

Review Article

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THE ALKALOIDS OF RAUWOLFIA

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INTRODUCTION

A comprehensive literature survey on the plants of family *Apocynaceae* has revealed that several genera such as *Ervatamia*, *Alstonia*, *Aspidosperma*, *Geissospermum*, *Hunteria*, *Kopsia*, *Picalima*, *Vinca*, *Rhazya* and *Rauwolfia* are rich in indole alkaloids.

The drugs derived from plants are widely used in a developing countries, because of their ready availability, cheapness, sociocultural effects and less toxicity as pronounced by the traditional practitioners (*Hakims*). In this connection particular mention could be made of *Rauwolfia* species. The fact that its physiologically active principles are alkaloids was first pointed out by Greshoff [1], while preliminary studies in the constituents of *Rauwolfia serpentina* Benth were initiated in 1890 by Dymock, *et al.* [2].

Systematic literature survey on the chemical consti-

tuents of *Rauwolfia* species was first under taken by Leo Marion [2a] in 1952 and in 1953 Asima Chatterjee (nee Mookerjee) reviewed the same along with their pharmacology [2b]. In 1956 C. Pakrashi and Asima Chatterjee, Satyesh and G. Werner reported the chemistry of *Rauwolfia* alkaloids in a voluminous monograph [2c]. Later on in 1960 another rich review on *Rauwolfia* alkaloids was written by J.E. Saxton and E. Schlittler in 1965 [2d].

Though there is not yet any evidence that the interest in indole alkaloids has declined sufficient new material has accumulated to warrant an up-to-date summary. The present short review deals with the list of alkaloids so far isolated from various *Rauwolfia* species (Table 1). The alkaloids are arranged in alphabetical order together with their molecular formulae, melting points and specific rotation. It is rather interesting to know that so far two hundred and four alkaloids have been isolated from various *Rauwolfia* species.

Table 1. List of *Rauwolfia* alkaloids.

Name	mp (°C)	Molecular formula	Specific rotation	References
Ajmalicine	235-36	C ₂₁ H ₂₆ N ₂ O ₄	[α] _D ²⁰ + 190° (C)	190
Ajmalicimine	217-18	C ₂₁ H ₂₆ N ₂ O ₃	[α] _D ²⁰ + 209° (C)	193
Ajmalicine	252-54	C ₂₁ H ₂₄ N ₂ O ₃	[α] _D ²³ - 58.1° (C)	3, 17-22, 111, 134
Ajmalidine	241-42	C ₂₀ H ₂₄ N ₂ O ₂	-	126, 134
Ajmalimine	188-89	C ₃₀ H ₃₆ N ₂ O ₆	[α] _D ²⁰ + 105° (C)	192
Ajmaline	158-60	C ₂₀ H ₂₆ N ₂ O ₂	[α] _D ²³ + 128° (C)	3,7-16, 104, 105, 114, 118
Ajmalinimine	198-99	C ₂₄ H ₃₀ N ₂ O ₄	[α] _D ²⁰ + 205° (C)	193
17-Acetyl ajmaline	153-55	C ₂₂ H ₂₈ N ₂ O ₃	[α] _D ²⁰ + 53° (C)	99,129
Ajmaline 17-0-trimethoxy benzoate	-	C ₃₀ H ₃₆ N ₂ O ₆	-	105, 146
Ajmalinine	180-81	C ₂₀ H ₂₆ N ₂ O ₃	[α] _D ²³ - 97° (C)	3, 134
Ajmalinol	209-10	C ₂₀ H ₂₆ N ₂ O ₃	[α] _D ³⁰ + 132° (C)	123
Akuammicine	181-85	C ₂₀ H ₂₂ N ₂ O ₂	[α] _D ²³ + 72° (M)	120, 127, 129, 141, 144
Akuammiline	160	C ₂₂ H ₂₄ N ₂ O ₄	[α] _D ²⁰ + 80° (E)	127, 145

(continued.)

(Table 1 continue)

Alstonine	300	$C_{21}H_{20}N_2O_3$	$[\alpha]_D^{21} + 164^\circ$ (M)	36-39, 100, 105
Amsoniafoline	220-23	$C_{25}H_{32}N_2O_5$	—	146
Aricine	190	$C_{20}H_{26}N_2O_4$	$[\alpha]_D^{20} - 63^\circ$ (P)	91, 104, 127
Canembine	228-29	$C_{22}H_{28}N_2O_3$	$[\alpha]_{H_g}^{25} + 57^{(b)}$ (C)	146
Carapanaubine	221-23	$C_{23}H_{38}N_2O_6$	$[\alpha]_D^{20} - 101^\circ$ (C)	88-90, 116
Chalcupine B	240	$C_{15}H_{24}N_6O_{11}$	—	146
Chandrine	230-31	$C_{25}H_{30}N_2O_8$	—	146
CMS-12	165	$C_{23}H_{26}N_2O_5$	$[\alpha]_D^{25} 0^\circ$ (C)	115
Corynantheal	—	$C_{19}H_{24}N_2O$	—	115
Corynantheol	—	$C_{19}H_{26}N_2O$	—	115
Corynanthine	218-25	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{20} - 82^\circ$ (P)	146
Deacetylakuammiline	—	$C_{21}H_{24}N_2O_3$	$[\alpha]_D^{20} + 14^\circ$ (E)	127, 145, 156
Deacetyldeformoakuammiline	140	$C_{20}H_{22}N_2O_3$	$[\alpha]_D^{20} + 133^\circ$ (C)	96, 98, 146
Deacetyldeformopicraline	223-25	$C_{20}H_{22}N_2O_3$	$[\alpha]_D^{20} - 48^\circ$ (C)	96, 97, 146
Deacetyldeformylakuammiline	140	$C_{20}H_{22}N_2O_2$	$[\alpha]_D^{20} + 133^\circ$ (C)	107, 147, 179
Deacetyl-1, 2-dihydroakuammiline	228-30	$C_{21}H_{24}N_2O_3$	$[\alpha]_D^{20} + 99^\circ$ (M)	127
Deacetylpicraline	198	$C_{21}H_{24}N_2O_4$	$[\alpha]_D^{20} + 31^\circ$ (C)	115, 155
Decarbomethoxy, dihydrovobasine	—	$C_{19}H_{24}N_2O$	—	180
19,20-Dehydroadirubineacetate	—	$C_{24}H_{29}N_2O_6$	—	127
19, 20-Dehydroreserpiline	—	$C_{23}H_{26}N_2O_5$	—	115
1-De-methyl-17-O-acetyl-21-deoxy-ajmaline-diene-(1, 19)	235-37	$C_{21}H_{22}N_2O_2$	—	122, 146
N_a -Demethyl dihydropurpeline	—	$C_{21}H_{22}N_2O_2$	—	113, 149, 157
N_a -Demethyl purpeline	—	$C_{20}H_{22}N_2O_2$	—	113, 149, 157
N_1 -Demethylseredamine	242-45	$C_{20}H_{24}N_2O_2$	$[\alpha]_D^{22} + 32^\circ$ (M)	164
21-Deoxyvomilenine	—	$C_{21}H_{22}N_2O_2$	—	137
Desacetyldesformoakuammiline	—	—	—	145
1-Desmethyl-2-dehydro-17-acetylajmaline	—	$C_{21}H_{24}N_2O_3$	—	126
N_a -Desmethyl-2-dehydrotetra-phyllicine	—	$C_{19}H_{20}N_2O$	—	122, 126
Deserpideine purpeline	149-52	$C_{32}H_{36}N_2O_8$	$[\alpha]_D^{20} - 33^\circ$ (P)	148
Deserpidine	228-32	$C_{32}H_{28}N_2O_8$	$[\alpha]_D^{25.4} - 137^\circ$ (C)	151
18, N_a -Didemethyl-19-hydroxy- N_b -methyl saueoline	—	$C_{19}H_{19}N_3O$	$[\alpha]_D^{22} + 33.8^\circ$ (M)	137
1, 2-Dihydro akuammiline	—	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{20} - 94^\circ$ (M)	127
Dihydro-norpurpeline	—	$C_{19}H_{22}N_2O_2$	—	115
19, 20-Dihydro vomilenine	—	$C_{23}H_{26}N_2O_4$	—	135
10, 11-Dimethoxyajmalicine	137	$C_{23}H_{28}N_2O_5$	$[\alpha]_D^{20} - 64^\circ$ (C)	115, 153
10, 11-Dimethoxy- N_a -methylpicrinine	—	$C_{23}H_{28}N_2O_5$	—	144
10, 11-Dimethoxy picrinine	—	$C_{22}H_{26}N_2O_5$	—	144
Endolobine	—	—	—	199
19-Epiajmalicine	240	$C_{21}H_{24}N_2O_3$	—	152
17, 20-Epicabucinine	170	$C_{22}H_{28}N_2O_5$	$[\alpha]_D 0^\circ$ (C)	124, 153
Ethylharman	215	$C_{14}H_{14}N_2$	—	121
Flexicorine	360	$C_{41}H_{44}N_4O_5$	$[\alpha]_D^{25} - 51.9^\circ$ (C)	133
Geissoschizine	194-96	$C_{21}H_{24}N_2O_3$	$[\alpha]_D^{21} + 115^\circ$ (E)	120, 127, 158
Geissoschizol	218-19	$C_{19}H_{24}N_2O_3$	$[\alpha]_D^{24} + 46^\circ$ (C)	96, 107, 108, 128

(continued.)

(Table 1, continue)

Harman	236-37	$C_{12}H_{10}N_2$	—	121
10-Hydroxyakuamicine	—	$C_{19}H_{22}N_2O_3$	—	144
10-Hydroxy-17-epi- α -yohimbine	—	$C_{21}H_{26}N_2O_4$	—	112
10-Hydroxy geissochizol	264	$C_{19}H_{24}N_2O_2$	—	116
5-Hydroxy methylakuammiline	—	$C_{21}H_{22}N_2O_3$	$[\alpha]_D^{21} - 141^\circ (M)$	127
10-Hydroxy nortetraphyllicine	—	$C_{20}H_{24}N_2O_2$	—	116
18-Hydroxy yohimbine	—	$C_{21}H_{26}N_2O_4$	—	115, 116, 125
Indobine	163-164	$C_{18}H_{17}NO_2$	—	193
Indobinine	180-181	$C_{17}H_{21}NO_2$	—	192
Indolenine	—	$C_{20}H_{19}N_2O_2$	—	116
Isoajmaline	264-66	$C_{20}H_{26}N_2O_2$	$[\alpha]_D^{35} + 72.8^\circ (E)$	4,5,159
Isocarapanaubine	220	$C_{23}H_{28}N_2O_6$	$[\alpha]_D^{35} - 68^\circ (C)$	96,116,134,145
Isopseudoreserpine	—	$C_{32}H_{38}N_2O_9$	—	146
Isorauhimbine	125	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{20} - 104^\circ (P)$	160
Isoraunescine	241-43	$C_{31}H_{36}N_2O_8$	$[\alpha]_D^{25} - 70^\circ (C)$	161
Isoraunitidine	258-59	$C_{22}H_{26}N_2O_4$	—	181, 182
Isoreserpiline	211-12	$C_{23}H_{28}N_2O_5$	$[\alpha]_D^{20} - 82^\circ (P)$	65-71, 91, 104, 134
Isoreserpiline ψ -indoxyl	251-54	$C_{23}H_{28}N_2O_6$	$[\alpha]_D^{24} - 254^\circ (C)$	85, 145, 183, 184
Isoreserpine	154-56	$C_{33}H_{40}N_2O_9$	$[\alpha]_D^{24} - 164^\circ (C)$	182
Isoreserpiline	225-26	$C_{22}H_{26}N_2O_4$	$[\alpha]_D^{20} - 5^\circ (P)$	161
Isosandwicimine	200-01	$C_{22}H_{28}N_2O_3$	$[\alpha]_D^{20} + 142^\circ (C)$	193
Isosandwicine	250	$C_{20}H_{26}N_2O_2$	$[\alpha]_D^{20} + 130^\circ (C)$	99
12-Methoxyajmaline	—	$C_{21}H_{27}N_2O_3$	—	105
10-Methoxy akuammicine	—	$C_{21}H_{24}N_2O_3$	—	144
10-Methoxy akuammicine	—	$C_{25}H_{26}N_2O_5$	—	127
10-Methoxy-2, 7-dihydropleio- carpamine	145	$C_{21}H_{26}N_2O_3$	—	144, 163
10-Methoxygeissoschizol	178-80	$C_{20}H_{26}N_2O_2$	—	100, 116, 142
10-Methoxypleiocarpamine	—	$C_{21}H_{24}N_2O_3$	—	120, 127, 144
11-Methoxy pseudoyohimbine	200-02	$C_{22}H_{28}N_2O_4$	$[\alpha]_D^{20} + 90^\circ (P)$	106
12-Methoxy rauvomitine	—	$C_{30}H_{34}N_2O_6$	—	115
11-Methoxyyohimbine	267-68	$C_{22}H_{28}N_2O_4$	$[\alpha]_D^{20} + 30^\circ (P)$	106
N-Methylajmaline	130	$C_{21}H_{28}N_2O_2$	$[\alpha]_D^{23} + 124 (C)$	126
Methylreserpate	—	$C_{23}H_{28}N_2O_5$	—	129
O-Methylnormacusine- N_b -oxide	—	$C_{21}H_{27}N_2O_4$	—	115
Methyl reserpate	244-45	$C_{23}H_{30}N_2O_5$	$[\alpha]_D^{20} - 99^\circ (C)$	105, 116
N_b -Methyl tetrahydroalstonine	—	$C_{22}H_{28}N_2O_3$	—	144
Mitoridine	321-22	$C_{20}H_{22}N_2O_2$	$[\alpha]_D^{18} + 175^\circ (P)$	81-84, 113, 149
Neoajmaline	205-07	$C_{20}H_{26}N_2O_2$	—	126, 146
Neonorreserpiline	291-92	$C_{32}H_{38}N_2O_9$	$[\alpha]_D^{24} - 88.2^\circ$	124
Neoreserpiline	129-31	$C_{23}H_{28}N_2O_5$	—	146
Neosarpagine	390	$C_{19}H_{22}N_2O_2$	—	146
Norajmaline	—	—	—	105
Nordihydro purpeline	—	$C_{20}H_{24}N_2O_2$	—	105, 115
Normacusine B	245	$C_{19}H_{22}N_2O_2$	—	116, 119, 138, 144, 145
Normitoridine	—	—	—	115
Norpurpeline	—	$C_{20}H_{22}N_2O_2$	—	115, 116
Norseredamine	245	$C_{20}H_{24}N_2O_2$	$[\alpha]_D + 33^\circ (M)$	115, 116

(continued.....)

(Table 1 continue)

Nortetraphyllicine	280	$C_{19}H_{22}N_2O_2$	—	115, 116, 144
Obscuridine	228	—	—	142, 146
Ochrolifuanine	160-62	$C_{30}H_{34}N_4O$	$[\alpha]_D + 15^\circ$ (E)	142
OR ₄	180-81	$C_{19}H_{27}N_2O_2$	—	127
Papaverine	147	$C_{20}H_{21}NO_4$	$[\alpha]_D^{25} + 0^\circ$ (C)	146
Parakenine	236	$C_{20}H_{26}N_2O_2$	$[\alpha]_D^{32} - 34.75^\circ$ (E)	146
Peliocarpamine	152-55	$C_{20}H_{22}N_2O_2$	$[\alpha]_D^{20} + 123^\circ$ (C)	120, 127, 146
Peliocarpamine N-oxide	—	$C_{20}H_{22}N_2O_3$	—	120, 146
Pelirine	130-31	$C_{21}H_{28}N_2O_4$	$[\alpha]_D^{24} - 121^\circ$ (E)	104, 146
Perakine	183-85	$C_{21}H_{22}N_2O_3$	$[\alpha]_D^{24} + 112^\circ$ (C)	75-78, 131, 145
Peraksine	196-98	$C_{19}H_{22}N_2O_2$	—	115, 119, 129, 144, 145
Picaline	182	$C_{23}H_{26}N_2O_5$	$[\alpha]_D^{20} - 124^\circ$ (M)	123
Picrinine	160	$C_{20}H_{22}N_2O_3$	$[\alpha]_D - 140^\circ$ (C)	115, 123, 146
Pseudoreserpine	257-58	$C_{32}H_{38}N_2O_9$	$[\alpha]_D^{24} - 65^\circ$ (C)	165
Pseudoyohimbine	265-78	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{20} + 27^\circ$ (P)	166
Purpeline	155	$C_{21}H_{24}N_2O_2$	$[\alpha]_D^{25} + 333^\circ$ (C)	81, 190, 116
Quaternine	152	$C_{23}H_{23}N_2O_5$	$[\alpha]_D - 26^\circ$ (C)	119, 123, 168
Quebrachidine	265-75	$C_{21}H_{24}N_2O_3$	$[\alpha]_D^{25} + 54^\circ$ (C)	159
Raubasine	256-57	$C_{21}H_{24}N_2O_3$	$[\alpha]_D^{20} + 0^\circ$ (C)	182
Raucaffricine	220	$C_{27}H_{32}N_2O_3$	$[\alpha]_D^{30} + 4.5^\circ$ (E)	131, 168
Raucaffridine	221	$C_{21}H_{24}N_2O_3$	—	146
Raucaffriline	220-21	$C_{21}H_{22}N_2O_3$	—	145, 146
Raucaffrinoline	236	$C_{21}H_{24}N_3O_2$	—	122
Raucubaine	224	$C_{20}H_{24}N_2O_3$	$[\alpha]_D^{20} - 18^\circ$ (C)	134, 150
Raucubainine	—	—	—	134
Rauflexine	—	—	—	117
Raufloricine	190-92	$C_{24}H_{28}N_2O_5$	$[\alpha]_D^{20} + 129^\circ$ (C)	185
Raufloridine	—	$C_{22}H_{26}N_2O_4$	$[\alpha]_D^{20} + 5.95^\circ$ (A)	185
Rauflorine	221	$C_{19}H_{20}N_2O$	$[\alpha]_D^{20} + 312^\circ$ (C)	185
Raugalline	185	$C_{20}H_{26}N_2O_2$	$[\alpha]_D^{23} + 128^\circ$	146
Raugustine	160-70	$C_{32}H_{38}N_2O_9$	$[\alpha]_D^{25} - 50^\circ$ (C)	169
Raujemedine	144-50	$C_{33}H_{38}N_2O_9$	$[\alpha]_D^{25} - 83^\circ$ (C)	170
Raujemedine-N-oxide	215-17	$C_{33}H_{32}N_2O_{10}$	—	146
Raumitorine	138	$C_{22}H_{26}N_2O_4$	$[\alpha]_D^{25} + 60^\circ$ (C)	40, 171
Raunamine	206-07	$C_{23}H_{30}N_2O_4$	$[\alpha]_D^{25} + 60^\circ$ (C)	146
Raunescine	160-70	$C_{31}H_{36}N_2O_8$	$[\alpha]_D^{24} - 74^\circ$ (C)	146
Rauniticine	233-35	$C_{21}H_{22}N_2O_3$	$[\alpha]_D^{24} - 38^\circ$ (C)	128, 172
Raunitidine	276-78	$C_{20}H_{26}N_2O_4$	$[\alpha]_D^{30} - 70^\circ$ (C)	172
Rauvanine	129-35	$C_{23}H_{28}N_2O_5$	$[\alpha]_D^{24} 32.5^\circ$ (C)	74
Rauvolcinine	—	—	—	129
Rauvomitine	115-17	$C_{30}H_{34}N_2O_5$	$[\alpha]_D^{20} - 173.4^\circ$ (C)	57, 58, 105, 115, 128
Rauvoxine	210	$C_{23}H_{28}N_2O_6$	$[\alpha]_D^{25} + 98^\circ$ (C)	86-89, 116, 124
Rauvoxinine	203	$C_{23}H_{28}N_2O_6$	$[\alpha]_D^{25} + 64^\circ$ (C)	86-89, 116, 121, 145
Rauwolfine	235-36	$C_{20}H_{26}N_2O_3$	$[\alpha]_D^{23} + 128^\circ$ (C)	23, 173
Rauwolfinine	235-36	$C_{19}H_{26}N_2O_3$	$[\alpha]_D^{32} - 34.71^\circ$ (E)	174
Rauwolscine	231-32	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{30} - 40^\circ$ (E)	177
Reflexine	260	$C_{21}H_{26}N_2O_2$	$[\alpha]_D + 126^\circ$ (C)	109, 110
RE-Pseudoindoxyl	—	—	—	116

(continued.)

(Table 1, continue)

Rescidine	183-86	$C_{34}H_{40}N_2O_9$	$[\alpha]_D^{27} - 63.4^\circ (C)$	80, 175
Rescinnamidine	260-61	$C_{35}H_{44}N_2O_9$	$[\alpha]_D^{25} + 207^\circ (C)$	191
Rescinnamine	238-39	$C_{35}H_{42}N_2O_9$	$[\alpha]_D^{17} - 99.29^\circ (C)$	24, 25, 53, 56, 105, 115, 128
Rescinnaminol	241-43	$C_{32}H_{42}N_2O_6$	$[\alpha]_D^{20} + 199^\circ (C)$	193
Reserpacid	240	$C_{22}H_{28}N_2O_5$	$[\alpha]_D - 101^\circ (C)$	139
Reserpiline	—	$C_{23}H_{28}N_2O_5$	$[\alpha]_D^{24} - 40^\circ (E)$	59-61, 104, 115, 134, 143
Reserpine	275-77	$C_{33}H_{40}N_2O_9$	$[\alpha]_D^{23} - 117^\circ (C)$	6, 42, 52, 104, 115, 143
ψ -Reserpine	257-58	$C_{32}H_{38}N_2O_9$	$[\alpha]_D^{30} - 65^\circ (C)$	146
Reserpine-N-Oxide	238-41	$C_{33}H_{40}N_2O_{10}$	$[\alpha]_D^{25} - 100^\circ (C)$	72, 146
Reserpinine	233-44	$C_{20}H_{26}N_2O_4$	$[\alpha]_D^{23} - 117^\circ (C)$	172
Reserpinine oxindole	—	—	—	145
Rf-Pseudoindoxyl	—	—	—	116
Samatine	284-85	—	—	146
Sandwicensine	260-62	$C_{19}H_{22}N_2O$	$[\alpha]_D^{25} + 56^\circ (M)$	146
Sandwicine	210-11	$C_{20}H_{26}N_2O_2$	$[\alpha]_D^{25} + 180^\circ (C)$	99, 187
Sandwicolidine	213-214	$C_{21}H_{28}N_2O_2$	$[\alpha]_D^{20} + 227^\circ (C)$	188
Sandwicoline	177-178	$C_{21}H_{30}N_2O_2$	$[\alpha]_D^{20} + 202^\circ (C)$	189
Sarpagine	263-64	$C_{19}H_{22}N_2O_2$	$[\alpha]_D^{20} + 54^\circ (P)$	116, 125
Sarpagine-17-methoxy	—	$C_{21}H_{19}N_2O_3$	—	115
Sauveoline	—	—	—	125
Semperflorin	295	$C_{21}H_{26}N_2O$	—	146
Seredamine	297	$C_{21}H_{26}N_2O_2$	$[\alpha]_D^{18} + 60^\circ (C)$	81-84, 115
Seredine	291	$C_{23}H_{30}N_2O_5$	$[\alpha]_D^{20} - 1^\circ (C)$	40, 146
Serpenticine	275-76	$C_{22}H_{22}N_2 \cdot 5H_2O$	—	125
Serpentine	156-57	$C_{21}H_{20}N_2O_3$	$[\alpha]_D^{40} + 188^\circ (B-HCl)$	3, 26, 30, 115, 135
Serpentinine	265-70	$C_{42}H_{44}N_4O_6$	$[\alpha]_D^{25} + 52^\circ (M)$	3, 130
Serpentine-19-epi	—	$C_{21}H_{20}N_2O_3$	—	115
Serpine	213-15	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{20} + 70.1^\circ (P)$	95, 186
Sewerine	245	$C_{20}H_{22}N_2O_3$	—	127
Sitsirikine	208	$C_{21}H_{26}N_2O_3$	$[\alpha]_D - 58^\circ (M)$	137
Tabernaemontanine	215-16	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{25} - 58^\circ (C)$	177
Tetrahydroalstonine	230-31	$C_{21}H_{24}N_2O_3$	$[\alpha]_D^{28} - 98^\circ (C)$	91, 92, 105, 120, 123, 124, 144, 145
Tetraphyllicine	320-22	$C_{20}H_{24}N_2O$	$[\alpha]_D^{28} - 73^\circ (C)$	93-95, 105, 124, 135
Tetraphyllicine-17-O-acetyl	—	$C_{21}H_{26}N_2O_2$	—	129
Tetraphylline	220-23	$C_{20}H_{26}N_2O_4$	$[\alpha]_D^{28} + 21^\circ (P)$	135
Tetraphyllinine	231-34	$C_{22}H_{28}N_2O_5$	$[\alpha] - 35^\circ (P)$	177
Thebaine	195	$C_{19}H_{21}N_3O_3$	$[\alpha]_D^{20} - 270^\circ (P)$	146
Usambarensine	—	$C_{29}H_{28}N_4$	—	101-103, 142
Vellosimine	260	$C_{19}H_{20}N_2O$	—	119, 134
Vincamajine	225	$C_{22}H_{26}N_2O_3$	$[\alpha]_D^{25} - 55^\circ (E)$	178
Volkensine	—	—	—	120, 122, 144
Vomalidine	240-42	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{24} + 318^\circ (E)$	73, 100, 105, 142
Vomifoline	184	—	—	96, 107
Vomilenine	207	$C_{21}H_{22}N_2O_3$	$[\alpha]_D^{20} - 73^\circ (P)$	79, 121, 122, 132, 140
Yohimbine	235-37	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{30} + 105^\circ (P)$	59, 62-64, 111, 115, 116, 123, 124, 128, 134, 138

(continued. . . .)

(Table 1, continue)

α -Yohimbine	213-32	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{30} - 40^\circ$ (E)	59, 62-64, 100, 105, 107, 124, 138, 142, 145
β -Yohimbine	246-49	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{30} - 48^\circ$ (P)	166
γ -Yohimbine	258-59	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{30} - 28.3^\circ$ (P)	146
Yohimbine-3-epi	225	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{20} - 104^\circ$ (P)	146
ψ -Yohimbine	268	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{30} + 27^\circ$ (P)	146
Yohimbine-allo	135-36	$C_{21}H_{26}N_2O_3$	$[\alpha]_D^{30} - 72.7^\circ$ (P)	146
Yohambinine	189-190	$C_{20}H_{26}N_2$	$[\alpha]_D^{20} + 98^\circ$ (M)	192

C = Chloroform; E = Ethanol; M = Methanol; P = Pyridine

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