

CACTUS ALKALOIDS. 50. A COMPREHENSIVE TABULAR SUMMARY*

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ABSTRACT. The published literature on the identification and characterization of cactus alkaloids has mushroomed since the last comprehensive review thirty years ago (130). This report represents an attempt to tabulate (Table 1) all of the currently known alkaloid-bearing cactus species and their contained alkaloids. Species containing uncharacterized alkaloids and species giving negative alkaloid tests are not included. The alkaloids are usually listed by their trivial names; structures can be obtained by consulting the references cited. The survey is believed to be complete through 1980, and the authors request notification of omitted references. Botanical synonyms may be misleading, and readers are referred to the included taxonomic references (7, 9, 10, 12, 13, 28, 30, 46, 95, 151).

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Table 1. Occurrence of Alkaloids in the Cactaceae as Reported in the Literature

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Ariocarpus agavoides</u> (Castañeda) E.F. Anderson	Magueyitos (little agaves)	Tula and Tamaulipas (Mexico)	Hordenine <u>N</u> -Methyl-3,4-dimethoxyphenethylamine <u>N,N</u> -Dimethyl-4-hydroxy-3-methoxyphenethylamine	tlc,gc,gc-ms tlc,gc,gc-ms tlc,gc,gc-ms	19
<u>Ariocarpus fissuratus</u> var. <u>lloydii</u> (Rose) Marshall	Peyote Chaute	Zacatecas and Coahuila (Mexico)	Hordenine <u>N</u> -Methyltyramine	tlc,mp,mmp,ir tlc	102
<u>Ariocarpus fissuratus</u> var. <u>fissuratus</u> (Engel.) Schum.	living rock, chautle, peyote, sunami or dry whiskey, pezuña de venado, peyote cimarron, star cactus, star rock	Zacatecas and Coahuila (Mexico); Texas	Hordenine <u>N</u> -Methyltyramine <u>N</u> -Methyl-3,4-dimethoxyphenethylamine	mp tlc tlc,mp,mmp	47,102,112
<u>Ariocarpus kotschybevanus</u> (Lem.) Schum.	Pezuña de venado, pata de venado, chaute, peyote	Northern and Central Mexico	Hordenine <u>N</u> -Methyltyramine	tlc,mp,mmp,ir tlc,mp,mmp,ir	109,127
<u>Ariocarpus retusus</u> Scheid. <u>Anhalonium prismaticum</u> Lem.	Chaute, chouille, peyote	San Luis Potosi (Mexico)	Hordenine <u>N</u> -Methyltyramine <u>N</u> -Methyl-3,4-dimethoxyphenethylamine <u>N</u> -Methyl-4-methoxyphenethylamine	tlc,mp,mmp,ir tlc,mp,mmp,ir tlc,mp,mmp,ir tlc,mp,mmp,ir	11,47,107,130,131,155

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Ariocarpus schapharostrus</u> Boed.	Chaute	Nuevo Leon (Mexico)	Hordenine N-Methyltyramine N,N-Dimethyl-3,4-dimethoxyphenethylamine N-Methyl-3,4-dimethoxyphenethylamine	tlc,gc,gc-ms tlc,gc,gc-ms tlc,gc,gc-ms tlc,gc,gc-ms	22
<u>Ariocarpus trigonus</u> (Web.) Schum.	Chaute	Mexico	N-Methyl-3,4-dimethoxyphenethylamine Hordenine N-Methyltyramine	tlc,mp,mmp, uv,ir,nmr tlc,mp,mmp, ir tlc	145
<u>Azureocereus ayacuchensis</u> Johns		Peru	Tyramine	tlc,mp,mmp ir	81
<u>Backebergia militaris</u> (Andot) Bravo ex Sanchez Mejorada		Guerrero, Michoacan (Mexico)	3,4-Dimethoxyphenethylamine Heliamine 3-Methoxytyramine Lemaireocereine	tlc,mp,ir,ms tlc,mp,ir, ms,mikes tlc,mp,mmp, ir,ms tlc,mp,mmp, ir,ms,mikes	97,121,149
<u>Carnegiea gigantea</u> (Engel.) Br. and R.	Saguaro, sajuario, pitahaya	Arizona, California (USA); Sonora (Mexico)	Carnegine Gigantine Salsolidine 3-Methoxytyramine 3,4-Dimethoxyphenethylamine	gc,mp gc,mp mp,mmp,ir, nmr,gc-ms gc-ms gc-ms	14,16-18,26, 58,59,138, 140,149
			Arizonine Dopamine	tlc,mp,mmp, ir,nmr,ms gc-ms tlc	
<u>Cereus aethiops</u> Haw.		Argentina, Brazil	Hordenine Tyramine Candicine	tlc,mp,mmp,ir tlc,mp,mmp,ir tlc,mp,mmp	136
<u>Cereus alacriportanus</u> Pfeiff.		Brazil and Paraguay	Hordenine	ir	2
<u>Cereus forbesii</u> O.		Cordoba, Catamarca, Tucuman (Argentina)	Tyramine	ir,nmr,ms	2
<u>Cereus glaucus</u> SD.		Unknown	Tyramine Hordenine	gc gc	2

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Cereus jamacaru</u> DC.		Brazil	Caffeine (unconfirmed) Tyramine	No reported tlc,mp,ir,ms	25,45
<u>Cereus peruvianus</u> (L.) Mill.		Southeastern South America	Tyramine Hordenine	gc gc	2,32,131
<u>Cereus validus</u> Haw.		E. Bolivia to Argentina	3-Nitrotyramine	mp,tlc,uv,ir, nmr,ms	111
<u>Cereus peruvianus monstrosus</u> DC.		Southeastern South America	Tyramine	ir,ms	2.
<u>Coryphantha bumamma</u> (Ehren.) Br. and R.		Morelos, Guerrero (Mexico)	Hordenine N-Methyl-3,4-dimethoxyphenethylamine N-Methyl-4-methoxyphenethylamine	tlc,gc-ms tlc,gc-ms tlc,gc-ms	20,23
<u>Coryphantha calipensis</u> H. Bravo		Calipan (Mexico)	N-Methyl-3,4-dimethoxyphenethylamine Normacromerine β -O-Methylnormacromerine (calipamine) β -O-Methylmacromerine N,N-Dimethyl-3,4,-dimethoxyphenethylamine Hordenine N-Methyltyramine	tlc,gc-ms,mp, mmp, ir tlc,gc-ms,mp, mmp, ir mp,tlc,ms,gc, nmr mp,tlc,gc,ms, nmr tlc,gc-ms tlc,gc-ms tlc,gc-ms	21,23,156
<u>Coryphantha cornifera</u> (DC.) Lem.		Central Mexico	4-Methoxyphenethylamine N-Methyl-3,4-dimethoxyphenethylamine 4-Methoxy- β -hydroxyphenethylamine Hordenine	tlc,gc tlc,gc tlc,gc tlc	60
			Synephrine β -O-Methylsynephrine	tlc tlc	

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Coryphantha cornifera</u> (DC.) Br. and R. var. <u>echinus</u> (Engel.) L. Benson		North Mexico; W. Texas (USA)	<u>N</u> -Methyl-4-methoxyphenethylamine <u>N</u> -Methyl-3,4-dimethoxyphenethylamine Macromerine 4-Methoxy- β -hydroxyphenethylamine Hordenine <u>N</u> -Methyltyramine β - <u>O</u> -Methylsynephrine Synephrine	tlc, mp, mmp, ir tlc, mp, mmp, ir gc, ms nmr, ms tlc, mp, mmp, ir tlc, mp, mmp, ir tlc, nmr, ms tlc	60
<u>Coryphantha duranguensis</u> (Rünge) Br. and R.		Northern Mexico	<u>N</u> -Methyl-3,4-dimethoxyphenethylamine Hordenine	tlc, gc tlc, gc	60
			<u>N</u> -Methyltyramine Synephrine	tlc, gc tlc, gc	
<u>Coryphantha elephanatidens</u> Lem.		Michoacan (Mexico)	<u>N</u> -Methyl-3,4-dimethoxyphenethylamine Macromerine 4-Methoxy- β -hydroxyphenethylamine Hordenine <u>N</u> -Methyltyramine Synephrine <u>N</u> -Methyl-4-Methoxyphenethylamine	tlc, gc tlc tlc, gc tlc, gc tlc tlc tlc	60
<u>Coryphantha greenwoodii</u> H. Bravo		Vera Cruz (Mexico)	<u>N,N</u> -Dimethyl-3,4-dimethoxyphenethylamine Hordenine	tlc, gc-ms tlc, gc-ms	23, 125
			Normacromerine <u>N</u> -Methyl-3,4-dimethoxyphenethylamine β - <u>O</u> -Methylsynephrine Synephrine β - <u>O</u> -Methylnormacromerine	tlc, gc-ms mp, mmp, ir tlc, gc-ms tlc, gc-ms tlc tlc, ir, ms, nmr	

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Coryphantha macromeris</u> (Engel.) Lem.	Doña Ana	Southern N. Mexico, Western Texas (USA); Chihuahua (Mexico)	Macromerine	ir,nmr,ms,uv	15,59,77
<u>Coryphantha macromeris</u> var. <u>runyonii</u> L. Benson	Doña Ana; dumpling cactus	Northern Mexico; S. Texas (USA)	Normacromerine N-Methyl-3,4-dimethoxyphenethylamine N-Methylmetanephrine N-Methyl-4-methoxyphenethylamine	tlc,mp,mmp ir,nmr,tlc,mp,mmp,ir,nmr,ms tlc tlc,mp,mmp,ir,nmr,gc-ms	2,5,8,77-79
			Hordenine Macromerine N-Methyltyramine Metanephrine N-Formylnormacromerine Tyramine Synephrine	tlc,mp,mmp,ir,nmr,ms tlc,mp,mmp,ir,nmr tlc,mp,mmp,ir,nmr tlc,mp,mmp,ir,nmr tlc,mp,mmp,ir,nmr tlc,mp,mmp,ir,gc tlc	
<u>Coryphantha missouriensis</u> (Sweet) Br. and R.	Missouri pin-cusion	Western USA	Hordenine N-Methyltyramine Tyramine N-Methyl-3,4-dimethoxyphenethylamine	tlc,mp,mmp,ir,ms tlc,mp,mmp,ir,ms tlc,ms tlc,ms	122
<u>Coryphantha ottonis</u> (Pfeif.) Lem.		Central Mexico	4-Methoxyphenethylamine Hordenine N-Methyltyramine Synephrine	tlc,gc tlc,gc tlc,gc tlc,gc	60
<u>Coryphantha pectinata</u> (Engel.) Br. and R.		Southern Texas (USA)	N-Methyl-3,4-dimethoxyethylamine N-Methyl-3,4-dimethoxyphenethylamine Macromerine 4-Methoxy- β -hydroxyphenethylamine Hordenine N-Methyltyramine	tlc,gc tlc,gc tlc,gc tlc,gc tlc tlc	41,60

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
			Synephrine β -O-Methylsynephrine	tlc tlc	
<u>Coryphantha poselgeriana</u> (Dietr.) Br. and R.		Nuevo Leon, Zacatecas, Coahuila (Mexico)	4-Methoxyphenethylamine Hordenine	tlc,gc tlc,gc	60
			N-Methyltyramine Synephrine	tlc,gc tlc,gc	
<u>Coryphantha radicans</u> (DC.) Br. and R.		Central Mexico	N-Methyltyramine Hordenine	tlc,gc-ms tlc,gc-ms	23
<u>Coryphantha ramillosa</u> Cutak.		Southern Texas (USA); and northcentral Mexico	N-Methyl-4-methoxy- phenethylamine N-Methyltyramine Synephrine β -O-Methylsynephrine Hordenine	tlc,mp,mmp, ir tlc,mp,mmp ir tlc,mp,mmp ir tlc,mp,mmp, ir tlc,mp,mmp, ir	137
<u>Coryphantha vivipara</u> (Nutt.) Eng.		Manitoba to Alberta (Canada); Kansas, Texas, Colorado, (USA)	Hordenine	tlc,gc-ms	14,23
Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Coryphantha vivipara</u> (Nutt.) Br. and R. var. <u>arizonica</u> (Engelm.) W.T. Marshall		Arizona (USA)	Hordenine	tlc,mp,mmp, ir	62
<u>Dolichothele baumii</u> (Boed.) Werd. and F. Boyb.		Tamaulipas (Mexico)	Dolichotheline	tlc	34
<u>Dolichothele longimamma</u> (DC.) Br. and R.	Peyotillo, peyote	Central Mexico	Dolichotheline Longimamine Longimamosine Longimamidine Longimammatine Longimammamine Normacronerine Synephrine	tlc nmr,ms,ir,uv, mp,mmp nmr,ms,ir,uv, mp,mmp nmr,ms,ir,uv, mp,mmp nmr,ms,ir,uv, mp,mmp nmr,ms,ir,uv, mp,mmp tlc,mp,mmp,ir tlc,mp,mmp,ir	34,80,124,127

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Dolichothele melaleuca</u> (Kar.) Craig		Oaxaca (Mexico)	Dolichotheleine	tlc	34
<u>Dolichothele sphaerica</u> (Dietr.) Br. and R.	peyote	Southern Texas (USA); Northern Mexico	Dolichotheleine β -O-Methylsynephrine N-Methyltyramine Synephrine β -O-Ethylsynephrine (artifact) N-Methylphenethylamine	tlc, ir, nmr, ms tlc, ir, nmr, ms, mp, mmp tlc, ir, nmr, ms, mp, mmp tlc, ir, nmr, ms, mp, mmp tlc, ir, nmr, ms, mp, mmp tlc, ir, nmr, ms, mp, mmp	33, 134, 135
<u>Dolichothele surculosa</u> (Boed.) F. Buxb.		Tamaulipas (Mexico)	dolichotheleine N-Methylphenethyl- amine Hordenine	tlc ir, mp, tlc, mmp, nmr, ms ir, mp, tlc, mmp, nmr, ms	34
			N-Methyltyramine Synephrine Dolichotheleine	ir, mp, tlc, mmp, nmr, ms ir, mp, tlc, mmp, nmr, ms tlc	
<u>Dolichothele uberiformis</u> (Zucc.) Br. and R.	peyote	Central Mexico	Dolichotheleine Ubine Hordenine N-Methyltyramine Longimammatine Synephrine Uberine Longimammamine N-Methyl-3,4-dimethoxy- phenethylamine N-Methyl-4-methoxy- phenethylamine	tlc ms, nmr, ir, mp, mmp tlc tlc tlc ir, mp, tlc ms, nmr, uv tlc tlc, mp, mmp tlc, mp, mmp	2, 80, 126, 127, 130, 131, 155
			Normacromerine	ir, mp, mmp, tlc	
<u>Echinocereus cinerascens</u> (DC.) Rümpler		Central Mexico	N-Methyl-3,4-dimethoxy- phenethylamine N-N-Dimethyl-3,4-dimeth- oxyphenethylamine	tlc, gc, ir, ms tlc, gc, ir, ms	27

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Echinocereus merkerii</u> Hildm.		Durango, Coahuila, San Luis Potosi (Mexico)	<u>N,N</u> -Dimethyl-3,4-dimethoxyphenethylamine <u>N</u> -Methyl-3,4-dimethoxyphenethylamine 3,4-Dimethoxyphenethylamine 3-Methoxytyramine Hordenine Salsoline	mp,mmp,gc-ms, ir mp,mmp,gc-ms, ir gc-ms gc-ms gc-ms gc-ms	
<u>Echinocereus triglochidatus</u> Engelm var. <u>paucispinus</u> Engelm. ex W.T. Marshall	claret cup	S. Texas (USA)	<u>N^α,N^α</u> -Dimethylhistamine	tlc,uv,ir, nmr,ms,mp,mmp	43
<u>Echinopsis eyriesii</u> (Turpin) Zucc.		Southern Brazil; Uruguay; Entre Rios (Argentina)	Hordenine	ir	2,55,131
<u>Echinopsis rhodotricha</u> K. Schum.		Paraguay and Northern Argentina	Hordenine Tyramine	tlc,gc-ms tlc,gc-ms	6
<u>Espositoa huanucensis</u> Ritt.		Peru	Tyramine <u>N</u> -Methyltyramine Hordenine	tlc,mp,mmp, ir tlc,mp,mmp, ir tlc,mp,mmp, ir	96
<u>Gymnocactus aquirreanus</u> Glass and Foster		S. Coahuila (Mexico)	Hordenine <u>N</u> -Methylphenethylamine <u>N</u> -Methyltyramine	tlc,mp,mmp, ir tlc tlc	153
<u>Gymnocactus beguinii</u> (Web.) Backbg.		Coahuila, Zaca Texas (Mexico)	Hordenine <u>N</u> -Methylphenethylamine <u>N</u> -Methyltyramine	tlc tlc tlc	153
<u>Gymnocactus horripilus</u> (Lem.) Backbg.		Hidalgo (Mexico)	<u>N</u> -Methylphenethylamine Hordenine	tlc,mp,mmp, ir tlc	
<u>Gymnocactus knuthianus</u> (Boed.) Backbg.		San Luis Potosi (Mexico)	<u>N</u> -Methylphenethylamine	tlc	41,153
<u>Gymnocactus mandragora</u> (Fric) Bckbg.		Mexico	<u>N</u> -Methylphenethylamine <u>N</u> -Methyltyramine	tlc tlc	153

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria Identifica-tion	References
<u>Lobivia alegriana</u> Backbg.		S.E. Peru	Hordenine N-Methyltyramine Tyramine	tlc tlc tlc	44
<u>Lobivia aurea</u> (Br. and R.) Backbg.		Cordoba (Ar- gentina)	Hordenine N-Methyltyramine Tyramine	tlc tlc tlc	44
<u>Lobivia backebergii</u> (Werd.) Backbg.		La Paz (Bolivia)	Hordenine N-Methyltyramine Tyramine	mp, mmp, ir, tlc mp, mmp, ir, tlc tlc	44
<u>Lobivia binghamiana</u> Backbg.		S.E. Peru	Hordenine N-Methyltyramine Tyramine	mp, mmp, ir, tlc mp, mmp, ir, tlc tlc	44
<u>Lobivia huashua</u> (Weber) W.T. Marshall		Argentina	Hordenine N-Methyltyramine Tyramine	tlc tlc tlc	44
<u>Lobivia pentlandii</u> (Hook.) Br. and R.		S. Peru; N. Bolivia	Hordenine N-Methyltyramine Tyramine	mp, mmp, ir tlc tlc tlc	44
<u>Leocereus bahiensis</u> Br. and R.	Cacto, rabo de raposa	Bahia (Brazil)	Caffeine (uncon- firmed)	none reported	45
<u>Lophocereus schottii</u> (Engel.) Br. and R.	Senita, Totem pole cactus, cana cancerina	Southern Ari- zona (USA); Sonora, Baja California, (Mexico)	Lophocerine Pilocereine Piloceredine	mp, ir, etc. mp, x-ray, ir, etc. mp, ir, etc.	36, 39, 40, 41, 57, 114, 115, 120, 130, 149
<u>Lophocereus schottii</u> (Eng.) Br. and R. var. <u>australis</u> (K. Brand) Borg.		Mexico	Pilocereine	mp, mmp, ir	37
<u>Lophocereus gatesii</u> M.E. Jones		Baja Califor- nia (Mexico)	Pilocereine	tlc, mp, mmp, ir	37
<u>Lophocereus schottii</u> (Eng.) Br. and R. forma <u>mon- strosus</u> Gates and <u>mieckleyanus</u> G. Lindsey	Totem pole cactus	Baja Califor- nia (Mexico)	Pilocereine	tlc, mp, mmp, ir	154

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Lophophora diffusa</u> (Croizat) H. Bravo	Peyote	Mexico	Pellotine Lophophorine Anhalamine Anhalonidine Mescaline O-Methylpellotine	tlc tlc tlc tlc tlc tlc,gc-ms	24,147
<u>Lophophora williamsii</u> (Lem.) Coult.	Biznaga, challote, peyote,mescal, dry whiskey,tuna de tierra, seni, ho, kamaba, devil's root,	North central Mexico; south Texas (USA)	Tyramine N-Methyltyramine Hordenine Candicine	tlc tlc,mp,mmp, ir tlc,mp,mmp, ir tlc	1,2,12,24,47- 53,63-71,73- 76,80,82-86, 88,89,91-94, 100,101,103, 118,130,131, 139-144,147
	Chaute		Mescaline Anhalamine Lophophorine Pellotine O-Methylpellotine N,N-Dimethyl-3- methoxytyramine Dopamine Epinine 3-Methoxytyramine 3,4-Dimethoxyphen- ethylamine 3,4-Dihydroxy-5- methoxyphenethylamine 3-Demethylmescaline N-Methyl-3-hydroxy-4, 5-dimethoxyphenethyl- amine	mp,mmp mp,mmp mp,mmp mp,mmp gc,gs-ms gc,gc-ms gc,gc-ms gc,gc-ms gc,gc-ms gc,gc-ms gc,gc-ms gc,gc-ms gc,gc-ms gc,gc-ms gc,gc-ms	
			N,N-Dimethyl-3-hydroxy- 4,5-dimethoxyphenethyl- amine N-Formyl-3-hydroxy-4,5- dimethoxyphenethylamine N-Acetyl-3-hydroxy-4,5- dimethoxyphenethylamine N-Methylmescaline N-Formylmescaline N-Acetylmescaline N-Formylanhalamine	gc,gc-ms gc-ms gc-ms mp,mmp gc-ms mp,mmp gc-ms	

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
			<u>N</u> -Acetylshalamine	gc-ms	
			Isoanhalamine	gc,gc-ms	
			Anhalinine	mp,mmp	
			<u>N</u> -Formylanhalinine	gc-ms	
			Anhalidine	mp,mmp	
			Anhalotine	ir,nmr,uv	
			Isoanhalidine	gc,gc-ms	
			Anhalonidine	mp,mmp	
			<u>N</u> -Formylanhalonidine	gc-ms	
			Isoanhalonidine	gc,gc-ms	
			<u>O</u> -Methylanhalonidine	mp,mmp	
			<u>N</u> -Formyl- <u>O</u> -Methylanhalonidine	gc-ms	
			Isopellotine	gc,gc-ms	
			Anhalonine	mp,mmp	
			<u>N</u> -Formylanhalonine	gc-ms	
			<u>N</u> -Acetylanhalonine	gc-ms	
			Lophotine	ir,nmr,uv	
			Peyophorine	tlc,gc,ir,ms	
			Mescaline succinimide	gc-ms	
			Mescaline malimide	gc-ms	
			Mescaline citrimide	gc-ms	
			Mescaline maleimide	gc-ms	
			Mescaline isocitrimide lactone	gc-ms	
			Peyoglutan	gc-ms	
			Mescalotan	gc-ms	
			Mescaloxylic acid	gc	
			Mescalorovic acid	gc	
			Peyoxylic acid	gc	
			Peyorovic acid	gc	
			Peyonine	gc	
			Peyoglunal	gc	
			Choline	tlc,gc,ir	

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Mammillaria elongata</u> DC.	golden star	Hildago (Mexico)	Hordenine Synephrine β-O-Methylsynephrine Tyramine N-Methyltyramine	tlc,mp,ump tlc tlc,mp,ump, tlc tlc tlc tlc	152
<u>Mammillaria heyderii</u> Muehl.	Biznaga, biznaga de chilillos, chilito,nipple cactus	New Mexico, Texas (USA)	N-Methyl-3,4-dimethoxy- phenethylamine	tlc,gc-ms	19
<u>Mammillaria microcarpa</u> Eng.		Arizona (USA)	N-Methyltyramine Hordenine	tlc,mp,ump, ir tlc,mp,ump, ir	61
<u>Melocactus delessertianus</u> Lem.		Jalapa (Mexico)	Tyramine	tlc	35
<u>Melocactus maxonii</u> (Rose) Gürke		El Rancho, Salama (Guatemala)	Tyramine	tlc	35
<u>Notocactus ottonis</u> (Lem.) Berg. ex Bckbg. and Knuth.		Brazil, Argentina, Uruguay	Hordenine	gc-ms	32
<u>Obregonia denegrii</u> Fric.	Peyote	Tamaulipas, San Vicente, Ciudad Victoria (Mexico)	Tyramine	tlc,mp,ump, ir	19,41,108
			N-Methyltyramine Hordenine	tlc,mp,ump, ir tlc,mp,ump ir	
<u>Opuntia aurantiaca</u> Lindley		Argentina and Uruguay	Hordenine	gc-ms	32
<u>Opuntia clavata</u> Eng.	Club cholla Dagger cholla	Northwestern and Central Mexico; New Mexico (USA)	N-Methyltyramine Hordenine Tyramine	ir,tlc,mp, ump tlc tlc	150
<u>Opuntia imbricata</u> Baw.		S.W. USA to Central Mexico	Tyramine 3-Methoxytyramine <u>Mescaline</u> 3,4-Dimethoxy-β- phenethylamine	tlc,ms tlc,ms tlc,ms tlc,ms	104
<u>Opuntia invicta</u> Brandege		Lower California (Mexico)	Tyramine	tlc	104

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
			N-Methyltyramine Hordenine	tlc tlc	
<u>Opuntia kleiniae</u> DC.		Texas (USA) to Central Mexico	Tyramine N-Methyltyramine	tlc tlc	104
<u>Opuntia maldonesis</u> Arech.		Punta Ballena (Uruguay)	Hordenine	gc,ms	32
<u>Opuntia schottii</u> Engelm.	Dog cholla	Texas (USA) to Northern Mexico	Tyramine N-Methyltyramine Hordenine	tlc,ms tlc,ms,ir,mp tlc,ms,ir,mp	104
<u>Opuntia spinosior</u> (Engelm.) Toumey	Cane cholla	Arizona, New Mexico (USA); Northern Mexico	Mescaline Tyramine 3-Methoxytyramine 3,4-Dimethoxyphenethylamine	tlc,mikes,mp,ir,ms tlc,mp,ir,ms tlc,mp,ir,ms tlc,ms	80,116
<u>Opuntia stanlyi</u> Engelm. var. <u>kunzei</u> (Rose) L. Benson		Arizona; New Mexico (USA); Northern Mexico	Tyramine N-Methyltyramine	tlc, tlc,ms,ir,mp,mp	104
<u>Opuntia stanlyi</u> var. <u>stanlyi</u> Engelm.		Arizona, New Mexico (USA); Northern Mexico	Tyramine N-Methyltyramine	tlc tlc	104
<u>Opuntia subulata</u> (Mühlenpfordt) Engelm.		Valparaiso (Chile)	3-Methoxytyramine	tlc	104
<u>Opuntia verisicolor</u> Engelm.		Arizona, New Mexico (USA)	Tyramine N-Methyltyramine Hordenine	tlc tlc tlc	104
<u>Opuntia vulgaris</u> Miller		Coast and islands of Brazil; Uruguay; Argentina; interior of Paraguay; Cuba, India, South Africa; Australia (naturalized)	Hordenine	gc,ms	32,42
<u>Opuntia whipplei</u> Engelm. & Bigelow		Arizona, New Mexico (USA)	3,4-Dimethoxyphenethylamine	tlc	104
<u>Pachycereus marginatus</u> DC.) Br. and R.	Organo	Hidalgo, Queretaro, Guanajuato (Mexico)	Pilocerine	mp,mp,ir,uv	37,41,130

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid content	Criteria of Identification	References
<u>Pachycereus pecten-aboriginum</u> (Engel.) Br. and R.	Cardon, hecho, carve, organo, pitahayo	Chihuahua, Sonora, Calima, and Baja California (Mexico)	Carnegine (pectenine) 3-Hydroxy-4-methoxyphenethylamine Salsolidine 3,4-Dimethoxyphenethylamine Heliamine 3-Methoxytyramine Arizonine	mp gc-ms tlc,ms,ir, nmp gc-ms mp,tlc,gc, hplc,ir,nmr, ms tlc,gc,hplc, gc-ms tlc,gc,hplc, gc-ms	25,127,138, 146,149
			Salsoline Isosalsoline	tlc,hplc,gc, gc-ms tlc,gc,hplc, gc-ms	
<u>Pachycereus pringlei</u> (S. Wats.) Br. and R.	Cardon	Sonora, Nayarit, Baja California (Mexico)	Tehuanine Heliamine Lemaireocereine Weberine	tlc,mp,ms,ir, mikes tlc,mp,ms,ir, mikes tlc,mikes tlc,mikes	98,149
<u>Pachycereus weberi</u> (Coul.) Br. and R.	Cardon, candebobe, candelabro	Puebla, Oaxaca (Mexico)	Pellotine Weberidine Anhalonidine Tehuanine Heliamine	tlc,mp,ir tlc,mp,uv,ir, nmr,ms,mikes mp,nmp,ir tlc,mp,uv,ir, nmr,ms,mikes tlc,mp,uv,ir, nmr,ms,mikes	37,99,149
			N-Methylheliamine (oxymethylcorypalline) Nortehuanine Lemaireocereine Weberine	tlc,mp,uv,ir, nmr,ms,mikes tlc,mp,uv,ir, nmr,ms,mikes tlc,mp,uv,ir, nmr,ms,mikes tlc,mp,uv,ir, nmr,ms,mikes	
<u>Pachycereus tehauntep-cannus</u> Mac Doug. and H. Bravo		Mexico	Tepenine Tehuanine	not reported not reported	72

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Pelecypora aselliformis</u> Ehren.	Peyotillo, peyote, hat- chet cactus, peotillo, piote, peyote meco	San Luis Potosi (Mexico)	Hordenine Anhalidine Pellotine Mescaline N-Methylmescaline	tlc,gc-ms tlc,gc-ms tlc,mp,mmp,ir tlc,ms,gc tlc,ms,gc	6,110
			3,4-Dimethoxyphen- ethylamine N-Methyl-3,4-dimethoxy- phenethylamine 3-Demethyltrichocereine	tlc, ms, gc tlc, ms, gc mp, mmp, ir nmr	
<u>Pelecypora pseudopecti- nata</u> Bckbg.		Palmillas (Mexico)	Hordenine	gc-ms	19
<u>Pereskia aculeata</u> Miller		tropical America (Venezuela)	Tyramine	tlc	35
<u>Pereskia autumnalis</u> (Eichlam) Rose		Guatemala	β -Phenethylamine Tyramine	tlc tlc	35
<u>Pereskia corrugata</u> Cutak		Unknown	3,4-Dimethoxy- phenethylamine Mescaline 3-Methoxytyramine Tyramine	tlc, gc tlc, gc tlc tlc	35
<u>Pereskia cubensis</u> Br. and R.		Cuba	Tyramine	tlc	35
<u>Pereskia godseffiana</u> (Sand.) Knuth		tropical America	4-Methoxy- β -hydroxy- phenethylamine	tlc	35
<u>Pereskia grandifolia</u> Haw.		Brazil	3-Methoxytyramine Tyramine	tlc tlc	35
<u>Pereskia grandiflora</u> Hort.		Unknown	β -Hydroxymescaline Tyramine	tlc tlc	35
<u>Pereskia pititache</u> (Karwinsky) Br. and R.		Mexico; Guatemala?	β -Phenethylamine Tyramine	tlc tlc	35
<u>Pereskia tampicana</u> Web.		Tampico (Mexico)	3,4-Dimethoxy- phenethylamine Mescaline 4-Methoxy- β -hydroxy- phenethylamine β -Phenethylamine Tyramine	tlc,gc tlc,gc tlc tlc tlc tlc	35
<u>Pereskiopsis chapistle</u> (Web.) Br. and R. Abbey		Oaxaca	4-Methoxy- β -hydroxy- phenethylamine β -Phenethylamine 3-Methoxytyramine Tyramine	tlc tlc tlc tlc	35
<u>Pereskiopsis scandens</u> Br. and R.		Yucatan (Mexico)	3,4-Dimethoxy- β - phenethylamine Mescaline Tyramine	tlc,gc tlc,gc tlc	35

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Pilocereus gounellei</u> (Web.) Byl. and Rowl.	Chique-chique	Pernambuco & Bahia (Brazil)	Caffeine (unconfirmed)	None reported	45
<u>Pilocereus chrysacanthus</u> (Web.) Byl. and Rowl.		Tehuacan, Puebla, Oaxaca (Mexico)	<u>N</u> -Methyl-3,4-dimethoxy- phenethylamine	tlc,gc,ir, mp,ms	27
<u>Pilosocereus guerreronis</u> (Bckbg.) Byl. and Rowl.		Guerrero (Mexico)	<u>N</u> -Methyl-3,4-dimethoxy- phenethylamine <u>N,N</u> -Dimethyl-3,4-dimethoxy- phenethylamine <u>O</u> -Methylcorypalline	tlc,gc,gc-ms tlc,gc,gc-ms tlc,ms,gc	87
<u>Pilosocereus maxonii</u> (Rose) Byles & Rowley		El Rancho, Salama (Guatemala)	<u>N</u> -Methyl-3,4-dimethoxy- phenethylamine <u>N</u> -Methyl-3-methoxy- tyramine <u>N,N</u> -Dimethyl-3-methoxy- tyramine 3,4-Dimethoxy- phenethylamine Tyramine <u>N</u> -Methyltyramine	tlc,mp,mmp, ir,ms tlc,mp,uv,ms, mmp,ir tlc,mp,mmp, ir,ms tlc,ms tlc tlc	123
<u>Pseudobolivia kermesina</u> Kainz			3,4-Dimethoxy- β - phenethylamine Tyramine	tlc,ms tlc,ms,mp,ir	44
<u>Pterocereus gaumeri</u> (Br. and R.) MacDoug. and Mir.		Yucatan (Mexico)	Pterocereine Deglucopterocereine	tlc,ms,nmr, uv,mp,ir tlc,ms,nmr, uv,mp,ir	106
<u>Selenicereus grandiflorus</u> (L.) Br. and R.	Night bloom- ing cereus, reina de la noche	Jamaica, Cuba, Haiti, Mexico	Cactine (uncharacterized)	gc	14,130,140
<u>Solisia pectinata</u> (B. Stein) Br. and R.	Cochinito, peyotillo, peyote	Tehuacan, Puebla, Oaxaca, (Mexico)	Hordeine <u>N</u> -Methyltyramine	gc-ms gc-ms	19,127
<u>Stetsonia coryne</u> (S.D.) Br. and R.		Northwestern Argentina	Mescaline Tyramine Coryneine Anhalonidine (tr.) Anhalidine (tr.) Oxycandicine <u>N</u> -Methyltyramine 3-Methoxytyramine 3,4-Dimethoxy- phenethylamine	tlc,gc-ms tlc,gc-ms tlc,gc-ms tlc,gc-ms tlc,gc-ms tlc,gc-ms tlc,gc-ms tlc,gc-ms tlc,gc-ms	6,113,130
<u>Trichocereus bridgesii</u> (S.D.) Br. and R.		La Paz (Bolivia)	Mescaline 3,4-Dimethoxy- phenethylamine 3-Methoxytyramine Tyramine	tlc,mp,ir,ms tlc,ms tlc,ir,ms tlc,ms	2
<u>Trichocereus camarguen- sis</u> Card.		Bolivia	Tyramine 3,4-Dimethoxyphene- thylamine 3-Methoxytyramine <u>N</u> -Methyltyramine	tlc,ms tlc,ms tlc,ms tlc,gc	2

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Trichocereus candicans</u> (Gill.) Br. and R.		Northwestern Argentina	Candicine Hordenine N-Methyltyramine Tyramine	mp,mmp tlc,mp,ir tlc,mp,ir tlc	2,53,96, 128,130
<u>Trichocereus chilensis</u> (Colla.) Br. and R.		Atacama, Curico (Chile)	Candicine	tlc, mp,mmp, ir	29
<u>Trichocereus courantii</u> (K. Sch.) Bckbg.		Bahia Blanca, Rio Negro, Rio Colorado (Argentina)	N-Methyltyramine N-Methyl-3-methoxytyra- mine 3,4-Dimethoxyphenethyl- amine Tyramine 2-Methoxytyramine	tlc, gc-ms tlc, gc-ms tlc, gc-ms tlc, gc-ms tlc, gc-ms	6
<u>Trichocereus cuzcoensis</u> Br. and R.		Cuzco (Peru)	3-Methoxytyramine Tyramine Mescaline 3-Hydroxy-4,5-dimethoxy- phenethylamine	tlc, gc-ms tlc, gc-ms tlc, gc-ms tlc, gc-ms	6
<u>Trichocereus fulvianus</u> Ritt.		Chile	Tyramine N-Methyltyramine Mescaline	tlc, gc-ms tlc, gc-ms tlc, gc-ms	6
<u>Trichocereus lamprochlo- rus</u> (Lew.) Bckbg.		Northern Argentina, Bolivia	Hordenine Candicine	tlc,ir unreported	2,130, 133,160
<u>Trichocereus knuthianus</u> Bckbg.		Feru	Tyramine 3-Methoxytyramine	tlc,gc-ms tlc,gc-ms	6
<u>Trichocereus macrogonus</u> (S.D.) Ricc.		South America	Mescaline 3,4-Dimethoxyphen- ethylamine 3-Methoxytyramine Tyramine	tlc,ms,ir tlc,ms tlc,ms tlc,ms	2,130
<u>Trichocereus manguinii</u> Bckbg.		Paraguay	Tyramine N-Methyltyramine Hordenine 3-Methoxytyramine	tlc,gc-ms tlc,gc-ms tlc,gc-ms tlc,gc-ms	6

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Trichocereus pachanoi</u> Br. and R.	Ciganton	Peru and Ecuador	Mescaline 3,4-Dimethoxyphenethylamine Hordenine Tyramine 3-Methoxytyramine 3,5-Dimethoxy-4-hydroxyphenethylamine 3,4-Dimethoxy-5-hydroxyphenethylamine	tlc, mp, mmp, ir, ms tlc, ms, ir tlc, ms tlc, ms, gc tlc, ms, ir, gc, mp, mmp tlc, ms tlc, ms	2,3,31,90,119,148
<u>Trichocereus pasacana</u> (Web.) Br. and R.		Bolivia; Argentina	Candicine Tyramine N-Methyltyramine Hordenine	tlc, mp, mmp, ir tlc tlc tlc	105
<u>Trichocereus peruvianus</u> Br. and R.		Peru	Tyramine 3-Methoxytyramine Mescaline 3,4-Dimethoxyphenethylamine 3,5-Dimethoxy-4-hydroxyphenethylamine 2-Chloromescaline (artifact)	tlc, ms, mp, mmp, ir tlc, ms, mp, mmp, ir tlc, mp, mmp, ir, ms tlc, ms tlc, mp, mmp, ir, ms tlc, mp, mmp, ms, uv, nmr, mikes	2,117
<u>Trichocereus purpureopilosus</u> Wgt.		Sierra Cordoba, (Argentina)	Tyramine N-Methyltyramine	tlc, gc-ms tlc, gc-ms	6
<u>Trichocereus santiaguensis</u> (Speg.) Bckbg.		Santiago del Estero (Argentina)	Tyramine Hordenine	tlc, gc-ms tlc, gc-ms	6
<u>Trichocereus schickendantzii</u> (Web.) Br. and R.		Northwestern Argentina	Hordenine N-Methyltyramine	tlc, ms tlc, gc	2
<u>Trichocereus skottsbergii</u> Bckbg.		Coquimbo (Chile)	Hordenine N-Methyltyramine	tlc, gc-ms tlc, gc-ms	6
<u>Trichocereus spachianus</u> (Lam.) Ricc.		Western Argentina	Candicine Hordenine N-Methyltyramine Tyramine	ir mp, mmp, ir tlc tlc	2,96,130
<u>Trichocereus striogosus</u> (SD.) Br. and R.		Merdoza, San Juan (Argentina)	Hordenine	tlc, gc-ms	6

Table 1. (continued)

Botanical Name	Common Name	Habitat	Alkaloid Content	Criteria of Identification	References
<u>Trichocereus taquimbalensis</u> Card.		Bolivia	Mescaline Hordenine 3,4-Dimethoxyphenethylamine 3-Methoxytyramine	tlc,gc-ms tlc,gc-ms tlc,gc-ms tlc,gc-ms	6
<u>Trichocereus terscheckii</u> (Parm.) Br. and R.	Cardon grande	Northwestern Argentina	Trichocereine Mescaline Anhalonine	mp tlc,ms,ir —	2,56,1 129-132
<u>Trichocereus tbelegonus</u> (Web.) Br. and R.		Catamarca, Tucuman (Argentina)	Hordenine N-Methyltyramine	tlc,gc-ms tlc,gc-ms	6
<u>Trichocereus thelegonoides</u> (Speg.) Br. and R.		North Argentina	Hordenine	tlc,gc-ms	6
<u>Trichocereus tunariensis</u> Card.		Bolivia	Tyramine Hordenine	tlc,gc-ms tlc,gc-ms	6
<u>Trichocereus validus</u> (Monv.) Bckbg.		Bolivia	Mescaline	tlc,gc-ms	6
<u>Trichocereus verdermannianus</u> Bckbg.		Tupiza, Charcoma (Bolivia)	Mescaline 3,4-Dimethoxyphenethylamine Tyramine 3-Methoxytyramine 3,5-Dimethoxy-4-hydroxyphenethylamine	tlc,ir,ms tlc,ir,ms tlc,ms tlc,ir,ms tlc,ms	3
<u>Turbinicarpus pseudo-macrochele</u> (Bckbg.) F. Buxb and Bckbg.		San Luis Potosi (Mexico)	Hordenine	tlc,gc	19
<u>Wigginsia erinacea</u> (Haw.) D.M. Porter		Uruguay	Hordenine	gc,ms	32
<u>Wigginsia macrocantha</u> (Arech.) D.M. Porter		Uruguay	Hordenine	gc,ms	32
<u>Wigginsia tephraantha</u> (L. and O.) D.M. Porter		Uruguay	Hordenine	gc,ms	32

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