5 Hz, H-10′), 6.54 (H-5), 6.54 (1H, d, *J* = 1.7 Hz, H-10), 6.77 (H-5′), 6.81 (1H, dd, *J* = 2.2, 8.5 Hz, H-13′), 6.84 (1H, d, *J* = 8.3 Hz, H-13), 6.93 (1H, dd, *J* = 2.2, 8.5 Hz, H-11′), 6.97 (1H, dd, *J* = 1.7, 8.3 Hz, H-14), 7.39 (1H, dd, *J* = 2.2, 8.5 Hz).[79] Minor isomer: NMe 2.37 (N-2); NCOMe 2.27 (N-2′); OMe 3.93 (C-6′); AlH 2.94 (1H, m, H-α′), 3.11 (1H, dd, H-α′), 4.56 (1H, d, *J* = 4.3, 11.3 Hz, H-1′); CH_2O_2 5.88 (1H, d, *J* = 1.4 Hz), 5.93 (1H, d, *J* = 1.4 Hz); ArH 5.80 (H-8′), 6.42 (1H, dd, *J* = 2.2, 8.4 Hz, H-10′), 6.46 (1H, d, *J* = 1.7 Hz, H-10), 6.56 (H-5), 6.83 (1H, dd, *J* = 2.2, 8.4 Hz, H-13′), 6.86 (1H, d, *J* = 1.7, 8.1 Hz, H-13), 6.77 (H-5′), 6.97 (1H, m, H-14), 6.97 (1H, dd, *J* = 2.2, 8.4 Hz, H-11′), 7.17 (1H, dd, *J* = 2.2, 8.4 Hz, H-14′)[79]
MS: $[M]^+$ 620 (94), 619 (100), 577 (3), 326 (65), 296 (10), 295 (30), 284 (35), 189 (96), 187 (35), 159 (65)[79]
CD: 0 (312), −2.4 sh (294), −3.9 (285), −2.6 (282), −3.1 (279), 0 (253), −9.4 (241), 0 (235)[79]
source: *Cyclea atjehensis* (Menispermaceae)[79]

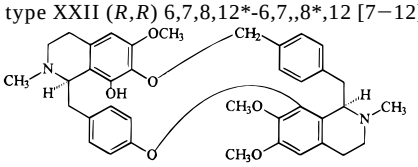
402 Cycleabarbatine
type VIII (*R*,*S*) 6,7,8*,11$^+$,12−6,7*,12$^+$



$C_{37}H_{40}O_6N_2$: 608.2886
mp: amorphous residue[7]
$[\alpha]_D$: +20° (*c* 0.1, $CHCl_3$)[7]
^{1}H NMR: NMe 2.25 (N-2), 2.58 (N-2′); OMe 3.18 (C-7), 3.55 (C-6′), 3.91 (C-12); AlH 2.58 (1H, m, H-4), 2.80 (1H, m, H-α), 2.83 (1H, m, H-4′), 2.85 (2H, m, H-3 + H-4), 2.95 (2H, m, H-3′ + H-4′), 3.02 (1H, m, H-α), 3.31 (1H, m, H-3), 3.36 (1H, m, H-α′), 3.47 (1H, m, H-3′), 3.95 (1H, m, H-1), 3.98 (1H, H-1′); ArH 6.08 (H-8′), 6.37 (H-5), 6.42 (2H, m, H-10 + H-10′), 6.55 (H-5′), 6.62 (1H, dd, *J* = 2.2, 8.2 Hz, H-11′), 6.83 (1H, d, *J* = 8.3 Hz, H-13), 6.94 (1H, m, H-14), 7.16 (1H, dd, *J* = 2.2, 8.2 Hz, H-13′), 7.32 (1H, dd, *J* = 2.2, 8.2 Hz, H-14′)[7]
MS: $[M]^+$ 608 (48), 607 (26), 594 (4), 593 (7), 382 (25), 381 (100), 367 (14), 192 (15), 191 (16), 174 (7), 168 (6)[7]
source: *Cyclea barbata* (Menispermaceae)[7]

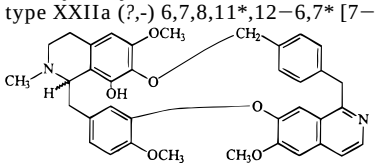
Table 3 (Continued)

403 (−)-Cycleaneonine
type XXII (*R*,*R*) 6,7,8,12*-6,7,,8*,12 [7−12]



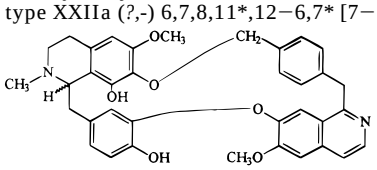
$C_{38}H_{42}O_6N_2$: 622.3043
mp: amorphous residue[75]
$[\alpha]^{26}_D$: −119° (*c* 1.28, $CHCl_3$)[75]
UV: 211 (4.86), 224 (sh) (4.73), 275 (3.72), 283 (sh) (3.66), with no change on the addition of NaOH[75]
IR (KBr): 3440, 2850, 2780, 1610, 1585, 1505, 1460, 1450, 1435, 1310, 1260, 1240, 1210, 1115, 1065, 1015, 835, 810[75]
^{1}H NMR: NMe 2.20 (N-2′), 2.36 (N-2); OMe 3.69 (C-7′), 3.85 (C-6), 3.86 (C-6′); AlH 2.5−3.5 (12H, complex, ring CH_2), 3.81 (1H, dd, *J* = 3.7, 8.0 Hz, H-1), 4.05 (1H, d, *J* = 7.8 Hz, H-1′), 4.99 (1H, d, *J* = 11.7 Hz, CH_2O), 5.14 (1H, d, *J* = 11.7 Hz, CH_2O); OH 5.03 (1H, s); ArH 6.13 (H-5), 6.53 (H-5′), 6.64 (2H, d, *J* = 8.5 Hz, H-11 + H-13), 6.82 (2H, d, *J* = 8.5 Hz, H-10 + H-14), 7.02 (2H, d, *J* = 7.8 Hz, H-11′ + H-13′), 7.15 (2H, d, *J* = 7.8 Hz, H-10′ + H-14′)[75]
EIMS: 622 $[M]^+$(16), 519 (2), 518 (1), 312 (75), 311 (100), 208 (3), 207 (21), 206 (18), 190 (16)[75]
source: *Cyclea sutchuenensis* (Menispermaceae)[75]
derivatives: *O*-methylcycleaneonine [(−)-cycleaneonine + CH_2N_2][75]
IR (KBr): 2850, 2780, 1600, 1580, 1500, 1460, 1450, 1315, 1265, 1215, 1115, 1070, 1015, 840, 810
^{1}H NMR: NMe 2.24 (N-2′), 2.46 (N-2); OMe 3.65 (6H, s, C-7′ + C-8), 3.85 (6H, s, C-6 + C-6′); AlH 2.2−3.4 (12H, complex, ring CH_2), 3.81 (1H, dd, *J* = 2.4, 7.8 Hz, H-1′), 3.94 (1H, dd, *J* = 4.4, 6.3, H-1), 5.23 (2H, s, CH_2O); ArH 6.27 (H-5), 6.51 (2H, d, *J* = 8.8 Hz, H-11 + H-13), 6.52 (H-5′), 6.68 (2H, d, *J* = 8.8 Hz, H-10 + H-14), 6.97 (2H, d, *J* = 7.8 Hz, H-10′ + H-14′), 7.04 (2H, d, *J* = 7.8 Hz)[75]
EIMS: 636 $[M]^+$(60), 533 (8), 532 (22), 326 (4), 312 (41), 311 (100), 222 (36), 221 (31), 220 (74), 206 (10), 204 (28), 190 (17)[75]

404 Cycleatjehenine
type XXIIa (?,-) 6,7,8,11*,12−6,7* [7−12]



$C_{37}H_{36}O_6N_2$: 604.2574
mp: 218 °C (MeOH)[80]
$[\alpha]_D$: +352° (*c* 0.25, $CHCl_3$);[80] +352° (*c* 0.25, MeOH)[80]
UV: 238 (4.76), 279 (3.84), 314 (3.41), 327 (3.46); MeOH + H^+ 226 (sh), 252, 313, 341 (sh)[80]
^{1}H NMR: NMe 2.30 (N-2); OMe 3.81 (C-12), 3.89 (C-6), 4.09 (C-6′); AlH 2.54 (2H, m, H-4 + H-α), 2.78 (1H, m, H-3), 2.95 (2H, m, H-4 + H-α), 3.27 (1H, m, H-3), 3.84 (1H, m, H-1), 4.34 (1H, d, *J* = 15.7 Hz, H-α′), 4.47 (1H, d, *J* = 15.7 Hz, H-α′), 4.54 (1H, d, *J* = 12.0 Hz, H-15′), 5.03 (1H, d, *J* = 12.0 Hz, H-15′); OH 4.74 (br s); ArH 6.26 (H-5), 6.83 (2H, d, *J* = 8.2 Hz, H-10′ + H-14′), 6.94 (1H, d, *J* = 8.3 Hz, H-13), 7.08 (2H, d, *J* = 8.2 Hz, H-11′ + H-13′), 7.21 (2H, m, H-10 + H-14), 7.21 (2H, s, H-5′ + H-8′), 7.53 (1H, d, *J* = 5.7 Hz, H-4′), 8.43 (1H, d, *J* = 5.7 Hz, H-3′)[80]
^{13}C NMR: 60.4 (C-1), 45.5 (C-3), 25.2 (C-4), 129.6 (C-4a), 102.8 (C-5), 150.5 (C-6), 131.1 (C-7), 146.5 (C-8), 119.2 (C-8a), 39.8 (C-α), 135.3 (C-9), 122.5 (C-10), 142.5 (C-11), 149.1 (C-12), 112.7 (C-13), 126.1 (C-14); 156.8 (C-1′), 141.0 (C-3′), 118.7 (C-4′), 134.0 (C-4a′), 106.0 (C-5′), 152.8 (C-6′), 148.9 (C-7′), 106.0 (C-8′), 122.5 (C-8a′), 40.8 (C-α′), 134.9 (C-9′), 128.1 (C-10′ + C-14′), 129.6 (C-11′ + C-13′), 76.2 (C-15′); 43.2 (NMe-2), 59.9 (OMe-6 + OMe-12), 62.5 (OMe-6′)[80]
MS: $[M]^+$ 604 (19), 590 (3), 588 (8), 574 (3), 399 (16), 398 (14), 397 (11), 382 (26), 302 (4), 208 (15), 207 (36), 206 (100), 178 (28)[80]
CD: 0 (310), −0.6 (285), 0 (270), +105 (244), 0 (232), negative tail below 223[80]
source: *Cyclea atjehensis* (Menispermaceae)[80]
derivatives: *O*-methylcycleatjehenine (cycleatjehenine + CH_2N_2)[80]
$[\alpha]_D$: +266° (*c* 0.175, $CHCl_3$);[80] +272° (*c* 0.11, MeOH);[80]
UV: 237 (4.77), 280 (3.95), 313 (3.52), 327 (3.54); MeOH + H^+ 231 (sh), 252, 283 (sh), 314, 345 (sh)[80]
^{1}H NMR: NMe 2.31 (N-2); OMe 3.25 (C-8), 3.81 (C-12), 3.87 (C-6), 4.09 (C-6′); AlH 4.11 (1H, d, *J* = 15.8 Hz, H-α′), 4.29 (1H, d, *J* = 15.8 Hz, H-α′), 4.47 (1H, d, *J* = 12.0 Hz, H-15′), 5.07 (1H, d, *J* = 12.0 Hz, H-15′); ArH 6.40 (H-5), 6.79 (2H, d, *J* = 8.0 Hz, H-10′ + H-14′), 6.94 (1H, d, *J* = 8.3 Hz, H-13), 7.03 (2H, d, J = 8.0 Hz, H-11′ + H-13′), 7.11 (1H, br s, H-10), 7.13 (1H, br d, *J* = 8.3 Hz, H-14), 7.19 (H-5′ or H-8′), 7.20 (H-8′ or H-5′), 7.51 (1H, d, *J* = 5.6 Hz, H-4′), 8.42 (1H, d, *J* = 5.6 Hz, H-3′)[80]
MS: $[M]^+$ 618 (10), 603 (9), 221 (26), 220 (100), 206 (15), 204 (13), 203 (14), 192 (11), 178 (21)[80]
X-ray cryst[81]
note: this is a new class that supplements class XXII as presented in the review of Guha et al.[1]

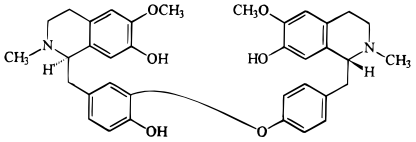
405 Cycleatjehine
type XXIIa (?,-) 6,7,8,11*,12−6,7* [7−12]



$C_{36}H_{34}O_6N_2$: 590.2417
$[\alpha]_D$: +321° (*c* 0.23, $CHCl_3$);[80] +252° (*c* 0.23, MeOH)[80]
UV: 237 (4.79), 280 (3.91), 314 (3.46), 327 (3.49); MeOH + H^+ 226 (sh), 253, 281 (sh), 313, 341 (sh); MeOH + OH^- 210, 240, 295, 332[80]
^{1}H NMR: NMe 2.35 (N-2); OMe 3.93 (C-6), 4.08 (C-6′); AlH 4.47 (1H, d, *J* = 15.7 Hz, H-α′), 4.58 (1H, d, *J* = 15.8 Hz, H-α′), 4.69 (1H, d, *J* = 12.3 Hz, H-15′), 5.03 (1H, d, *J* = 12.3 Hz, H-15′); OH 4.81 (1H, br s, C-8); ArH 6.31 (H-5), 6.99 (2H, d, *J* = 7.9 Hz, H-10′ + H-14′), 7.02 (1H, br d, *J* = 8.0 Hz, H-14), 7.16 (2H, d, *J* = 7.9 Hz, H-11′ + H-13′), 7.17 (1H, d, *J* = 8.0 Hz, H-13), 7.24 (H-5′), 7.31 (H-8′), 7.58 (1H, d, *J* = 5.6 Hz, H-4′), 8.52 (1H, d, *J* = 5.6 Hz, H-3′)[80]
MS: $[M]^+$ 590 (15), 575 (21), 385 (12), 384 (10), 383 (13), 368 (2), 208 (37), 207 (39), 206 (100), 178 (32)[80]
CD: 0 (310), −0.5 (286), 0 (270), +97 (241), 0 (232), negative tail below 225[80]
source: *Cyclea atjehensis* (Menispermaceae)[80]
note: this is a new class that supplements class XXII as presented in the review of Guha et al.[1]

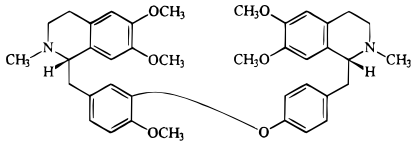
Table 3 (Continued)

406 Dauriciline
type I (*R,R*) 6,7,11*,12−6,7,12*



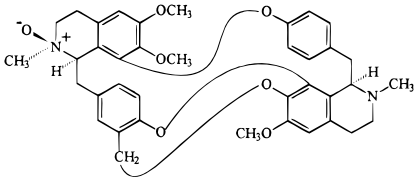
$C_{36}H_{40}O_6N_2$: 596.2886
mp: 109−110 °C ($CHCl_3$−Me_2CO)[82]
$[\alpha]^{15}_D$: −101° (*c* 0.085, MeOH)[82]
UV: 284[82]
IR(KBr): 3440, 2930, 1608, 1506, 1263, 1220, 1113, 1020[82]
^{1}H NMR: NMe 2.53 (6H, s, N-2 + N-2′); OMe 3.82, 3.87; ArH 5.90−6.92 (11H, m)[82]
FABMS: 597 $[M + H]^+$ (14), 404 (2), 192 (100), 191 (7), 190 (16), 177 (13), 176 (9), 162 (7), 148 (4)[82]
source: *Menispermum dauricum* (Menispermaceae)[82]
derivatives: *O*-methyldauricine (dauriciline + CH_2N_2)[82]

407 *O,O′*-Dimethylgrisabine
type I (*S,R*) 6,7,11*,12−6,7,12*



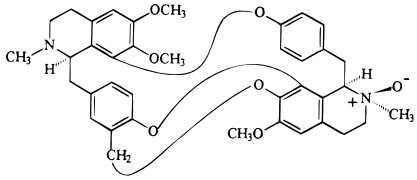
$C_{39}H_{46}O_6N_2$: 638.3356
mp: amorphous residue[83,84]
$[\alpha]^{26}_D$: −26° (*c* 0.19, $CHCl_3$)[83,84]
UV (EtOH): 210 (4.42), 223 (sh) (4.25), 285 (3.83)[84]
^{1}H NMR: NMe 2.56 (N-2), 2.62 (N-2′); OMe 3.51 (C-7′), 3.56 (C-7), 3.79 (C-12), 3.82 (C-6), 3.83 (C-6′); AlH 2.64 (1H, mt, H-4), 2.68 (1H, mt, H-4′), 2.73 (1H, dd, *J* = 8.6, 13.4 Hz, H-α), 2.76 (1H, dd, *J* = 9.0, 13.2 Hz, H-α′), 2.89 (1H, mt, H-3), 2.90 (1H, mt, H-4), 2.93 (1H, mt, H-3′), 2.97 (1H, mt, H-4′), 3.26 (1H, mt, H-3), 3.27 (1H, dd, *J* = 4.1, 13.4 Hz, H-α), 3.33 (1H, m, H-3′), 3.36 (1H, dd, *J* = 4.2, 13.2 Hz, H-α), 3.79 (1H, dd, *J* = 4.1, 8.6 Hz, H-1′); ArH 5.88 (H-8′), 5.95 (H-8), 6.55 (H-5), 6.57 (H-5′), 6.70 (1H, d, *J* = 2.0 Hz, H-10), 6.77 (2H, A_2B_2, *J* = 8.7 Hz, H-11′ + H-13′), 6.86 (1H, dd, *J* = 2.0, 8.4 Hz, H-14), 6.89 (1H, d, *J* = 8.4 Hz, H-13), 7.00 (2H, A_2B_2, *J* = 8.7 Hz, H-10′ + H-14′)[84]
^{13}C NMR: 24.08 (1C, t), 24.30 (1C, t), 40.13 (1C, t), 40.25 (1C, t), 41.32 (1C, q), 41.56 (1C, q), 45.66 (1C, t), 45.87 (1C, t), 55.49 (2C, q), 55.75 (2C, q), 56.06 (1C, q), 64.64 (1C, d), 64.57 (1C, d), 111.07 (1C, d), 111.19 (1C, d), 11.24 (2C, d), 112.70 (1C, d), 116.67 (2C, d), 122.70 (1C, d), 124.22 (1C, s), 124.67 (1C, s), 126.19 (1C, d), 126.80 (1C, s), 127.08 (1C, s), 130.90 (1C, d), 131.93 (1C, s), 132.52 (1C, s), 144.49 (1C, s), 146.52 (1C, s) 146.56 (1C, s), 147.76 (1C, s), 147.81 (1C, s), 149.97 (1C, s), 156.68 (1C, s)[84]
CIMS: 639 $[M + H]^+$ (100), 448 (5), 328 (10), 206 (42)[84]
CD: −2.6 (282), −6.2 (246), −10.7 (216)[83,84]
source: *Phaeanthus vietnamensis* (Menispermaceae) (the authors cite the Annonaceae, but this must be in error)[83,84]

408 Insularine 2*β*-*N*-Oxide
type XXVI (*R,R*) 6,7,8*,12$^+$,12−6,7,8$^+$,12* [11−7]



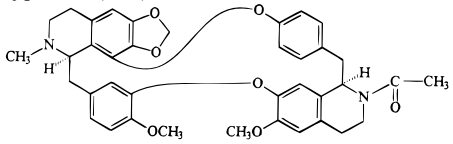
$C_{38}H_{40}O_7N_2$: 636.2836
data not available to author[71]
source: *Cyclea sutchuenensis* (Menispermaceae)[71]

409 Insularine 2′*β*-*N*-Oxide
type XXVI (*R,R*) 6,7,8*,12$^+$,12−6,7,8$^+$,12* [11−7]



$C_{38}H_{40}O_7N_2$: 636.2836
data not available to author[71]
source: *Cyclea sutchuenensis* (Menispermaceae)[71]

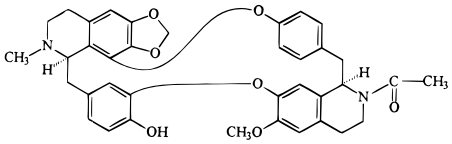
410 Isocuricycleatjenine
type XXI (*R,R*) 6,7,8*,11$^+$,12−6,7$^+$,12*



$C_{38}H_{38}O_7N_2$: 634.2679
mp: amorphous residue[79]
$[\alpha]_D$: −238° (*c* 0.18, $CHCl_3$);[79] −191° (*c* 0.18, MeOH)[79]
UV: 232 (sh) (4.58), 283 (4.04)[79]
^{1}H NMR: Two isomeric species (ratio of about 3.5:1) were clearly distinguished (500 MHz) due to geometric isomerism around the amide bond.[79] Major isomer: NMe 2.37 (N-2); NCOMe 2.16 (N-2′); OMe 3.70 (C-12), 3.89 (C-6′); AlH 2.53 (1H, dd, *J* = 3.5, 12.4 Hz, H-α′), 2.85 (1H, m, H-4′), 3.15 (1H, m, H-4′), 3.21 (1H, dd, *J* = 11.8, 12.4 Hz, H-α′), 3.50 (1H, m, H-3′), 3.64 (1H, m, H-1), 3.83 (1H, m, H-3′), 5.11 (1H, dd, *J* = 3.5, 11.8 Hz, H-1′); CH_2O_2 5.86 (1H, d, *J* = 1.4 Hz), 5.89 (1H, d, *J* = 1.4 Hz); ArH 5.56 (H-8′), 6.34 (1H, mdd, *J* = 2.1, 8.4 Hz, H-10′), 6.45 (1H, d, *J* = 2.0 Hz, H-10), 6.53 (H-5), 6.70 (1H, m, H-13′), 6.77 (H-5′), 6.82 (1H, d, *J* = 8.3 Hz, H-13), 6.82 (1H, m, H-11′), 7.23 (1H, dd, *J* = 2.0, 8.3 Hz, H-14), 7.31 (1H, br d, *J* = 2.1, 8.4 Hz, H-14′).[79] Minor isomer: NMe 2.38 (N-2); NCOMe 2.29 (N-2′); OMe 3.75 (C-12), 3.88 (C-6′); AlH 2.89 (1H, m, H-α′), 3.05 (1H, m, H-α′), 3.50 (1H, m, H-3′), 3.64 (1H, m, H-1), 3.83 (1H, m, H-3′), 4.55 (1H, dd, H-1′); CH_2O_2 5.86 (1H, d, *J* = 1.4 Hz), 5.89 (1H, d, *J* = 1.4 Hz); ArH 5.63 (H-8′), 6.35 (1H, d, *J* = 2.0 Hz, H-10), 6.53 (H-5), 6.77 (H-5′), 6.84 (1H, d, *J* = 8.2 Hz, H-13), 7.33 (1H, dd, *J* = 2.0, 8.2 Hz, H-14), (NOE used)[79]
MS: $[M]^+$ 634 (86), 633 (81), 620 (16), 619 (36), 591 (3), 341 (13), 340 (57), 339 (2), 298 (12), 297 (4), 282 (24), 190 (13), 189 (100), 187 (10), 159 (52)[79]
CD: 0 (308), −9.4 (289), −1.2 (sh)(282), 0 (279), +4.0 (275), 0 (258), −0.9 (254), −20.7 (241), 0 (232), positive tail below 230[79]
source: *Cyclea atjehensis* (Menispermaceae)[79]

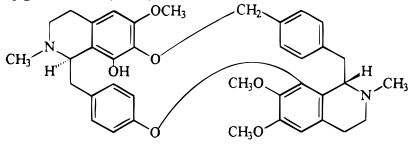
Table 3 (Continued)

411 Isocuricycleatjine
type XXI (*R,R*) 6,7,8*,11$^+$,12−6,7$^+$,12*



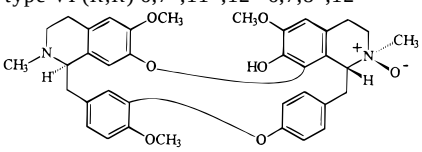
$C_{37}H_{36}O_7N_2$: 620.2523
mp: amorphous residue[79]
$[\alpha]_D$: −173° (*c* 0.13, $CHCl_3$);[79] −149° (*c* 0.13, MeOH)[79]
UV: 231 (sh) (4.80), 283 (4.25); (MeOH + OH^-) 235 (sh), 284, 305 (sh)[79]
^{1}H NMR: two isomeric species (ratio of about 3.5:1) due to geometric isomerism around the amide bond.[79] Major isomer: NMe 2.47 (N-2); NCOMe 2.19 (N-2′); OMe 3.89 (C-6′); AlH 2.55 (1H, dd, *J* = 3.5, 12.3 Hz, H-α′), 3.23 (1H, dd, *J* = 11.3, 12.3 Hz, H-α′), 3.61 (1H, m, H-3′), 3.85 (1H, m, H-3′), 5.27 (1H, dd, *J* = 3.5, 11.3 Hz,H-1′); CH_2O_2 5.91 (1H, d, *J* = 1.3 Hz), 5.92 (1H, d, *J* = 1.3 Hz); ArH 5.98 (H-8′), 6.32 (1H, m, H-10′), 6.51 (1H, d, *J* = 2.2 Hz, H-10), 6.56 (H-5), 6.77 (H-5′), 6.79 (1H, m, H-11′), 6.87 (1H, d, *J* = 8.2 Hz, H-13), 7.14 (1H, m, H-14), 7.46 (1H, br d, H-14′).[79] Minor isomer: NMe 2.47 (N-2); NCOMe 2.32 (N-2′); OMe 3.89 (C-6′); AlH 3.70 (1H, m, H-3′), 4.11 (1H, m, H-3′), 4.62 (1H, dd, H-1′); CH_2O_2 5.91 (1H, d, *J* = 1.3 Hz), 5.92 (1H, d, *J* = 1.3 Hz); ArH 6.00 (H-8′), 6.57 (H-5), 6.77 (H-5′), 6.84 (1H, d, *J* = 8.2 Hz, H-13)[79]
MS: $[M]^+$ 620 (100), 619 (97), 577 (3), 326 (57), 296 (9), 295 (12), 293 (28), 284 (28), 190 (11), 189 (81), 187 (35), 159 (47)[79]
CD: 0 (309), −5.5 (290), 0 (287), +0.3 (sh) (282), +3.8 (276), +3.1 (270), 0 (256), −16.5 (244), −17 (235)[79]
source: *Cyclea atjehensis* (Menispermaceae)[79]

412 Isocycleaneonine
type XXII (*R,S*) 6,7,8,12*-6,7,8*[7−12]



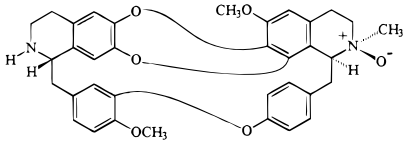
$C_{38}H_{42}O_6N_2$: 622.3043
mp: amorphous residue[75]
$[\alpha]^{26}_D$: +5.1° (*c* 0.12, $CHCl_3$)[75]
UV: 211 (4.81), 224 (sh) (4.65), 275 (3.74), 283 (sh) (3.69), with no change on the addition of NaOH[75]
IR (KBr): 3520, 2855, 2805, 1605, 1585, 1500, 1445, 1310, 1260, 1215, 1120, 1065, 1010, 830, 810[75]
^{1}H NMR: NMe 2.32 (N-2′), 2.37 (N-2); OMe 3.65 (C-7′), 3.87 (C-6), 3.90 (C-6′); AlH 2.4−3.4 (12H, complex, ring CH_2), 3.17 (1H, dd, *J* = 3.4, 7.7 Hz, H-1), 3.88 (1H, d, *J* = 7.8 Hz, H-1′), 4.58 (1H, d, *J* = 12.4 Hz, CH_2O), 5.29 (1H, d, *J* = 12.4 Hz, CH_2O); OH 4.36 (1H, s); ArH 6.30 (H-5), 6.51 (2H, d, *J* = 8.5 Hz, H-11 + H-13), 6.57 (H-5′), 6.69 (2H, d, *J* = 8.5 Hz, H-10 + H-14), 7.18 (2H, d, *J* = 7.8 Hz, H-11′ + H-13′), 7.43 (2H, d, J = 7.8 Hz, H-10′ + H-14′)[75]
EIMS: 622 $[M]^+$ (21), 519 (1), 518 (2), 312 (100), 311 (90), 208 (4), 207 (17), 206 (22), 204 (20), 190 (12)[75]
source: *Cyclea sutchuenensis* (Menispermaceae)[75]

413 Limacusine 2′*β*-*N*-Oxide
type VI (*R,R*) 6,7*,11$^+$,12−6,7,8*,12$^+$



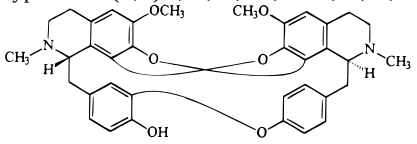
$C_{37}H_{40}O_7N_2$: 624.2836
mp: 215° [36]
$[\alpha]^{20}_D$: +157° (*c* 1.1, $CHCl_3$)[36]
UV: 218 (4.72), 283 (3.90)[36]
^{1}H NMR: NMe 2.53 (N-2), 3.19 (N-2′); OMe 3.56 (C-6), 3.81 (C-6′), 3.89 (C-12); AlH 3.50 (1H, m, H-1), 4.63 (1H, m, H-1′); ArH 6.36 (H-5), 6.38 (H-5′), 6.71 (H-8), 6.79 (2H, br s, H-10 + H-13), 6.86 (1H, dd, *J* = 2.0, 8.0 Hz, H-10′), 6.86 (1H, dd, *J* = 2.1, 6.6 Hz, H-11′), 6.89 (1H, br s, H-14), 7.78 (1H, dd, *J* = 2.1, 4.5 Hz, H-13′), 7.80 (1H, dd, *J* = 2.0, 7.9 Hz, H-14′)[36]
MS: $[M]^+$ 624 (6), 608 (78), 501 (7), 381 (88), 367 (49), 191 (100)[36]
source: *Anisocycla jollyana* (Pierre) Diels (Menispermaceae)[36]

414 12-*O*-Methylcocsoline 2′*β*-*N*-Oxide
type XXIII (*S,S*) 6*,7$^+$,11$^\#$,12−6,7*,8$^+$,12$^\#$



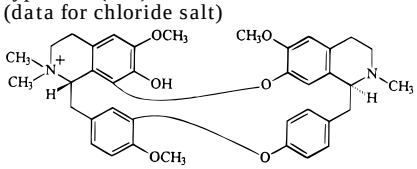
$C_{35}H_{34}O_6N_2$: 578.2417
mp: amorphous residue[77]
UV: 237, 287[77]
^{1}H NMR: $CDCl_3$−CD_3OD: NMe 3.30 (N-2′); OMe 3.88 (C-6′), 3.95 (C-12); AlH 3.78 (1H, m, H-1), 4.42 (1H, m, H-1′); ArH 6.24 (H-8), 6.39 (H-5′), 6.57 (1H, d, *J* = 1.2 Hz, H-10), 6.65 (H-5), 6.81 (1H, dd, *J* = 2.5, 8.2 Hz, H-11′), 6.92 (2H, br s, H-13 + H-14), 7.06 (1H, dd, *J* = 2.0, 8.3 Hz, H-10′), 7.20 (1H, dd, *J* = 2.5, 8.5 Hz, H-13′), 8.04 (1H, dd, *J* = 1.8, 7.5 Hz, H-14′)[77]
MS: $[M]^+$ 578 (29), 563 (75), 349 (74), 335 (100), 321 (53), 175 (58), 168 (53)[77]
source: *Anisocycla cymosa* (Menispermaceae)[77]
derivatives: 12-*O*-methylcocsoline (12-*O*-methylcocsoline 2′*β*-*N*-oxide + Zn/HCl)[77]

415 *O*-Methylcocsulinine
type XXIV (*S,S*) 6,7*,8$^+$,11$^\#$,12−6,7$^+$,8*,12$^\#$



$C_{36}H_{36}O_6N_2$: 592.2573
mp: amorphous residue[55]
$[\alpha]_D$: +307° [55]
UV: 232, 274 (sh), 285[55]
IR: 3289, 1624, 1590, 1247, 970[55]
^{1}H NMR: NMe 2.38, 2.45; OMe 3.80, 3.86[55]
MS: $[M]^+$ 592, 380, 379, 365, 350, 190[55]
source: *Cocculus pendulus* (Menispermaceae)[55]
derivatives: *O,O*-dimethylcocsulinine (*O*-methylcocsulinine + CH_2N_2)[55]
mp: 143−144 °C
$[\alpha]_D$: +295° [55]

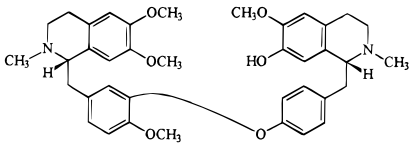
416 2-*N*-Methylfangchinoline
type VIII (*S,S*) 6,7,8*,11$^+$,12−6,7*,12$^+$
(data for chloride salt)



$C_{38}H_{43}O_6N_2$: 623.3121
mp: 205−208 °C (Me_2CO−MeOH)[85]
$[\alpha]_D$: +256° (*c* 0.9, MeOH)[85]
UV: 281 (3.83)[85]
^{1}H NMR: NMe 2.90 (N-2′), 3.17 (N-2), 3.20 (N-2); OMe 3.40 (C-6′), 3.80 (C-6), 3.94 (C-12); AlH 4.02 (1H, d, H-1), 4.38 (1H, dd, H-1′); ArH 6.08 (H-8′), 6.40 (1H, dd, *J* = 2.1, 8.2 Hz, H-10′), 6.43 (H-5), 6.58 (H-5′), 6.69 (1H, d, *J* = 1.8 Hz, H-10), 6.91 (1H, d, *J* = 8.1 Hz, H-13), 6.94 (1H, dd, *J* = 2.1, 8.2 Hz, H-11′), 6.98 (1H, dd, *J* = 1.8, 8.1 Hz, H-14), 7.08 (1H, dd, *J* = 2.1, 8.2 Hz, H-13′), 7.41 (1H, dd, *J* = 2.1, 8.2 Hz, H-14′) (NOE used)[85]
MS: $[M]^+$ 623 (10), 609 (100), 607 (35), 593 (17), 471 (6), 417 (9), 416 (20), 382 (17), 381 (61), 206 (8), 205 (18), 192 (71), 191 (16), 190 (48), 174 (38), 58 (72)[85]
source: *Stephania tetrandra* (Menispermaceae)[85]
derivatives: (+)-2,2′-*N,N*-dimethyltetrandrine (2-*N*-methylfangchinoline + MeI/KOH)[85]

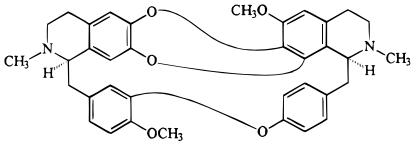
Table 3 (Continued)

417 7-*O*-Methylgrisabine
type I (*S*,*R*) 6,7,11*,12−6,7,12*



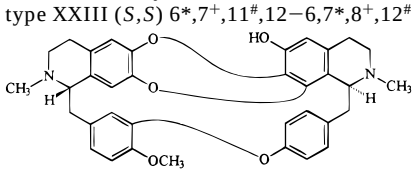
$C_{38}H_{44}O_6N_2$: 624.3199
mp: amorphous residue[84]
$[\alpha]^{20}_D$: −13.5° (*c* 0.78, $CHCl_3$)[84]
UV (EtOH): 222 (4.54), 282 (4.01); EtOH + NaOEt 212 (4.89), 282 (3.92), 305 (sh) (3.76)[84]
IR: 3420[84]
^{1}H NMR: NMe 2.52 (N-2), 2.64 (N-2′); OMe 3.44 (C-7), 3.78 (C-6′), 3.82 ($CDCl_3$ + CD_3OD) (C-6), 3.85 (C-12); ArH 5.83 (H-8′), 6.11 (H-8), 6.48 (H-5′), 6.50 (1H, d, *J* = 1.8 Hz, H-10), 6.57 (H-5), 6.78 (2H, d, *J* = 8.5 Hz, H-11′ + H-13′), 6.90 (1H, d, *J* = 8.5 Hz, H-13), 6.95 (1H, dd, *J* = 1.8, 8.5 Hz, H-14), 6.99 (2H, d, *J* = 8.5 Hz, H-10′ + H-14′)[84]
MS: $[M]^+$ 624 (0.05), 206 (80), 192 (100)[84]
CIMS: 625 $[M + 1]^+$ (100), 435 (2), 206 (50), 192 (29)[84]
CD: 9.2 (201), −7.0 (210), −4.4 (242), −0.75 (285)[84]
source: *Phaeanthus vietnamensis* (Menispermaceae)[84]

418 2-*N*-Methyltelobine
type XXIII (*R*,*S*) 6*,7$^+$,11$^\#$,12−6,7*,8$^+$,12$^\#$



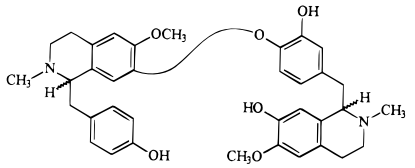
$C_{36}H_{36}O_5N_2$: 576.2624
mp: 172 °C[34]
$[\alpha]^{20}_D$: +226° (*c* 0.8, $CHCl_3$)[34]
UV: 207 (sh) (4.65), 233 (4.56), 280 (3.65), 305 (3.47)[34]
IR (KBr): 1618, 1587, 1504, 1273, 1210, 1127, 771[34]
^{1}H NMR: NMe 2.46 (N-2), 2.51 (N-2′); OMe 3.84 (C-6′), 3.87 (C-12); AlH 2.60 (1H, m, H-3), 3.02 (1H, m, H-3), 2.54 (2H, m, H-4), 2.68 (1H, dd, *J* = 5.3, 12.8 Hz, H-α′), 2.74 (1H, m, H-4′), 2.85 (1H, m, H-3′), 2.89 (2H, m, H-α), 2.95 (H-4′), 3.19 (1H, dd, *J* = 2.2, 12.8 Hz, H-α′), 3.28 (1H, m, H-3′), 3.32 (1H, dd, *J* = 4.2, 4.2 Hz, H-1), 3.94 (1H, dd, 2.2, 5.3 Hz, H-1′); ArH 5.97 (H-8), 6.27 (1H, d, *J* = 1.8 Hz, H-10), 6.34 (H-5′), 6.50 (H-5), 6.84 (1H, d, *J* = 8.1 Hz, H-13), 6.86 (4H, m, H-10′ + H-11′ + H-13′ + H-14′), 6.88 (1H, dd, *J* = 1.8, 8.1 Hz, H-14)[34]
^{13}C NMR: 64.91 (C-1), 48.38 (C-3), 26.29 (C-4), 129.76 (C-4a), 116.22 (C-5), 139.25 (C-6), 138.39 (C-7), 114.59 (C-8), 131.99 (C-8a), 37.25 (C-α), 131.44 (C-9), 120.67 (C-10), 147.28 (C-11), 148.56 (C-12), 111.82 (C-13), 124.53 (C-14); 58.86 (C-1′), 44.81 (C-3′), 24.62 (C-4′), 127.78 (C-4a′), 107.08 (C-5′), 146.06 (C-6′), 146.06 (C-7′), 139.25 (C-8′), 128.80 (C-8a′), 40.10 (C-α′), 134.64 (C-9′), 130.29 (C-10′), 120.24 (C-11′), 155.32 (C-12′), 120.24 (C-13′), 130.29 (C-14′); 43.30 (NMe-2), 42.45 (NMe-2′), 56.04 (OMe-12), 56.20 (OMe-6′)[34]
MS: $[M]^+$ 576 (60), 350 (23), 349 (100), 335 (33), 175 (9)[34]
source: *Stephania erecta* (Menispermaceae)[34]

419 12-*O*-Methyltricordatine
type XXIII (*S*,*S*) 6*,7$^+$,11$^\#$,12−6,7*,8$^+$,12$^\#$



$C_{35}H_{34}O_5N_2$: 562.2468
mp: amorphous residue[9]
$[\alpha]_D$: +55° (*c* 0.196, MeOH)[9]
UV: 206 (4.82), 236 (sh) (4.29), 286 (3.73)[9]
^{1}H NMR: NMe 2.41 (N-2), 2.61 (N-2′); OMe 3.98 (C-12); AlH 2.53 (1H, dd, H-α), 2.69 (1H, dd, H-α′), 2.91 (1H, m, H-α), 3.13 (1H, m, H-1), 3.36 (1H, br d, H-α′), 4.06 (1H, br s, H-1′); ArH 6.18 (H-8), 6.36 (H-5′), 6.54 (H-5), 6.59 (1H, s, H-10), 6.89 (2H, s, H-13 + H-14), 6.98 (1H, dd, H-11′), 7.15 (1H, dd, H-10′), 7.22 (1H, dd, H-13′), 7.59 (1H, dd, H-14′)[9]
EIMS: $[M]^+$ 562 (21), 561 (10), 336 (25), 335 (100), 321 (27), 168 (27)[9]
source: *Pachygone dasycarpa* (Menispermaceae)[9]

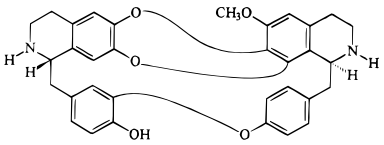
420 Neosutchuenenine
type V (*?*,*?*) 6,7*,12−6,7,11,12*



$C_{36}H_{40}O_6N_2$: 596.2886
mp: amorphous residue[69]
$[\alpha]^{26}_D$: +7.8° (*c* 0.158, EtOH)[69]
UV(EtOH): 209 (4.74), 224 (sh) (4.55), 284 (3.95); EtOH + OH^- 292, 303[69]
IR (KBr): 3440 br, 1610, 1590, 1510, 1260, 1220, 1120, 1020, 830[69]
^{1}H NMR: NMe 2.54 (N-2′), 2.55 (N-2); OMe 3.84 (C-6), 3.89 (C-6′); AlH 2.6−3.5 (12H, complex, ring CH_2), 3.53 (1H, dd, *J* = 2.9, 9.8 Hz, H-1), 3.70 (1H, dd, *J* = 2.9, 9.8 Hz, H-1′); ArH 5.96 (H-8′), 6.46 (1H, dd, *J* = 2.0, 7.8 Hz, H-14′), 6.56 (H-5), 6.68 (H-5′), 6.75 (1H, d, *J* = 7.8 Hz, H-13′), 6.76 (2H, d, *J* = 8.8 Hz, H-11 + H-13), 6.78 (1H, d, *J* = 2.0 Hz, H-10′), 6.93 (2H, d, *J* = 8.8 Hz, H-10 + H-14)[69]
^{13}C NMR: 64.3 (d, C-1), 44.7 (t, C-3), 22.2 (t, C-4), 130.2 (s, C-4a), 112.2 (d, C-5), 148.3 (s, C-6), 143.8 (s, C-7), 121.4 (d, C-8), 127.4 (s, C-8a), 42.1 (t, C-α), 130.2 (s, C-9), 130.9 (d, C-10), 116.4 (d, C-11), 155.6 (s, C-12), 116.4 (d, C-13), 130.9 (d, C-14); 65.2 (d, C-1′), 47.3 (t, C-3′), 26.1 (t, C-4′), 129.3 (s, C-4a′), 114.5 (d, C-5′), 146.7 (s, C-6′), 143.3 (C-7′), 110.8 (d, C-8′), 123.0 (s, C-8a′), 37.7 (t, C-α′), 132.7 (s, C-9′), 115.7 (d, C-10′), 145.8 (s, C-11′), 143.3 (s, C-12′), 118.2 (d, C-13′), 127.0 (d, C-14′); 40.5 (q, NMe-2′), 42.4 (q, NMe-2), 55.8 (q, OMe-6), 56.0 (q, OMe-6′)[69]
EIMS: 490 (4), 489 (12), 298 (94), 297 (8), 192 (100), 107 (11)[69]
source: *Cyclea sutchuenensis* (Menispermaceae)[69]
derivatives: tri-*O*-methylneosutchuenenine (neosutchuenenine + CH_2N_2)[69]
IR (film): 1610, 1580, 1510, 1255, 1020, 820[69]
^{1}H NMR: NMe 2.61 (6H, N-2 and N-2′); OMe 3.54 (C-7′), 3.71 (C-11′), 3.79 (C-12), 3.80 (C-6), 3.82 (C-6′); AlH 2.5−3.5 (14H, complex, ring CH_2); ArH 5.91 (H-8′), 6.22 (H-8), 6.53 (H-5), 6.54 (1H, d, *J* = 2.0 Hz, H-10′), 6.66 (2H, d, *J* = 8.5 Hz, H-11 + H-13), 6.66 (1H, s, H-5′), 6.71 (1H, dd, *J* = 2.0, 8.3 Hz, H-14′), 6.82 (1H, d, *J* = 8.3 Hz, H-13′), 6.89 (2H, d, *J* = 8.5 Hz, H-10 + H-14)[69]
EIMS: 639 $[M + 1]^+$ (0.4), 638 $[M]^+$ (0.1), 518 (7), 517 (20), 326 (100), 312 (12), 296 (8), 206 (75), 121 (18)[69]
note: the absolute configuration remains unassigned, although the specific rotation suggests *R*,*R* as the most likely possibility[69]

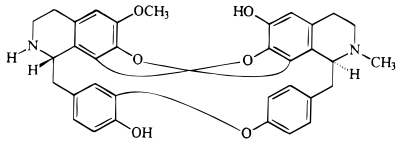
Table 3 (Continued)

421 2′-Norcocsoline
type XXIII (*S*,*S*) 6*,7^{+},11$^{\#}$,12−6,7*,8^{+},12$^{\#}$



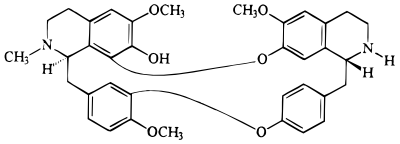
$C_{33}H_{30}O_5N_2$: 534.2155
mp: amorphous residue[77]
UV: 234, 287[77]
^{1}H NMR: $CDCl_3$−CD_3OD: OMe 3.85 (C-6′); AlH 3.73 (1H, m, H-1), 4.37 (1H, m, H-1′); ArH 6.21 (H-8), 6.35 (H-5′), 6.49 (1H, br s, H-10), 6.64 (H-5), 6.79 (1H, dd, *J* = 2.5, 8.3 Hz, H-11′), 6.92 (2H, br s, H-13 + H-14), 7.06 (1H, dd, *J* = 2.5, 8.3 Hz, H-10′), 7.17 (1H, dd, *J* = 2.5, 8.3 Hz, H-13′), 7.62 (1H, dd, *J* = 1.9, 8.3 Hz, H-14′)[77]
MS: [M]$^{+}$ 534 (73), 533 (85), 322 (91), 321 (100), 307 (34), 161 (19)[77]
source: *Anisocycla cymosa* (Menispermaceae)[77]
derivatives: cocsoline (2′-norcocsoline + HCHO + HCOOH)[77]

422 *N*-Norcocsulinine
type XXIV (*S*,*S*) 6,7*,8^{+},11$^{\#}$,12−6,7^{+},8*,12$^{\#}$



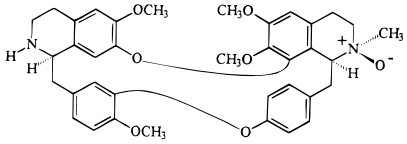
$C_{34}H_{32}O_6N_2$: 564.2260
mp: >250 °C dec[55]
$[\alpha]_D$: +294° [55]
UV: 232, 275 (sh), 290; MeOH + NaOH 300[55]
IR: 3350, 2936, 1622, 1590, 1260, 974[55]
^{1}H NMR (TFA): NMe 3.00; OMe 3.64[55]
MS: [M]$^{+}$ 564, 352, 351, 176[55]
source: *Cocculus pendulus* (Menispermaceae)[55]
derivatives: cocsulinine (*N*-norcocsulinine + CH_2O + HCOOH)[55]
mp: 262−264 °C[55]
$[\alpha]_D$: +311° [55]

423 2′-Norlimacine
type VIII (*R*,*R*) 6,7,8*,11^{+},12−6,7*,12^{+}



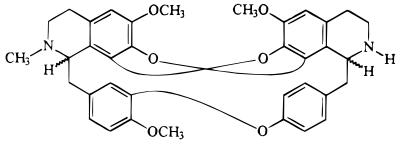
$C_{36}H_{38}O_6N_2$: 594.2730
mp: amorphous residue[7]
$[\alpha]_D$: −125° (*c* 0.13, $CHCl_3$)[7]
^{1}H NMR: NMe 2.32 (N-2); OMe 3.36 (C-6′), 3.74 (C-6), 3.93 (C-12); AlH 2.42 (1H, m, H-4), 2.50 (1H, d, *J* = 13.6 Hz, H-α), 2.65 (1H, dd, *J* = 10.2, 13.6 Hz, H-α), 2.80 (1H, m, H-4′), 2.87 (3H, m, H-3 + H-4 + H-4′), 2.98 (1H, dd, *J* = 10.2, 11.4 Hz, H-α′), 3.20 (2H, m, H-α′ + H-3), 3.51 (2H, m, H-3 + H-4), 3.74 (1H, m, H-1), 4.17 (1H, dd, *J* = 5.2, 10.2 Hz, H-1′); ArH 6.07 (H-8′), 6.26 (H-5), 6.37 (1H, dd, *J* = 2.1, 8.1 Hz, H-10′), 6.50 (1H, br s, H-10), 6.51 (H-5′), 6.82 (1H, dd, *J* = 2.1, 8.1 Hz, H-11′), 6.85 (2H, br s, H-13 + H-14), 7.14 (1H, dd, *J* = 2.1, 8.1 Hz, H-13′), 7.36 (1H, dd, J = 2.1, 8.1 Hz, H-14′)[7]
^{13}C NMR: 61.4 (C-1), 44.2 (C-3), 21.8 (C-4), 123.4 (C-4a), 104.7 (C-5), 145.5 (C-6), 134.9 (C-7), 142.6 (C-8), 123.2 (C-8a), 41.9 (C-α), 134.8 (C-9), 116.0 (C-10), 149.3 (C-11), 146.9 (C-12), 111.4 (C-13), 122.7 (C-14); 55.8 (C-1′), 38.1 (C-3′), 27.6 (C-4′), 128.6 (C-4a′), 113.4 (C-5′), 148.7 (C-6′), 143.5 (C-7′), 119.8 (C-8′), 129.5 (C-8a′), 41.7 (C-α′), 134.4 (C-9′), 132.4 (C-10′), 122.0 (C-11′), 154.7 (C-12′), 121.9 (C-13′), 130.3 (C-14′); 42.3 (NMe-2), 56.0 (OMe-6), 56.1 (OMe-12), 56.2 (OMe-6′)[7]
MS: [M]$^{+}$ 594 (100), 593 (80), 592 (11), 579 (19), 416 (13), 368 (12), 367 (40), 353 (18), 192 (11)[7]
source: *Anisocycla jollyana* (Menispermaceae)[36], *Cyclea barbata* (Wall) Miers (Menispermaceae)[7]

424 2-Norobaberine 2′*β*-*N*-Oxide
type VI (*R*,*S*) 6,7*,11^{+},12−6,7,8*,12^{+}



$C_{37}H_{40}O_7N_2$: 624.2836
mp: amorphous residue[36]
$[\alpha]^{20}_D$: +158° (*c* 0.31, $CHCl_3$)[36]
UV: 212, 284[36]
^{1}H NMR: $CDCl_3$−CD_3OD: NMe 3.39 (N-2′); OMe 3.27 (C-7′), 3.63 (C-6), 3.81 (C-6′), 3.90 (C-12); AlH 4.25 (1H, m, H-1), 4.70 (1H, m, H-1′); ArH 5.54 (1H, br s, H-10), 6.27 (1H, dd, *J* = 2.4, 8.2 Hz, H-11′), 6.38 (H-5′), 6.41 (H-5), 6.73 (H-8), 6.78 (2H, br s, H-13 + H-14), 6.88 (1H, dd, *J* = 2.4, 8.2 Hz, H-10′), 7.00 (1H, dd, *J* = 2.4, 8.3 Hz, H-13′), 7.90 (1H, dd, *J* = 2.4, 8.3 Hz, H-14′)[36]
MS: [M]$^{+}$ 624 (36), 608 (100), 499 (23), 396 (43), 381 (51), 368 (80), 303 (33), 191[36]
source: *Anisocycla cymosa* (Menispermaceae)[36]

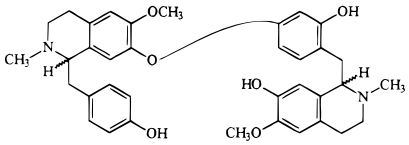
425 Pendilinine
type XXIV (*?*,*?*) 6,7*,8^{+},11$^{\#}$,12−6,7^{+},8*,12$^{\#}$



$C_{36}H_{36}O_6N_2$: 592.2573
mp: amorphous residue[55]
$[\alpha]_D$: +286° [55]
UV: 286[55]
IR: 2945, 1620, 1245, 975[55]
^{1}H NMR: NMe 2.60 (N-2′)[55]
MS: [M]$^{+}$ 592, 366, 350, 183[55]
source: *Cocculus pendulus* (Menispermaceae)[55]
derivatives: *O*,*O*-dimethylpendulinine (pendilinine + CH_2O + HCOOH)[55]
preparation: pendilinine (pendine + CH_2N_2)[55]

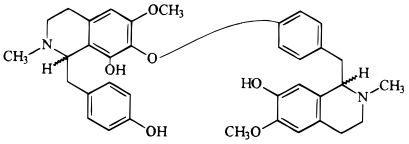
Table 3 (Continued)

426 Sutchueneneonine
type Vc (*?,?*) 6,7*,12−6,7,12*



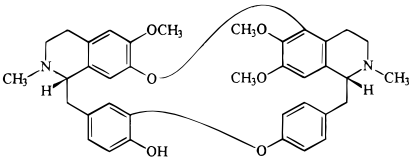
$C_{36}H_{40}O_6N_2$: 596.2886
mp: amorphous residue[69]
$[\alpha]^{26}_D$: +6.7° (*c* 0.422, EtOH)[69]
UV (EtOH): EtOH + OH^- 295, 303[69]
IR (KBr): 3440 br, 1610, 1595, 1510, 1250, 1210, 1115, 1020, 825[69]
^{1}H NMR: NMe 2.50 (N-2′), 2.55 (N-2); OMe 3.85 (C-6), 3.87 (C-6′); AlH 2.6−3.5 (12H, complex, ring CH_2), 3.69 (1H, dd, *J* = 3.4, 9.3 Hz, H-1), 3.72 (1H, t, *J* = 5.4 Hz, H-1′); ArH 6.17 (H-8′), 6.24 (H-8), 6.46 (1H, d, *J* = 2.0 Hz, H-11′), 6.55 (H-5), 6.62 (H-5′), 6.61 (1H, dd, *J* = 2.0, 7.8 Hz, H-13′), 6.65 (2H, d, *J* = 8.8 Hz, H-11 + H-13), 6.80 (1H, d, *J* = 7.8 Hz, H-14′), 6.88 (2H, d, *J* = 8.8 Hz, H-10 + H-14)[69]
^{13}C NMR: 64.1 (d, C-1), 45.4 (t, C-3), 23.1 (t, C-4), 130.3 (s, C-4a), 112.3 (d, C-5), 148.8 (s, C-6), 144.7 (s, C-7), 120.3 (d, C-8), 129.9 (s, C-8a), 41.5 (t, C-α), 130.7 (s, C-9), 130.7 (d, C-10), 116.1 (d, C-11), 155.2 (s, C-12), 116.1 (d, C-13), 130.7 (d, C-14); 64.6 (d, C-1′), 47.3 (t, C-3′), 26.3 (t, C-4′), 129.8 (s, C-4a′), 114.4 (d, C-5′), 146.2 (s, C-6′), 143.5 (s, C-7′), 110.7 (d, C-8′), 123.7 (s, C-8a′), 38.6 (t, C-α′), 128.1 (s, C-9′), 145.7 (s, C-10′), 115.7 (d, C-11′), 143.2 (s, C-12′), 125.5 (d, C-13′), 128.3 (d, C-14′); 41.3 (q, NMe-2′), 42.6 (q, NMe-2), 55.9 (q, OMe-6), 55.9 (q, OMe-6′)[69]
EIMS: 597 $[M + 1]^+$ (0.7), 596 $[M]^+$ (0.1), 490 (10), 489 (32), 298 (40), 297 (11), 192 (100), 107 (4)[69]
source: *Cyclea sutchuenensis* (Menispermaceae)[69]
note: this is a new class that supplements class V as presented in the review of Guha et al.[1]

427 Sutchuenenine
type Vd (*?,?*) 6,7*,8,12−6,7,12*



$C_{36}H_{40}O_6N_2$: 596.2886
mp: amorphous residue[69]
$[\alpha]^{26}_D$: −47.4° (*c* 0.703, $CHCl_3$)[69]
UV (EtOH): 210 (4.80), 225 (sh) (4.67), 284 (3.99); EtOH + OH^- 228 (sh), 298[69]
IR (KBr): 3440, 1610, 1595, 1510, 1270, 1220, 1115, 830[69]
^{1}H NMR: NMe 2.22 (N-2′), 2.46 (N-2); OMe 3.79 (C-6), 3.88 (C-6′); AlH 2.5−3.4 (12H, complex, ring CH_2), 3.71 (1H, t, *J* = 5.9 Hz, H-1), 3.82 (1H, dd, *J* = 4.0, 9.2 Hz, H-1′); ArH 6.18 (H-8′), 6.48 (2H, d, *J* = 7.7 Hz, H-11′ + H-13′), 6.49 (H-5), 6.52 (H-5′), 6.71 (2H, d, *J* = 8.1 Hz, H-11 + H-13), 6.92 (2H, d, *J* = 8.1 Hz, H-10 + H-14), 6.92 (2H, d, 7.7 Hz, H-10′ + H-14′) (NOE used)[69]
^{13}C NMR: 60.2 (d, C-1), 43.7 (t, C-3), 22.8 (t, C-4), 124.7 (s, C-4a), 108.0 (d, C-5), 145.6 (s, C-6), 136.9 (s, C-7), 138.7 (d, C-8), 124.4 (s, C-8a), 40.4 (t, C-α), 131.2 (s, C-9), 130.7 (d, C-10), 115.4 (d, C-11), 156.0 (s, C-12), 115.4 (d, C-13), 130.7 (d, C-14); 64.6 (d, C-1′), 46.5 (t, C-3′), 24.7 (t, C-4′), 128.1 (s, C-4a′), 114.2 (s, C-5′), 146.9 (s, C-6′), 143.3 (C-7′), 110.2 (d, C-8′), 124.8 (s, C-8a′), 39.6 (t, C-α′), 132.7 (s, C-9′), 129.8 (d, C-10′), 114.5 (d, C-11′), 154.8 (s, C-12′), 114.5 (d, C-13′), 129.8 (d, C-14′); 41.9 (q, 2′-NMe), 42.0 (q, 2-NMe), 55.7 (q, 6-OMe), 56.1 (q, 6′-OMe)[69]
EIMS: 597 $[M + 1]^+$ (6), 490 (46), 489 (100), 298 (6), 297 (6), 192 (36), 107 (5)[69]
FABMS: found 597.2948 for $[M + 1]^+$; calcd for $C_{36}H_{41}O_6N_2$ 597.2962[69]
source: *Cyclea sutchuenensis* Gagnep. (Menispermaceae)[69]
derivatives: tri-*O*-methylsutchuenenine (sutchuenenine + CH_2N_2)[69]
IR (film): 1605, 1580, 1505, 1210, 1015, 830[69]
^{1}H NMR: NMe 2.41 (N-2′), 2.80 (N-2); OMe 3.45 (C-8), 3.63 (C-7′), 3.77 (C-12), 3.84 (C-6), 3.86 (C-6′); AlH 2.5−3.5 (12H, complex, ring CH_2), 4.01 (1H, m, H-1′), 4.11 (1H, m, H-1); ArH 5.86 (H-8′), 6.57 (H-5), 6.60 (H-5′), 6.73 (2H, d, *J* = 8.3 Hz, H-11′ + H-13′), 6.77 (2H, d, *J* = 8.3 Hz, H-11 + H-13), 7.01 (2H, d, 8.3 Hz, H-10′ + H-14′), 7.02 (2H, d, *J* = 8.8 Hz, H-10 + H-14) (NOE used)[69]
EIMS: 639 $[M + 1]^+$ (0.1), 638 $[M]^+$ (0.1), 518 (16), 517 (49), 312 (4), 311 (1), 206 (100), 204 (8), 121 (2)[69]
FABMS: 639 $[M + 1]^+$ [69]
note: this is a new class that supplements class V as presented in the review of Guha et al.[1]

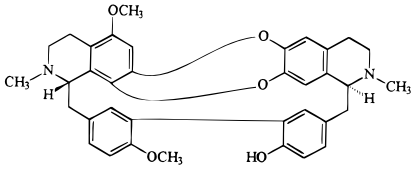
428 Thalifortine
type XIV (*S,R*) 6,7*,11^+,12−5*,6,7,12^+



$C_{37}H_{40}O_6N_2$: 608.2886
mp: 143−145 °C[30]
$[\alpha]^{25.5}_D$: +271.4° (*c* 0.37, MeOH)[30]
UV (EtOH): 215 (4.61), 280 (3.91)[30]
IR (KBr): 3415, 2927, 2815, 1608, 1508, 1450, 1221, 1169[30]
^{1}H NMR: NMe 2.08 (N-2), 2.55 (N-2′); OMe 3.61 (C-7′), 3.77 (C-6′), 3.86 (C-6); ArH 5.98 (H-8′), 6.05 (H-8), 6.31 (1H, d, *J* = 1.7 Hz, H-10), 6.57 (H-5), 6.62 (1H, dd, *J* = 1.7, 8.9 Hz, H-14), 6.66 (1H, dd, *J* = 2.6, 8.0 Hz, H-11′), 6.71 (1H, dd, *J* = 2.6, 8.2 Hz, H-13′), 7.20 (1H, dd, *J* = 2.6, 8.2 Hz, H-14′)[30]
^{13}C NMR: 60.6 (C-1), 47.8 (C-3), 26.5 (C-4), 131.2 (C-4a), 109.7 (C-5), 141.0 (C-6), 145.5 (C-7), 111.5 (C-8), 129.5 (s, C-8a), 39.6 (C-α), 133.1 (C-9), 115.1 (C-10), 146.0 (C-11), 152.1 (C-12), 114.6 (C-13), 124.0 (C-14); 63.4 (d, C-1′), 42.8 (C-3′), 22.0 (C-4′), 131.4 (C-4a′), 145.5 (C-5′), 145.2 (C-6′), 144.3 (C-7′), 113.8 (C-8′), 129.1 (C-8a′), 36.9 (C-α′), 135.4 (C-9′), 124.2 (s, C-10′), 119.7 (C-13′), 126.7 (C-14′); 41.7 (NMe-2), 43.1 (NMe-2′), 56.0 (OMe-6′ or OMe-7′), 56.1 (OMe-7′ or OMe-6′)[30]
EIMS: 608 $[M]^+$ (93), 396 (67), 395 (71), 364 (19), 206 (17), 198 (100), 175 (53), 107 (20), 91 (12)[30]
source: *Thalictrum fortunei* (Ranunculaceae)[30]

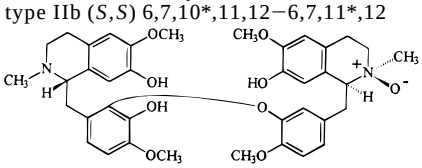
Table 3 (Continued)

429 Tiliaresine
type XIXa (*S,S*) 5,7*,8$^+$,12−6*,7$^+$,12(11−11)



$C_{36}H_{36}O_5N_2$: 576.2624
mp: amorphous residue[8]
$[\alpha]^{22}_D$: +75.2° ($CHCl_3$)[8]
UV: 212, 291[8]
^{1}H NMR: $CDCl_3$−CD_3OD: NMe 2.17 (N-2), 2.46 (N-2′); OMe 3.70 (C-5), 3.84 (C-12); AlH 3.20 (1H, m, H-1), 3.35 (1H, m, H-1′); ArH 6.58 (H-5′), 6.82 (1H, d, *J* = *o*, H-13′, 6.84 (1H, d, *J* = *o*, H-13), 7.12 (1H, dd, *J* = *o*,*m*, H-14′), 7.22 (1H, dd, *J* = *o*,*m*, H-14), 7.45 (1H, d, *J* = *m*, H-10), 7.51 (1H, d, *J* = *m*, H-10′, 7.93 (H-8′)[8] (Author note: the unusual aromatic substitution pattern in the left-hand isoquinoline ring has not been unequivocally established by this data)
EIMS: 576 $[M]^+$, 349 (100)[8]
source: *Tiliacora racemosa* (Menispermaceae)[8]
note: this is a new class that supplements class V as presented in the review of Guha et al.[1]

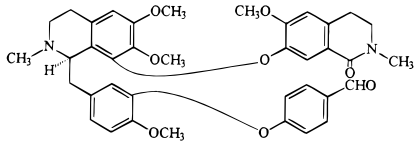
430 Vateamine 2′*β*-*N*-Oxide
type IIb (*S,S*) 6,7,10*,11,12−6,7,11*,12



$C_{38}H_{44}O_9N_2$: 672.3047
mp: 133−135 °C (MeOH)[86]
$[\alpha]^{24}_D$: +341° (*c* 0.11, $CHCl_3$)[86]
UV (EtOH): 207 (4.94), 230 (sh) (4.51), 284 (4.07); EtOH + KOH 208 (4.97), 289 (4.06)[86]
IR (KBr): 3300, 1600, 1500, 1435[86]
^{1}H NMR: NMe 2.34 (N-2), 3.05 (N-2′); OMe 3.71 (C-6), 3.73 (C-6′), 3.86 (C-12′), 3.87 (C-12); AlH 2.31 (2H, m, H-α + H-α′), 2.62 (1H, m, H-4), 2.76 (1H, m, H-3), 2.88 (2H, m, H-4′), 3.02 (3H, m, H-3 + H-4 + H-α), 3.30 (1H, m, H-3′), 3.48 (1H, m, H-3′), 3.57 (1H, br d, *J* = 10.0 Hz, H-1), 3.64 (1H, dd, *J* = 11.7, 2.6 Hz, H-α′), 4.17 (1H, br d, *J* = 11.7 Hz, H-1′); ArH 5.06 (H-8), 5.90 (H-8′), 5.95 (1H, dd, *J* = 1.6, 8.2 Hz, H-14′), 6.12 (1H, d, *J* = 8.4 Hz, H-14), 6.36 (H-5′), 6.41 (H-5), 6.64 (1H, d, *J* = 8.4 Hz, H-13), 6.65 (1H, d, *J* = 8.2 Hz, H-13′), 7.07 (1H, d, *J* = 1.6 Hz, H-10′)[86]
FABMS: 673 $[M + H]^+$ (100), 657 [M + H − O] (21)[86]
source: *Hernandia nymphaeifolia* (*Biasolettia nymphaeifolia*, *Hernandia peltata*) (Hernandiaceae)[86]

Secobisbenzylisoquinoline Alkaloids

431 Secoisotetrandrine
type VIII (*R*,−)



$C_{38}H_{40}O_8N_2$: 652.2785
$[\alpha]^{20}_D$: +2.73° (*c* 1.1, $CHCl_3$)[56]
^{1}H NMR: NMe 2.41 (N-2), 3.03 (N-2′); OMe 3.62 (C-7), 3.72 (C-12), 3.81 (C-7′), 3.82 (C-6); AlH 2.42 (1H, m, H-4), 2.75−2.95 (6H, m, H-3 + H-4 + 2H-4′ + 2H-α), 3.32 (1H, m, H-3), 3.47 (2H, t, *J* = 7 Hz, H-3′), 3.66 (1H, dd, *J* = 2.5, 10 Hz, H-1); ArH 6.51 (H-5), 6.56 (H-5′), 6.86 (1H, d, *J* = 8.5 Hz, H-13), 6.92 (2H, d, A_2B_2, H-10′ + H-14′), 6.94 (1H, d, *J* = 2 Hz, H-10), 7.03 (1H, dd, *J* = 2, 8.5 Hz, H-14), 7.22 (H-8′), 7.77 (2H, d, A_2B_2, H-11′ + H-13′); ArCHO 9.89;[56] also recorded in benzene-d_6[56]
^{13}C NMR: 60.6 (d, C-1), 44.3 (t, C-3), 22.8 (t, C-4), 130.1 (s, C-4a), 109.4 (d, C-5), 152.0 (s, C-6), 140.0 (s, C-7), 145.2 (s, C-8), 123.9 (s, C-8a), 40.0 (t, C-α), 134.9 (s, C-9), 123.3 (d, C-10), 141.9 (s, C-11), 149.5 (s, C-12), 112.4 (d, C-13), 127.2 (d, C-14); 163.9 (s, C-1′), 48.1 (t, C-3′), 27.5 (t, C-4′), 132.6 (s, C-4a′), 109.9 (d, C-5′), 151.3 (s, C-6′), 146.5 (s, C-7′), 113.3 (d, C-8′), 121.9 (s, C-8a′), 164.3 (s, C-9′), 115.9 (d, C-10′), 131.8 (d, C-11′), 130.5 (s, C-12′), 131.8 (d, C-13′), 115.9 (d, C-14′), 190.8 (d, CHO); 34.9 (q, NMe-2′), 42.2 (q, NMe-2), 55.8 (q, OMe-12′), 55.9 (q, OMe-7), 55.9 (q, OMe-7′), 60.7 (q, OMe-8);[56] also recorded in benzene-d_6[56]
EIMS: 411 (100), 403 (18), 291 (20), 241 (4), 179 (20), 153 (6), 114 (6)[56]
source: *Laurelia sempervirens* (Monimiaceae)[56]

Table 4. Calculated Molecular Weights of New Bisbenzylisoquinoline Alkaloids

534.2155	$C_{33}H_{30}O_5N_2$ 2′-norcocsoline (**421**)[55]	608.2886	$C_{37}H_{40}O_6N_2$ cissampentin (**395**)[76] cycleabarbatine (**402**)[7] thalifortine (**428**)[30]
550.2104	$C_{33}H_{30}O_6N_2$ cocsilinine (**397**)[55]		
562.2468	$C_{35}H_{34}O_5N_2$ angchibangkine (**394**)[9] 12-*O*-methyltricordatine (**419**)[9]	620.2523	$C_{37}H_{36}O_7N_2$ curicycleatjine (**401**)[79] isocuricycleatjine (**411**)[79]
564.2260	$C_{34}H_{32}O_6N_2$ cocsoline 2′*β*-*N*-oxide (**398**)[77] *N*-norcocsulinine (**422**)[55]	622.3043	$C_{38}H_{42}O_6N_2$ (−)-cycleaneonine (**403**)[75] isocycleaneonine (**412**)[75]
576.2624	$C_{36}H_{36}O_5N_2$ 2−*N*-methyltelobine (**418**)[34] tiliaresine (**429**)[8]	623.3121	$C_{38}H_{43}O_6N_2$ 2-*N*-methylfangchinoline (**416**)[85]
578.2417	$C_{35}H_{34}O_6N_2$ cocsiline (**396**)[55] 12-*O*-methylcocsoline 2′*β*-*N*-oxide (**414**)[77]	624.2836	$C_{37}H_{40}O_7N_2$ limacusine 2′*β*-*N*-oxide (**413**)[36] 2-norobaberine 2′*β*-*N*-oxide (**424**)[35]
582.2730	$C_{35}H_{38}O_6N_2$ costaricine (**399**)[78]	624.3199	$C_{38}H_{44}O_6N_2$ 7-*O*-methylgrisabine (**417**)[84]
590.2417	$C_{36}H_{34}O_6N_2$ cycleatjehine (**405**)[80]	634.2679	$C_{38}H_{38}O_7N_2$ curicycleatjenine (**400**)[79] isocuricycleatjenine (**410**)[79]
592.2573	$C_{36}H_{36}O_6N_2$ *O*-methylcocsulinine (**415**)[55] pendilinine (**425**)[55]	636.2836	$C_{38}H_{40}O_7N_2$ insularine 2*β*-*N*-oxide (**408**)[71] insularine 2′*β*-*N*-oxide (**409**)[71]
594.2730	$C_{36}H_{38}O_6N_2$ 2′-norlimacine (**423**)[7]	638.3356	$C_{39}H_{46}O_6N_2$ *O*,*O*′-dimethylgrisabine (**407**)[83,84]
596.2886	$C_{36}H_{40}O_6N_2$ dauriciline (**406**)[82] neosutchuenenine (**420**)[69] sutchuenenine (**427**)[69] sutchueneneonine (**426**)[69]	652.2785	$C_{38}H_{40}O_8N_2$ secoisotetrandrine (**431**)[56]
		672.3047	$C_{38}H_{44}O_9N_2$ vateamine 2′*β*-*N*-oxide (**430**)[86]
604.2574	$C_{37}H_{36}O_6N_2$ cycleatjehenine (**404**)[80]		

Table 5. Taxonomic Distribution of the Different Types of New Bisbenzylisoquinoline Alkaloids

Hernandiaceae	*Hernandia*: vateamine 2′*β*-*N*-oxide (**430**), type IIb
Lauraceae	*Nectandra*: costaricine (**399**), type I
Menispermaceae	*Anisocycla*: cocsoline 2′*β*-*N*-oxide (**398**), type XXIII; limacusine 2′*β*-*N*-oxide (**413**), type VI; 12-*O*-methylcocsoline 2′*β*-*N*-oxide (**414**), type XXIII; 2′-norcocsoline (**421**), type XXIII; 2′-norlimacine (**423**), type VIII; 2-norobaberine 2′*β*-*N*-oxide (**424**), type VI
	Cissampelos: cissampentin (**395**), type XXIIa
	Cocculus: cocsiline (**396**), type XXIV; cocsilinine (**397**), type XXIV; *O*-methylcocsulinine (**415**), type XXIV; *N*-norcocsulinine (**422**), type XXIV; pendilinine (**425**), type XXIV
	Cyclea: curicyleatjenine (**400**), type XXI; curicycleatjine (**401**), type XXI; cycleabarbatine (**402**), type VIII; (−)-cycleaneonine (**403**), type XXII; cycleatjehenine (**404**), type XXIIa; cycleatjehine (**405**), type XXIIa; insularine 2*β*-*N*-oxide (**408**), type XXVI; insularine 2′*β*-*N*-oxide (**409**), type XXVI; isocuricycleatjenine (**410**), type XXI; isocuricyleatjine (**411**), type XXI; isocycleaneonine (**412**), type XXII; neosutchuenenine (**420**), type V; 2′-norlimacine (**423**), type VIII; sutchueneneonine (**426**), type Vc; sutchuenenine (**427**), type Vd
	Menispermum: dauriciline (**406**), type I
	Pachygone: angchibangkine (**394**), type XXVIII; 12-*O*-methyltricordatine (**419**), type XXIII
	Phaeanthus: *O*,*O*-dimethylgrisabine (**407**), type I; 7-*O*-methylgrisabine (**417**), type I
	Stephania: 2-*N*-methylfangchinoline (**416**), type VIII; 2-*N*-methyltelobine (**418**), type XXIII
	Tiliacora: tiliaresine (**429**), type XIXa
Monimiaceae	*Laurelia*: secoisotetrandrine (**431**), type VIII
Ranunculaceae	*Thalictrum*: thalifortine (**428**), type XIV

Table 6. Botanical Sources of New and Reisolated Bisbenzylisoquinoline Alkaloids by Family and Genus

Annonaceae	*Cardiopetalum*: dauricine (**3**)[20]
Berberidaceae	*Berberis*: aromoline (**31**),[13,17,27] berbamine (**57**),[16,19,38,46,52] berbamunine (**1**),[11−15,17−19] calafatine (**190**),[72] isotetrandrine (**62**),[14,17,39,40,44] 2′-*N*-methylberbamine (**66a**),[18] *O*-methylthalicberine (**95**),[18] obaberine (**46**),[16,38−40] oxyacanthine (**48**)[11,13−19,38,42−46]
Hernandiaceae	*Hernandia*: malekulatine (**238**),[74] vateamine 2′*β*-*N*-oxide (**430**)[86]
Lauraceae	*Beilschmiedia*: dehatrine (**288**)[10]
	Dehaasia: oxyacanthine (**48**)[47]
	Nectandra: costaricine (**399**)[78]
Menispermaceae	*Anisocycla*: coclobine (**35**),[35] cocsoline 2′*β*-*N*-oxide (**398**),[77] daphnandrine (**37**),[35] 1,2-dehydrotelobine (**194**),[36] homoaromoline (**42**),[36] isotrilobine (**157**),[36] limacine (**64**),[36] limacine 2′*β*-*N*-oxide (**317**),[36] limacusine 2′*β*-*N*-oxide (**413**),[36] 12-*O*-methylcocsoline 2′*β*-*N*-oxide (**414**),[77] 2′-norcocsoline (**421**),[77] 2-norlimacine (**336**),[36] 2′-norlimacine (**423**),[36] 2-norobaberine (**46 dvt**),[35] 2-norobaberine 2′*β*-*N*-oxide (**424**),[35] trilobine (**163**)[36]
	Cissampelos: cissampentin (**395**)[76]
	Cocculus: cocsiline (**396**),[55] cocsilinine (**397**),[55] cocsoline (**152**),[55] cocsuline (**153**),[55,58] cocsulinine (**164**),[55] 12′-*O*-demethyltrilobine (**155**),[55] *O*,*O*-dimethylcocsulinine (**164 dvt**),[55] hernandezine (**81**),[58] isotetrandrine (**62**),[55] isotrilobine (**157**),[55,70] *O*-methylcocsulinine (**415**),[55] *N*-norcocsulinine (**422**),[55] pendilinine (**425**),[55] penduline (**72**),[55,58] punjabine (**265**),[58] tetrandrine (**76**),[58] trilobine (**163**)[55,70]
	Cyclea: berbamine (**57**),[7] curicycleatjenine (**400**),[79] curicycleatjine (**401**),[79] (−)-curine (**133**),[7] cycleabarbatine (**402**),[7] (+)-cycleaneonine (**286**),[75] (−)-cycleaneonine (**403**),[75] cycleanorine (**60**),[7] cycleatjehenine (**404**),[80] cycleatjehine (**405**),[80] cycleapeltine (**36**),[6] daphnandrine (**37**),[7] homoaromoline (**42**),[6] insulanoline (**169**),[69,71] insularine 2*β*-*N*-oxide (**408**),[71] insularine 2′*β*-*N*-oxide (**409**),[71] insularine (**170**),[71] isochondodendrine (**122**),[69] isocuricycleatjenine (**410**),[79] isocuricycleatjine (**411**),[79] isocycleaneonine (**412**),[75] limacine (**64**),[6] neosutchuenenine (**420**),[69] 2′-norlimacine (**423**),[7] pendine (**178**),[55] pendulinine (**179**),[55] phaeanthine (**74**),[59] repandine (**49**),[7] sutchueneneonine (**426**),[69] sutchuenenine (**427**),[69] tetrandrine (**76**),[6,59] thalrugosine (**79**)[6]
	Menispermum: dauriciline (**406**),[82] dauricine (**3**),[21−24] daurisoline (**192**)[21,23]
	Pachygone: angchibangkine (**394**),[9] atherospermoline (**56**),[9] cocsuline (**153**),[9] daphnoline (**38**),[9] fangchinoline (**61**),[9] isotrilobine (**157**),[9] *N*-methyl-7-*O*-demethylpeinamine (**71a dvt**),[9] 12-*O*-methyltricordatine (**419**),[9] 2′-norcocsuline (**329**),[9] penduline (**72**),[9] tetrandrine (**76**),[9] tricordatine (**161**)[9]
	Phaeanthus: *O*,*O*′-dimethylgrisabine (**407**),[83,84] limacine (**64**),[57] 7-*O*-methylgrisabine (**417**),[84] phaeanthine (**74**)[57]
	Spirospermum: limacine (**64**)[54]
	Stephania: aromoline (**31**),[28,29] berbamine (**57**),[28,31,33] cepharanoline (**33**),[28,31,32] cepharanthine (**34**),[28,31,33,34] (−)-curine (**133**),[32] cycleanine (**121**),[28,33,31] daphnandrine (**37**),[34] 1,2-dehydrotelobine (**194**),[34] fangchinoline (**61**),[53] homoaromoline (**42**),[28,31,34,37] isochondodendrine (**122**),[32] isotetrandrine (**62**),[28,31,34] 2-*N*-methylfangchinoline (**416**),[85] 2-*N*-methyltelobine (**418**),[34] 2-norcepharanthine (**328**),[34] (−)-norcycleanine (**125**),[28] 2-norisotetrandrine (**334**),[34] 2-norobaberine (**46 dvt**),[34] 2-northalrugosine (**344**),[34] obaberine (**46**),[34] obamegine (**71**),[28] stephibaberine (**375**),[34] tetrandrine (**76**),[53,60] thalrugosine (**79**)[34,61]
	Strychnopsis: fangchinoline (**61**)[54]
	Tiliacora: *N*-methyltiliamosine (**323**),[8] nortiliacorinine A (**116**),[68] tiliamosine (**120**),[8] tiliaresine (**429**),[8] tiliacorinine (**118**)[68]
Monimiaceae	*Daphnandra*: daphnine (**191**)[73]
	Laurelia: isotetrandrine (**62**),[56] secoisotetrandrine (**431**)[56]
Nymphaeaceae	*Nelumbo*: liensinine (**29**)[25,26]
Ranunculaceae	*Thalictrum*: aromoline (**31**),[30] hernandezine (**81**),[48,62−65] isothalidezine (**82**),[65] *O*-methylthalibrine (**209**),[65] *O*-methylthalicberine (**95**),[41,48,63,66] *O*-methylthalmethine (**96**),[66] obaberine (**46**),[41] oxyacanthine (**48**),[41] thalfoetidine (**99**),[50,63,67] thalicberine (**97**),[41,66] thalidasine (**100**),[49,50,63,67] thalidezine (**84**),[48,63−65] thalifortine (**428**),[30] thaligosine (**52a**),[41,48] thaligosinine (**52b**),[49,50] thalisopidine (**53**),[50,51] thalmethine (**98**),[66] thalrugosaminine (**55**)[49]

Table 7. Botanical Sources of Bisbenzylisoquinoline Alkaloids

name	part[a]	alkaloid	structural type
Anisocycla cymosa Troupin (Menispermaceae)	Sd	coclobine (**35**)[35]	VI
	R	cocsoline 2′β-*N*-oxide (**398**)[77]	XXIII
	Sd	daphnandrine (**37**)[35]	VI
	R	12-*O*-methylcocsoline 2′β-*N*-oxide (**414**)[77]	XXIII
	R	2′-norcocsoline (**421**)[77]	XXIII
	Sd	2-norobaberine (**46 dvt**)[35]	VI
	Sd	2-norobaberine 2′β-*N*-oxide (**424**)[35]	VI
Anisocycla jollyana (Pierre) Diels (Menispermaceae)	L	1,2-dehydrotelobine (**194**)[36]	XXIII
		homoaromoline (**42**)[36]	VI
		isotrilobine (**157**)[36]	XXIII
		limacine (**64**)[36]	VIII
		limacine 2′β-*N*-oxide (**317**)[36]	VIII
		limacusine 2′β-*N*-oxide (**413**)[36]	VI
		2-norlimacine (**336**)[36]	VIII
		2′-norlimacine (**336**)[36]	VIII
		trilobine (**163**)[36]	XXIII
Beilschmiedia madang Bl. (Lauraceae)	W	dehatrine (**288**)[10]	VIII
Berberis aggregata[b] (Berberidaceae)	Unk	berbamine (**57**)[52]	VIII
Berberis amurensis Rupr. (Berberidaceae)	R, RB, StB, Sh	berbamunine (**1**)[11,12]	I
		oxyacanthine (**48**)[11]	VI
Berberis brachypoda[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis circumserrata[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis dasystachya[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis diaphana[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis dictyoneura[b] (Berberidaceae)	Unk	berbamine (**57**)[52]	VIII
	R, RB, StB	berbamunine (**1**)[12]	I
Berberis dubia[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis ferdinandi-coburgii[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis fracisci-ferdinandi[b] (Berberidaceae)	Unk	berbamine (**57**)[52]	VIII
		berbamunine (**1**)[12]	I
Berberis gyalaica[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis henryana[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis heterobotrys Wolf. (Berberidaceae)	L, Sh	berbamine (**57**)[38]	VIII
		obaberine (**46**)[38]	VI
		oxyacanthine (**48**)[38]	VI
Berberis heteropoda Schrenk (Berberidaceae)	L	aromline (**31**)[13]	VI
	Sh	berbamunine (**1**)[13−15]	I
	Sh	Isotetrandrine (**62**)[14]	VIII
	L, R, Sh, StB	oxyacanthine (**48**)[13−15]	VI
Berberis horrida[b] (Berberidaceae)	L, St	calafatine (**190**)[72]	Xa
Berberis iliensis[b] (Berberidaceae)	Sh	berbamine (**57**)[16]	VIII
		berbamunine (**1**)[16]	I
		obaberine (**46**)[16]	VI
		oxyacanthine (**48**)[16]	VI
Berberis integerrima Bge. (Berberidaceae)	L	oxyacanthine (**48**)[42,43]	VI
Berberis jamesiana[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis julianae[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis kansuensis[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis koreana Palib. (Berberidaceae)	R	isotetrandrine (**62**)[39]	VIII
		obaberine (**46**)[39]	VI
Berberis nummularia Bge. (Berberidaceae)	L	aromoline (**31**)[17]	VI
		berbamunine (**1**)[17]	I
		isotetrandrine (**62**)[17,44]	VIII
		oxyacanthine (**48**)[17,43,44]	VI
Berberis oblonga[b] (Berberidaceae)	L, F, R, Sh	oxyacanthine (**48**)[45]	VI
Berberis poiretii[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis polyantha[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis prattii[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis pseudothunbergii[b] (Berberidaceae)	Unk	berbamine (**57**)[52]	VIII
Berberis sargentiana[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis sibirica[b] Pall. (Berberidaceae)	R	berbamine (**57**)[46]	VIII
	R, Sh	oxyacanthine (**48**)[46]	VI
Berberis silva-taroucana[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis soulieana[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis turcomanica[b] Kar. (Berberidaceae)	L	berbamunine (**1**)[18]	I
		2′-*N*-methylberbamine (**66a**)[18]	VIII
		O-methylthalicberine (**95**)[18]	XI
		oxyacanthine (**48**)[18]	VI
Berberis valdiviana[b]	L, St	isotetrandrine (**62**)[40]	VIII
		obaberine (**46**)[40]	VI
Berberis vernae[b] (Berberidaceae)	R, RB, StB	berbamunine (**1**)[12]	I
Berberis virgetorum[b] (Berberidaceae)	R, RB, StB	berbamine (**1**)[12]	VIII
Berberis vulgaris[b] (Berberidaceae)	R	berbamine (**57**)[19]	VIII
		berbamunine (**1**)[19]	I
		oxyacanthine (**48**)[19]	VI
Berberis waziristanica[b] (Berberidaceae)	RB	aromoline (**31**)[27]	VI
Cardiopetalum calophyllum Schlecht (Annonaceae)	TB	dauricine (**3**)[20]	I

Table 7 (Continued)

name	part[a]	alkaloid	structural type
Cissampelos fasciculata Benth. (Menispermaceae)	AP	cissampentin (**395**)[76]	XXIIa
Cocculus hirsutus Diels (Menispermaceae)	AP	isotrilobine (**157**)[70]	XXIII
		trilobine (**163**)[70]	XXIII
Cocculus pendulus (Forsk) Diels (Menispermaceae)	L, St	cocsiline (**396**)[55]	XXIV
		cocsilinine (**397**)[55]	XXIV
		cocsoline (**152**)[55]	XXIII
		cocsuline (**153**)[55,58]	XXIII
		cocsulinine (**164**)[55]	XXIV
		12′-*O*-demethyltrilobine (**155**)[55]	XXIII
		O,*O*-dimethylcocsulinine (**164**)[55]	XXIV
		hernandezine (**81**)[58]	IX
		isotetrandrine (**62**)[55]	VIII
		isotrilobine (**157**)[55]	XXIII
		O-methylcocsulinine (**415**)[55]	XXIV
		N-norcocsulinine (**422**)[55]	XXIV
		pendilinine (**425**)[55]	XXIV
		pendine (**178**)[55]	unknown
		penduline (**72**)[55,58]	VIII
		pendulinine (**179**)[55]	unknown
		punjabine (**265**)[58]	XXIII
		tetrandrine (**76**)[58]	VIII
		trilobine (**163**)[55]	XXIII
Cyclea atjehensis Forman (Menispermaceae)	L	curicycleatjenine (**400**)[79]	XXI
		curicycleatjine (**401**)[79]	XXI
		cycleatjehenine (**404**)[80,81]	XXIIa
		cycleatjehine (**405**)[80]	XXIIa
		isocuricycleatjenine (**410**)[79]	XXI
		isocuricycleatjine (**411**)[79]	XXI
Cyclea barbata (Wall) Miers (Menispermaceae)	R	berbamine (**57**)[7]	VIII
		(−)-curine (**133**)[7]	XXI
		cycleabarbatine (**402**)[7]	VIII
		cycleanorine (**60**)[7]	VIII
		cycleapeltine (**36**)[6]	VI
		daphnandrine (**37**)[7]	VI
		homoaromoline (**42**)[6]	VI
		limacine (**64**)[6]	VIII
		2′-norlimacine (**423**)[7]	VIII
		repandine (**49**)[7]	VI
		tetrandrine (**76**)[6]	VIII
		thalrugosine (**79**)[6]	VIII
Cyclea burmanni (DC.) Miers ex. Hook. f., & Thoms. (Menispermaceae)	R	phaeanthine (**74**)[59]	VIII
		tetrandrine (**76**)[59]	VIII
Cyclea racemosa Oliv. (Menispermaceae)	St	cycleaneonine (**286**)[75]	XXII
Cyclea sutchuenensis Gagnep. (Menispermaceae)	R	(−)-cycleaneonine (**403**)[75]	XXII
		insulanoline (**169**)[69,71]	XXVI
		insularine (**170**)[71]	XXVI
		isochondodendrine (**122**)[69]	XX
		isocycleaneonine (**412**)[75]	XXII
		neosutchuenenine (**420**)[69]	V
		sutchueneneonine (**426**)[69]	Vc
		sutchuenenine (**427**)[69]	Vd
Daphnandra dielsii Perk. (Monimiaceae)	B	daphnine (**191**)[73]	Xb
Dehaasia incrassata (Lauraceae)	L	oxyacanthine (**48**)[47]	VI
Hernandia nymphaeifolia (Presl.) Kubirtzki (*Biasolettia* numphaeifolia Presl., *Hernandia* peltata Meissn.) (Hernandiaceae)	TB	vateamine 2′*β*-*N*-oxide (**430**)[86]	IIb
Hernandia sonora L. (*H. ovigera* L.) (Hernandiaceae)	StB	malekulatine (**238**)[74]	Va
Laurelia sempervirens R. et P. (Monimiaceae)	L	isotetrandrine (**62**)[56]	VIII
		secoisotetrandrine (**431**)[56]	VIII
Menispermum dauricum DC. (Menispermaceae)	R, Rh	dauricine (**3**)[21−23]	I
	Rh culture	dauriciline (**406**)[82]	I
		dauricine (**3**)[24]	I
		daurisoline (**192**)[21,23]	I
Nectandra salicifolia (H.B.K.) Nees (Lauraceae)	TB	costaricine (**399**)[78]	I
Nelumbo nucifera Gaertn. (Nymphaeaceae)	Sd	liensinine (**29**)[25,26]	V
Pachygone dasycarpa Kurz (Menispermaceae)	StB	angchibangkine (**394**)[9]	XXVIII
		atherospermoline (**56**)[9]	VIII
		cocsuline (**153**)[9]	XXIII
		daphnoline (**38**)[9]	VI
		fangchinoline (**61**)[9]	VIII
		isotrilobine (**157**)[9]	XXIII
		N-methyl-7-*O*-demethylpeinamine (**71a** dvt)[9]	VIII
		12-*O*-methyltricordatine (**419**)[9]	XXIII
		2′-norcocsuline (**329**)[9]	XXIII
		penduline (**72**)[9]	VIII
		tetrandrine (**76**)[9]	VIII
		tricordatine (**161**)[9]	XXIII

Table 7 (Continued)

name	part[a]	alkaloid	structural type
Phaeanthus crassipetalus Becc. (Menispermaceae)	Unk	limacine (**64**)[57]	VIII
		phaeanthine (**74**)[57]	VIII
Phaeanthus vietnamensis Ban. (Menispermaceae)	L	*O*,*O*′-dimethylgrisabine (**407**)[71,84]	I
		7-*O*-methylgrisabine (**417**)[84]	I
Spirospermum penduliflorum Thou. (Menispermaceae)	StR	limacine (**64**)[54]	VIII
Stephania cepharantha Hayata (Menispermaceae)	R	aromoline (**31**)[28,29]	VI
		berbamine (**57**)[28,31,33]	VIII
		cepharanthine (**34**)[28,31,33]	VI
		cepharanoline (**33**)[28,31]	VI
		cycleanine (**121**)[28,31,33]	XX
		homoaromoline (**42**)[28,31]	VI
		isotetrandrine (**62**)[28,31]	VIII
		(−)-norcycleanine (**125**)[28]	XX
		obamegine (**71**)[28]	VIII
Stephania epigaea (Menispermaceae)	Tb	cepharanoline (**33**)[32]	VI
		(−)-curine (**133**)[32]	XX
Stephania erecta Craib. (Menipsermaceae)	Tb	cepharanthine (**34**)[34]	VI
		daphnandrine (**37**)[34]	VI
		1,2-dehydrotelobine (**194**)[34]	XXIII
		homoaromoline (**42**)[34]	VI
		isochondodendrine (**122**)[32]	XX
		isotetrandrine (**62**)[34]	VIII
		2-*N*-methyltelobine (**418**)[34]	XXIII
		2-norcepharanthine (**328**)[34]	VI
		2-norisotetrandrine (**334**)[34]	VIII
		2-norobaberine (**46 dvt**)[34]	VI
		2-northalrugosine (**344**)[34]	VIII
		obaberine (**62**)[34]	VI
		stephibaberine (**375**)[34]	VI
		thalrugosine (**79**)[34]	VIII
Stephania excentrica H-S. Lo (Menispermaceae)	R	homoaromoline (**42**)[37]	VI
Stephania sutchuenensis H. S. Lo (Menispermaceae)	R	thalrugosine (**79**)[61]	VIII
Stephania tetrandra S. Moore (Menispermaceae)	R	fangchinoline (**61**)[53]	VIII
	R	2-*N*-methylfangchinoline (**416**)[85]	VIII
	AP, R	tetrandrine (**76**)[53,60]	VIII
Strychnopsis thouarsii Baill. (Menispermaceae)	L	fangchinoline (**61**)[54]	VIII
Thalictrum delavayi Franch. (Ranunculaceae)	WP	hernandezine (**81**)[62]	IX
Thalictrum fargesii (Ranunculaceae)	R	thalfoetidine (**99**)[50,67]	XII
		thalidasine (**100**)[50,67]	XII
		thaligosinine (**52b**)[50]	VII
Thalictrum flavum L. (Ranunculaceae)	R	hernandezine (**81**)[63]	IX
		O-methylthalicberine (**95**)[63]	XI
		thalfoetidine (**99**)[63]	XII
		thalidasine (**100**)[63]	XII
		thalidezine (**83**)[63]	IX
Thalictrum foetidum L. (Ranunculaceae)	Unk	hernandezine (**81**)[48]	IX
		O-methylthalicberine (**95**)[48]	XI
	UP	thalidasine (**100**)[49]	XII
		thalidezine (**83**)[48]	IX
		thaligosine (**52a**)[48]	VII
	UP	thaligosinine (**52b**)[49]	VII
	UP	thalrugosaminine (**55**)[49]	VII
Thalictrum fortunei S. Moore (Ranunculaceae)	WP	aromoline (**31**)[30]	VI
		thalifortine (**428**)[30]	XIV
Thalictrum glandulosissimum (Finet et Gagnep.)	R, Rh	hernandezine (**81**)[64,65]	IX
W.T. Wang et S.H. Wang (Ranunculaceae)	R	isothalidezine (**82**)[65]	IX
	R	*O*-methylthalibrine (**209**)[65]	I
	R, Rh	thalidezine (**83**)[64,65]	IX
Thalictrum isopyroides C.A.M. (Ranunculaceae)	AP	thalisopidine (**53**)[51]	VII
Thalictrum minus L. (Ranunculaceae)	AP	*O*-methylthalicberine (**95**)[66]	XI
		O-methylthalmethine (**96**)[66]	XI
		thalicberine (**97**)[66]	XI
		thalmethine (**99**)[66]	XI
Thalictrum minus L. var. *majus* (Ranunculaceae)	AP	*O*-methylthalicberine (**95**)[41]	XI
	UP	obaberine (**46**)[41]	VI
	UP	oxyacanthine (**48**)[41]	VI
	AP	thalicberine (**97**)[41]	XI
	AP	thaligosine (**52a**)[41]	VII
Tiliacora racemosa Colebr. (Menispermaceae)	L	*N*-methyltiliamosine (**323**)[8]	XIX
		nortiliacorinine A (**116**)[68]	XVIII
		tiliacorinine (**116**)[68]	XVIII
		tiliamosine (**120**)[8]	XIX
		tiliaresine (**429**)[8]	XIXa

[a] AP = aerial parts, B = bark, Bb = bulb, Fr = fruits, L = leaves, R = roots, RB = rootbark, Rh = rhizomes, Sd = seeds, Sh = shoots, St = stems, StB = stembark, StR = stemroots, Tb = tubers, TB = trunkbark, Unk = unknown, UP = underground parts, W = wood, WP = whole plant. [b] The authority designation was not cited in the reference.

Table 8. Names and Synonyms of Bisbenzylisoquinoline Alkaloids Cited in This Review[a]

angchibangkine (**394**) n.a.	fangchinoline (**61**) r.i.	2′-norlimacine (**423**) n.a.
aromoline (**31**) r.i.	hernandezine (**81**) r.i.	2-norobaberine (**46 dvt**) r.i.
atherospermoline (**56**) r.i.	homoaromoline (**42**) a.d., r.i.	2-norobaberine 2′*β*-*N*-oxide (**424**) n.a.
berbamine (**57**) r.i.	insulanoline (**169**) r.i.	2-northalrugosine (**344**) r.i.
berbamunine (**1**) r.i.	insularine (**170**) r.i.	nortiliacorinine A (**116**) r.i.
calafatine (**190**) r.i.	insularine 2*β*-*N*-oxide (**408**) n.a.	nortiliacorinine B (**117**) a.d.
cepharanoline (**33**) r.i.	insularine 2′*β*-*N*-oxide (**409**) n.a.	obaberine (**46**) r.i.
cepharanthine (**34**) c.s., r.i.	isochondodendrine (**122**) r.i.	obamegine (**71**) r.i.
cissampentin (**395**) n.a.	isocuricycleatjenine (**410**) n.a.	oxyacanthine (**48**) r.i.
coclobine (**35**) r.i.	isocuricycleatjine (**411**) n.a.	pendilinine (**425**) n.a.
cocsiline (**396**) n.a.	isocycleaneonine (**412**) n.a.	pendine (**178**) r.i.
cocsilinine (**397**) n.a.	isotetrandrine (**62**) r.i.	penduline (**72**) r.i.
cocsoline (**152**) r.i.	isothalidezine (**82**) r.i.	pendulinine (**179**) r.i.
cocsoline 2′*β*-*N*-oxide (**398**) n.a.	isotrilobine (**157**) a.d., r.i.	phaeanthine (**74**) r.i.
cocsuline (**153**) a.d., r.i.	liensinine (**29**) c.s., r.i.	punjabine (**265**) r.i.
cocsulinine (**164**) r.i.	limacine (**64**) a.d., r.i.	repandine (**49**) r.i.
costaricine (**399**) n.a.	limacine 2′*β*-*N*-oxide (**317**) r.i.	secoisotetrandrine (**431**) n.a.
curicyleatjenine (**400**) n.a.	limacusine 2′*β*-*N*-oxide (**413**) n.a.	stephibaberine (**375**) r.i.
curicycleatjine (**401**) n.a.	malekulatine (**238**) r.i.	sutchueneneonine (**426**) n.a.
(−)-curine (**133**) r.i.	2′-*N*-methylberbamine (**66a**) r.i.	sutchuenenine (**427**) n.a.
cycleabarbatine (**402**) n.a.	12-*O*-methylcocsoline 2′*β*-*N*-oxide (**414**) n.a.	tetrandrine (**76**) a.d., c.s., r.i.
(+)-cycleaneonine (**286**) r.i.	*O*-methylcocsulinine (**415**) n.a.	tetrandrine 2′*β*-*N*-oxide (**78**) a.d.
(−)-cycleaneonine (**403**) n.a.	2-*N*-methylfangchinoline (**416**) n.a.	thalicberine (**97**) r.i.
cycleanine (**121**) c.s., r.i.	7-*O*-methylgrisabine (**417**) n.a.	thalidasine (**100**) r.i.
cycleanorine (**60**) r.i.	2-*N*-methyltelobine (**418**) n.a.	thalidezine (**84**) r.i.
cycleapeltine (**36**) a.d., r.i.	*O*-methylthalibrine (**209**) r.i.	thalfoetidine (**99**) r.i.
cycleatjehenine (**404**) n.a.	*O*-methylthalicberine (**95**) r.i.	thalifortine (**428**) n.a.
cycleatjehine (**405**) n.a.	*O*-methylthalmethine (**96**) r.i.	thaligosine (**52a**) r.i.
daphnandrine (**37**) r.i.	*N*-methyltiliamosine (**323**) a.d., r.i.	thaligosinine (**52b**) r.i.
daphnine (**191**) r.i.	*N*-methyl-7-*O*-demethylpeinamine (**71a dvt**) r.i.	thalisopidine (**53**) r.i.
daphnoline (**38**) r.i.	12-*O*-methyltricordatine (**419**) n.a.	thalmethine (**98**) r.i.
dauriciline (**406**) n.a.	neosutchuenenine (**420**) n.a.	thalrugosaminine (**55**) r.i.
dauricine (**3**) c.c., c.s., r.i.	2-norcepharanthine (**328**) r.i.	thalrugosine (**79**) a.d., r.i.
daurisoline (**192**) c.s., r.i.	2′-norcocsoline (**421**) n.a.	tiliacorinine (**119** r.i.
dehatrine (**288**) a.d., r.i.	2′-norcocsuline (**329**) r.i.	tiliamosine (**120**) a.d., r.i.
1,2-dehydrotelobine (**194**) r.i.	*N*-norcocsulinine (**422**) n.a.	tiliaresine (**429**) n.a.
12′-*O*-demethyltrilobine (**155**) r.i.	(−)-norcycleanine (**125**) r.i.	tricordatine (**161**) r.i.
O,*O*-dimethylcocsulinine (**164 dvt**) r.i.	2-norisotetrandrine (**334**) r.i.	trilobine (**163**) r.i.
O,*O*′-dimethylgrisabine (**407**) n.a.	2-norlimacine (**336**) r.i.	vateamine 2′*β*-*N*-oxide (**430**) n.a.

[a] a.d. = additional data; b.s. = biosynthesis; c.c. = cell culture; c.s. = chromatographic separation; n.a. = new alkaloid; r.i. = reisolated; r.s. = revised structure; s.s. = semisynthetic; syn. = synthesized; dvt = derivative (meaning a derivative of an alkaloid with the preceding number).

UV spectra (nm, log ϵ) and the CD spectra were obtained in MeOH, the IR spectra (cm^{-1}) in $CHCl_3$, and both the ^1H NMR and ^{13}C NMR spectra in $CDCl_3$. The numbering of the skeleton and the systematic numerical classification describing oxygenation and dimerization patterns of the alkaloids follow (almost without exception) the convention established by Shamma and Moniot,[5] and that has been employed in the previous three reviews.[2−4]

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