



and frequently causes toxic symptoms should be made in order to check the presence of the active constituent of this local wild yam.

The allied tropane group of alkaloids from plants in the different classes or different phyla of the vegetable kingdom may pave way to the relationship of enzyme system and the biogenesis in chemotaxonomy.

Historical

Alkaloids previously isolated from *Datura* species.

The alkaloids isolated from *Datura* are summarized as follows:-

<u><i>Datura arborea</i> Linne'</u>		
Plant Parts	Alkaloids	References
Plant, leaves, flowers, roots.	Atropine, Duboisine (Hyoscyamine), Scopolamine, Aposcopolamine	31

<u>Datura alba</u> Nees.		
Plant Parts	Alkaloids	References
Seed	Hyoscyamine	32
Leaves, Pericarp, Stem	Scopolamine	28

<u>Datura candida</u> (Persoon.) Safford		
Plant Parts	Alkaloids	References
Aerial parts	Atropine, Meteloidine, noratropine, Oscine, Norscopolamine, Scopolamine.	33
Roots	Atropine, Meteloidine, Noratropine, Oscine, Norscopolamine, Scopolamine, 3α , 6β -ditigloyloxytropine- 7βol ; 3α -tigloyloxytropine, Tropine.	

Datura ceratocaula Ort.

Plant Parts	Alkaloids	References
Leaves, Stems, Roots, Pericarp.	Atropine, Scopolamine	34
Pericarps and Roots	Atropine, Scopolamine, Cuskygrine (not tropane) and 4 unidentified alkaloids	

Datura cornigera Hooker.

Plant Parts	Alkaloids	References
Leaves, Flowers, Pericarps.	Scopolamine, Noratropine	35, 36
Roots	(-)3,6-ditigloyloxytropane, 7-hydroxy-3,6-ditigloyloxytro- pane, Scopolamine, Hyoscyamine, Atropine, 3,6-dihydroxytropane.	

<u>Datura discolor</u> Bernh.		
Plant Parts	Alkaloids	References
Leaves, Stems, Roots, Root- Barks.	Scopolamine	35

<u>Datura ferox</u> Linne'		
Plant Parts	Alkaloids	References
Plant	Apoatropine, Hyoscine (Scopola- mine), Hyoscyamine, Meteloidine	
Roots	7-hydroxy-3,6-ditigloyloxytropane, (-)-3,6-ditigloyloxytropane, 3-tigloyloxytropane, Tropine, Pseudotropine.	36 37

<u>Datura inoxia</u> Mill.		
Plant Parts	Alkaloids	References
Leaves, Herbs, Roots.	Hyoscyamine, Scopolamine, Meteloidine.	38
Roots.	7-hydroxy-3,6-bis(tigloyloxy)- tropane, (-)-3,6-bis(tigloyloxy) tropane, Tropine, Pseudotropine.	39

<u>Datura metel</u> Linné' . (<u>D. alba</u> Nees. and <u>D. fastuosa</u> Linné' .)		
Plant Parts	Alkaloids	References
Plants.	Scopolamine, Hyoscyamine, Meteloidine (Indian species).	40
Roots.	Hyoscyamine, Norhyoscyamine, Littorine, 3,6-ditigloyloxytro- pane, Scopolamine, Tigloidine, Cuscohygrine, Tropine and Pseudotropine.	41
Seeds.	Fastunine, Fastudine, Fastusidine.	42

<u>Datura meteloides</u> D.C.		
Plant Parts	Alkaloids	References
Aerial parts	Apohyoscine (6,7 ^S -Epoxy-3 α -atro- pyloxytropane), Scopolamine, Meteloidine, Norhyoscyamine.	41
Roots	Littorine, 3,6-ditigloyloxytropan -7-ol, Scopolamine, Hyoscyamine, Meteloidine, Norhyoscine (Nor- scopolamine), Norhyoscyamine, 3 α -tigloyloxytropane, Cuscuhy- grine 3,6-Dihydroxytropane, Tropine and \star Tropine.	

<u>Datura quercifolia</u> H.B.K. or (<u>D. villosa</u> Fernald.)		
Plant parts	Alkaloids	References
Plants	Atropine, Scopolamine, and 5 unidentified alkaloids.	43

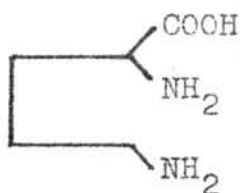
<u>Datura suaveolens</u> Humb. & Bonpl. ex Willd.		
Plant Parts	Alkaloids	References
Aerial parts	Scopolamine, Aposcopolamine, Norscopolamine, Atropine, Nor-atropine, 3,6-ditigloyloxytropan-7-ol, Meteloidine, (+)-3-tigloyloxytropan-6-ol.	44
Roots	Scopolamine, Meteloidine, Atropine, Littorine, 3-tigloyloxytropane-6-ol, Tropine, Cuscohygrine.	41

<u>Datura sanguinea</u> Ruiz. & Pavon.		
Plant Parts	Alkaoids	References
Aerial Parts	Scopolamine, Hyoscyamine, Nor-scopolamine, Aposcopolamine, Scopoline.	44
Roots	3 α , 6 β -ditygloyloxytropane, 3,6-ditygloyloxytropan -7-ol, Scopolamine, Hyoscyamine, Littorine, Meteloidine, Norscopolamine, Tigloidine, Cuscohygrine.	

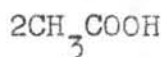
<u>Datura stramonium</u> Linne'		
Plant Parts	Alkaloids	References
Roots	Littorine, 3,6-ditigloyloxytropan -7-ol, 3,6-ditigloyloxytropane, Hyoscyamine, Hyoscine, Meteloidine, Apotropine, Tropine and * tropine.	40
Leaves	Hyoscyamine and Scopolamine	

Structure of Tropane alkaloid

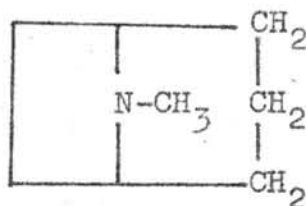
Tropane is a bicyclic compound formed by the condensation of a pyrrolidine precursor (ornithine) with three acetate derived carbon atoms. Both pyrrolidine and piperidine ring system may be discerned in the molecule.



ornithine



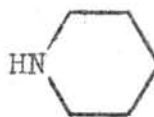
acetate



tropane

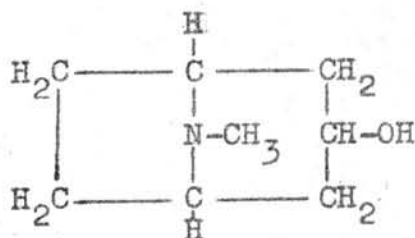


Pyrrolidine

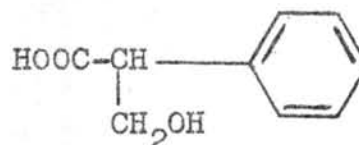


Piperidine

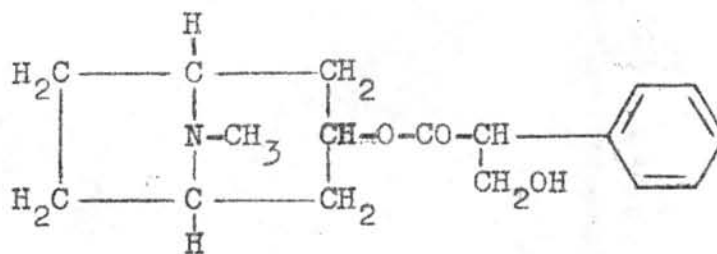
The 3-hydroxy derivative of tropane is known as tropine. Esterification of it with l-tropic acid yields hyoscyamine (tropine tropate) which may be racemized to form atropine



tropine



tropic acid



Hyoscyamine, Atropine

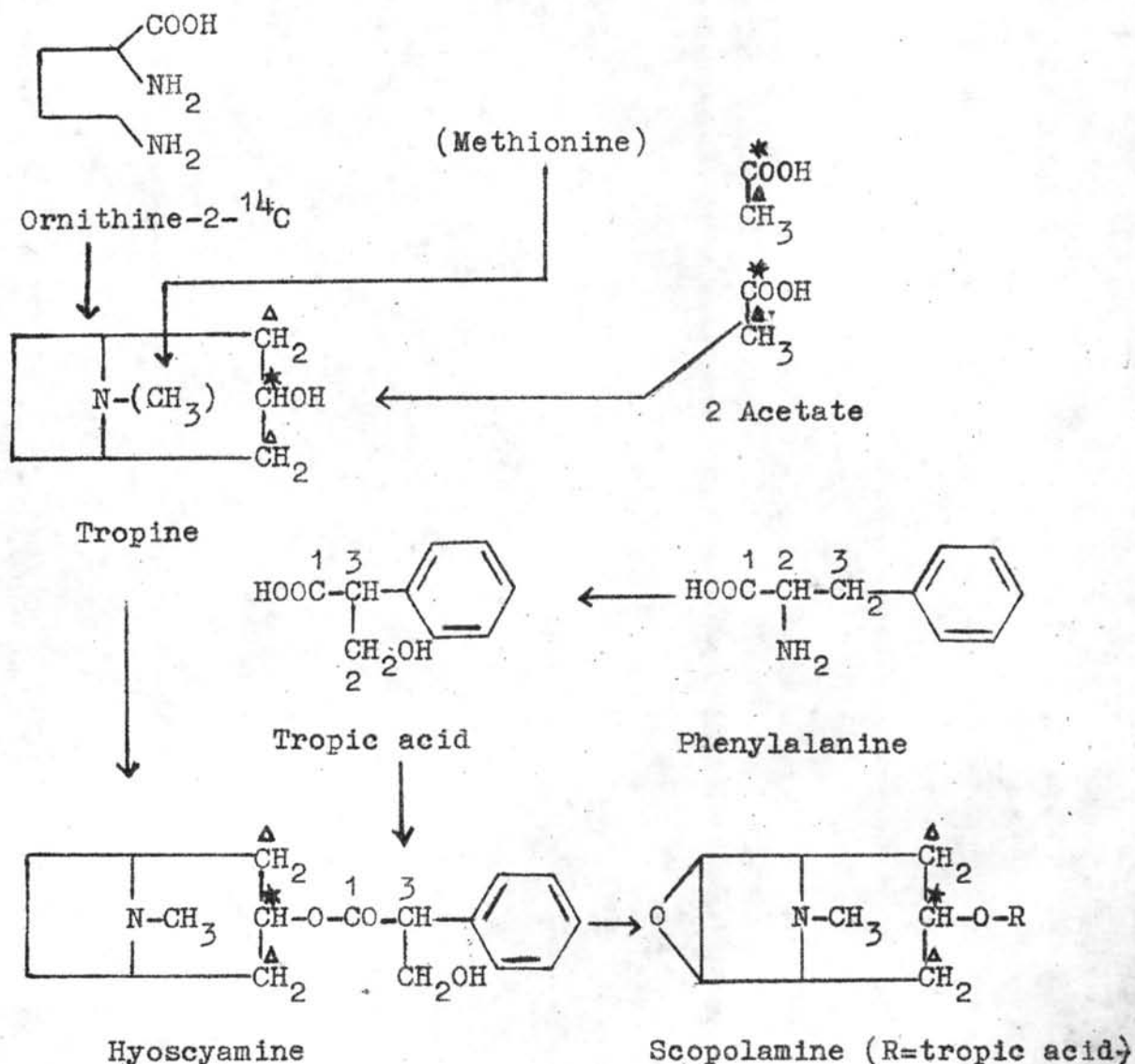
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Biosynthesis of tropane alkaloids.

Example:- Hyoscyamine and scopolamine.

Because of the commercial importance of these alkaloids, their biosynthesis has been extensively investigated, especially in *Datura* species. Feeding studies with labeled ornithine have revealed that this amino acid is incorporated stereospecifically to form the pyrrolidine ring of tropine. The remaining three carbon atoms derive from acetate, thus completing the piperidine moiety. Methylation results via transmethylation from a suitable donor, eg., methionine, to complete the tropine nucleus.

Phenylalanine is the precursor of tropic acid. Tracer studies have shown that the side chain of the amino acid undergoes a novel type of intramolecular rearrangement during the conversion. Esterification of tropic acid with tropine produces hyoscyamine. Scopolamine is formed from the latter by mediation of a highly specific enzyme system. These reactions are summarized as follows:-



General formula and some physical properties of tropane³ alkaloids are shown in Table 1 and 2 page 20 and 21 :-

Table 1. Tropane alkaloids of

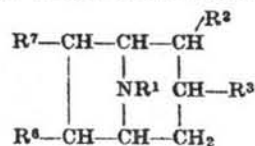


TABLE I

Compound	Formula number	Molecular formula	M.p. (°C)	[α] _D	Substituents	
					R ¹	R ²
Tropine	1	C ₈ H ₁₅ ON	64	—	CH ₃	H
Pseudotropine	2	C ₈ H ₁₅ ON	108	—	CH ₃	H
Atropine	3	C ₁₇ H ₂₃ O ₃ N	116-17	—	CH ₃	H
(-)-Hyoscyamine	4	C ₁₇ H ₂₃ O ₃ N	108-111	-21° (A)	CH ₃	H
Tropacocaine	5	C ₁₅ H ₁₉ O ₂ N	49	—	CH ₃	H
Tigloidine	6	C ₁₃ H ₂₁ O ₂ N	Liquid	—	CH ₃	H
Convolamine	7	C ₁₇ H ₂₃ O ₄ N	114-15	—	CH ₃	H
Convolvine	8	C ₁₆ H ₂₁ O ₄ N	115	—	H	H
Phyllalbine	9	C ₁₆ H ₂₁ O ₄ N	209-10	—	CH ₃	H
Poroidine	10	C ₁₂ H ₂₁ O ₂ N	Liquid	—	H	H
Isoporoidine	11	C ₁₂ H ₂₁ O ₂ N	Liquid	(+)	H	H
Valerine	12	C ₈ H ₁₅ O ₂ N	212	-25° (A)	CH ₃	H
Valeroidine	13	C ₁₃ H ₂₃ O ₂ N	85	-9° (A)	CH ₃	H
6-Tigloyl-(+)-dihydroxy-tropane	14	C ₁₃ H ₂₁ O ₃ N	Amorphous	-28.1 (CHCl ₃)	CH ₃	H
Ditigloyl-(+)-dihydroxy-tropane	15	C ₁₈ H ₂₇ O ₅ N	Amorphous	-21.5° (A)	CH ₃	H
Teloidine	16	C ₈ H ₁₅ O ₃ N	168-9	—	CH ₃	H
Meteloidine	17	C ₁₃ H ₂₁ O ₄ N	141-2	—	CH ₃	H
Tigloylmeteloidine	18	C ₁₈ H ₂₇ O ₅ N	Amorphous	—	CH ₃	H
Scopine	19	C ₈ H ₁₃ O ₂ N	76	—	CH ₃	H
Scopolamine	20	C ₁₇ H ₂₁ O ₄ N	82-3	—	CH ₃	H
Hyoscine	21	C ₁₇ H ₂₁ O ₄ N	59	-18° (A)	CH ₃	H
Oscine	22	C ₉ H ₁₃ O ₂ N	110	—	CH ₃	H
(-)-Ecgonine	23	C ₉ H ₁₅ O ₃ N	205	-45° (W)	CH ₃	β-COOH
(-)-Cocaine	24	C ₁₇ H ₂₁ O ₄ N	98	-16° (C)	CH ₃	β-COOCH ₂
(+)-Pseudoecgonine	25	C ₉ H ₁₅ O ₃ N	254-7	+21°	CH ₃	α-COOH
(+)-Pseudoecgonine	26	C ₁₇ H ₂₁ O ₄ N	46-47	—	CH ₃	α-COOCH ₃
α-Truxilline	27	C ₃₈ H ₄₆ O ₈ N ₂	Amorphous	—	CH ₃	β-COOCH ₃
β-Truxilline	28	C ₃₈ H ₄₆ O ₈ N ₂	Amorphous	—	CH ₃	β-COOCH ₃
Cinnamylcocaine	29	C ₁₉ H ₂₃ O ₄ N	121	-47°	CH ₃	β-COOCH ₃

known constitution and configuration 3

in general formula

R ³	R ⁶	R ⁷	Plant source
α-OH	H	H	<i>Atropa belladonna</i> , <i>Datura innoxia</i> , etc.
β-OH	H	H	<i>Datura innoxia</i> (<i>Fastuosa</i>)
α-(±)-O-Tropoyl	H	H	<i>Atropa belladonna</i>
α(-)-O-Tropoyl	H	H	<i>Atropa acuminata</i> , <i>A. belladonna</i> , etc.
β-O-Benzoyl	H	H	<i>Erythroxylum coca</i>
β-O-Tigloyl	H	H	<i>Datura innoxia</i> (<i>Fastuosa</i>)
α-O-Veratroyl	H	H	<i>Convolvulus pseudocantabrica</i>
α-O-Veratroyl	H	H	<i>Convolvulus pseudocantabrica</i>
α-O-Vanilloyl	H	H	<i>Phyllanthus discoides</i> Muell. arg.
α-O-3-Methylbutyryl	H	H	<i>Duboisia myoporoides</i>
α-O-(+)-2-Methylbutyryl	H	H	<i>Duboisia myoporoides</i>
α-OH	β-OH	H	<i>Erythroxylum coca</i>
α-O-3-Methylbutyryl	β-OH	H	<i>Datura sanguinea</i> , <i>Duboisia myoporoides</i>
α-OH	H	β-O-Tigloyl	<i>Datura cornigera</i>
α-O-Tigloyl	H	β-O-Tigloyl	<i>Datura ferox</i> , <i>D. innoxia</i> , etc.
α-OH	β-OH	β-OH	—
α-O-Tigloyl	β-OH	β-OH	<i>Datura ferox</i> , <i>D. innoxia</i> (<i>Fastuosa</i>), etc.
α-O-Tigloyl	OH	β-O-Tigloyl	<i>Datura ferox</i> , <i>D. innoxia</i> , etc.
α-OH		β-Oxide	<i>A. belladonna</i> , <i>Datura innoxia</i> , etc.
α-O-(±)-Tropoyl		β-Oxide	Presumably nonnatural, formed by racemization of hyoscine
α-O(-)-Tropoyl		β-Oxide	<i>A. acuminata</i> , <i>A. belladonna</i> , etc.
	α-Oxide		—
β-OH	H	H	—
β-O-Benzoyl	H	H	<i>Erythroxylum coca</i> , <i>E. monogynum</i>
β-OH	H	H	—
β-O-Benzoyl	H	H	—
β-O-α-Trixillyl	H	H	<i>Erythroxylum coca</i>
β-O-β-Trixillyl	H	H	<i>Erythroxylum coca</i>
β-O-Cinnamyl	H	H	<i>Erythroxylum coca</i> , <i>E. monogynum</i>

Table 2

Compound	Formula	Crystal form	m.p. °C	Solubility [α] _D	Mol. wt.	Botanical sources	References
Apoatropine Syn. (Atropamine, Atropyltro- peine)	$C_{17}H_{21}ON_2$ $ \begin{array}{c} H_2C-CH-CH_2 \quad C_6H_5 \\ \quad \quad \\ N-CH_3 \quad CHOCO-C=CH_2 \\ \\ HC-CH-CH_2 \\ \\ H_2 \end{array} $	Crystal (Ether)	62	Slightly sol. in H ₂ O, Readily sol. in organic solvents (except light petroleum ether)	271.35	<u>Atropa</u> <u>belladonna</u> Linne'	45, 27 4

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Apoatropine		Aurichloride	110-112					45, 27, 4
		fine yellow needle (H ₂ O)						
		Chloroplati- nate yellow glistening scale (H ₂ O)	212-214					
		Hydrobromide needles	248					
		Hydrochloride white leaflets (H ₂ O)	237-239					

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Apoatropine		Mercuri- chloride	115					45, 27, 4
		Picrate yellow needle (H ₂ O)	166-168					
Apoxyoscine	C ₁₇ H ₁₉ O ₃ N	Rhomboi- dal plate (Pet. ether)	79-80		0° (EtOH)			4, 46
Syn. Aposco- polamine.	$ \begin{array}{c} \text{HC}-\text{CH}-\text{CH}_2 \quad \text{C}_6\text{H}_5 \\ \quad \quad \\ \text{O} \quad \text{N}-\text{CH}_3 \quad \text{CHO} \quad \text{CO} \quad \text{C}=\text{CH}_2 \\ \quad \quad \\ \text{HC}-\text{CH}-\text{CH}_2 \end{array} $							

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Apohyoscine		Aurichloride amorphous.	178-179					4, 46
		Hydrochloride stout needles (H ₂ O)			0° (H ₂ O)			
		d-hydrogen tartrate	95-97		8.59 (H ₂ O)			
		Methiodide Pearly leaflets (dec.)	238					
		Picrate	117-118					
		Nitrate	157					

Compound	Formula	Crystal form	m.p. °C	Solubility	n_D	Mol. wt.	Botanical sources	Ref.
Atropine dl-hyoscyamine, dl-tropyl tropate.	$C_{17}H_{23}O_3N$ $ \begin{array}{c} H_2C-CH-CH_2 \quad C_6H_5 \\ \quad \quad \\ N-CH_2-CHOCO-CH \\ \quad \quad \\ H_2C-CH-CH_2 \quad CH_2OH \end{array} $	long spear	116-117	in EtOH (1:3), in $CHCl_3$ (1:2), in ether (1:60), in Benzene (1:60), in boiling H_2O (1:35)	0.289.38		<u>Atropa</u> <u>belladonna</u> Linne' <u>Datura</u> <u>stramonium</u> Linne'	44, 27, 4

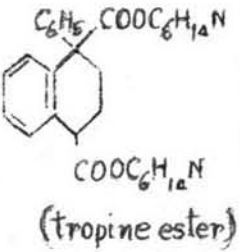
Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Atropine		Auribromide	120					44, 27, 4
		chocolate color prism (H ₂ O-HCl)						
		Aurichloride	137-139					
		yellow crystal (H ₂ O).						
		Chloroplatinate	207-208					
		monoclinic crystal						
		Sulfate (needle)	194					



Compound	Formula	Crystal form	m.p. °C	Solubility	[α] _D	Mol. wt.	Botanical sources	Ref.
Atropine		Hydrobromide colorless needles (EtOH)	162					44, 27, 4
		Hydrochloride	165					
		Picrate Rectangular plate	175-176					

Compound	Formula	Crystal form	m.p. °C	Solubility (g)	Mol. wt.	Botanical sources	Ref.
dl-scopolamine. Syn. Atroscine	$C_{17}H_{21}NO_4 \cdot H_2O$ $ \begin{array}{cccc} HC-CH-CH_2 & & H & \\ & & & \\ O & N-CH_3 & CHOCOC & C_6H_5 \\ & & & \\ HC-CH-CH_2 & & CH_2OH & \end{array} $	long prism Monohydrate Dihydrate (EtOH-H ₂ O) Auribromide leaflet (H ₂ O-HBr)	82-83 56-56.5 38-40 209-210	very slightly sol. in H ₂ O, Soluble in alc, CHCl ₃ , ethers, oils	321.36		4

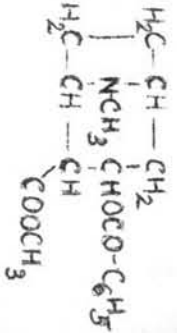
Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Bot. sources	Ref.
dl-scopolamine.		Aurichloride (Bat shaped crystal)	214-215					4
		(H ₂ O-HCl)						
		Hydrobromide	181-182					
		Picrate. Rosette of needle (H ₂ O)	173.5-174.5					
		Chloroplatinate (Yellow ppt.)	165					
		Ethiodide octahedra (H ₂ O)	170					

Compound	Formula	Crystal form	m.p. °C	Solubility	M.D.	Mol. wt.	Botanical sources	Ref.
Belladonnine Syn. Isotropylditropeine, Tropol isotropate, Ditropol isotropate	$C_{34}H_{42}O_2N_4$  <p>(tropine ester)</p>	Cubes (ethyl acetate) Aurichloride (yellow powder) Chloroplatinate, amorphous solid	129 120 --	Sparingly sol. in H ₂ O and Pet. ether. Sol. in alc, benzene, CHCl ₃ , Ethyl acetate		542.69	<u>Atropa belladonna</u> Linné	4, 27

Compound	Formula	Crystal form	m.p. °C	Solubility	n_D	Mol. wt.	Botanical sources	Ref.
Belladonnine		Hydrochloride (spear-like crystal)	195-196					4, 27
Butropine (Isobutyryltropeine)	$C_{12}H_{21}O_2N$	oil.				212	Duboisia leichardtii F. Muell.	47
		Hydrobromide (prism)	242					
		Chloroplatinate, Golden needles.	149					
		Picrate	224-225					

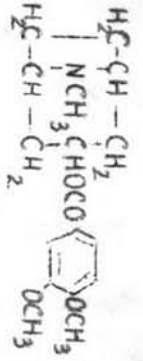
Compound	Formula	Crystal form	m.p. °C	Solubility	Mol. wt.	Botanical sources	Ref.
α cocaine	$C_{17}H_{21}O_4N$ $ \begin{array}{c} H_2C-CH-CH_2 \begin{array}{l} \diagup COOCH_3 \\ \diagdown \end{array} \\ \quad \\ NCH_3 \quad C \\ \quad \\ H_2C-CH-CH_2 \begin{array}{l} \diagdown COOCH_3 \\ \diagup \end{array} \end{array} $	<p>Four side prism (Pet. ether)</p> <p>Aurichloride golden leaves (MeOH)</p> <p>Hydriodide (Hydrate) Glistening needle.</p>	<p>87-88</p> <p>222 (dec.)</p> <p>192</p>	<p>Sol. in ether, alc. $CHCl_3$, benzene.</p> <p>insol. in H_2O</p>	303	<u>Erythroxylon coca</u> Lam.	4

Compound	Formula	Crystal form	m.p. °C	Solubility	[α] _D	Mol. wt.	Botanical sources	Ref.
cocaine		Hydrochloride Needle or prism. (Amyl acetate)	180 (dec.)					4
		Methiodide Quadratic plates. (CH ₃ OH)	220					
		Picrate Golden yellow prism.	195					
		Phosphomo- lybdate	--					


Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Botanical sources	Ref.
1-cocaine	$C_{17}H_{21}O_4N$ 	Prism	187-188	1:600 H ₂ O	-16.15°	<u>Erythroxyton</u>	4,
Syn. β -cocaine		(CHCl ₃) (0.1 mm)	1:270	(CHCl ₃)			
2 β -Carbome- thoxy-3- β benzoxytro- peine, Benzoyl methylecgonine		monoclinic	97-98	(H ₂ O 80°C) 1:6.5 alc. 1:0.7 CHCl ₃ 1:3.5 ether 1:30-50 liq. petrolatum	$[\alpha]_D^{18} = -35^\circ$ C=1 in 50% alc. $[\alpha]_D^{20} = -16^\circ$ C=4 in CHCl ₃		
		Aurichlo- ride	--				
		Chloro- platinate	--				

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Bot. sources	Ref.
l-cocaine		Hydrochloride Prism (ethyl alc.)	200-202					4,27
		Mercurichloride Fine needle (EtOH + Ether)	152.5					
		Nitrate (hydrate) Deliquescent crystal.	58-63					
		Phosphomolybdate Picrate yellow powder.	-- --					

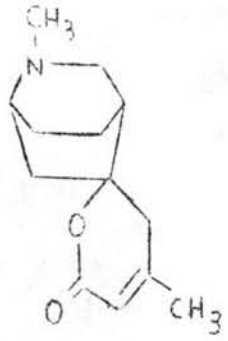
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Compound	Formula	Crystal form	m.p. °C	Solubility $[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Convolamine Syn. Convolvamine veratroly tropeine	$C_{17}H_{23}O_4N$ 	Dense prism (Pet. ether) Aurichloride Reddish yellow needled (H ₂ O-HCl)	114-115 201-202	Freely sol. in alc., acetone, CHCl ₃ , benzene. Sparingly sol. in ether, pet. ether, and hot water.	305.24	<u>Convolvulus pseudacanthabricus</u> Schrenk.	48.

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Bot. sources	Ref.
Convolamine		Chloroplatinate	216-217					48
		Orange prismatic needles (H ₂ O-HCl)						
		Hydrochloride	237-239					
		White crystal (C ₂ H ₅ CH)						
		Methiodide needles	275-276					
		(H ₂ O)						
		Pucrate yellow	263-264					
		glistening leaflets (dec.)						
		(H ₂ O)						
		Methyliodide needle	258					
		(H ₂ O)						

Compound	Formula	Crystal form	m.p. °C	Solubility (w/D)	Mol. wt.	Botanical sources	Ref.
Convolvine Syn. Vera- troylnortro- pine	$C_{16}H_{21}NO_4$ 	Needle (Pet. ether) Aurichloride yellow glistening leaflets. Chloropla- tinate	115 217 (dec.) 240-241 (dec.)	Sol. in EtOH, CHCl ₃ , acetone. Sparingly sol. in ether, pet. ether, hot water.	291.34	<u>Convolvulus</u> <u>pseudocan-</u> <u>tabricus</u> Schrenk.	49.

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Convolvine		Hydrochloride (C ₂ H ₅ OH)	261					49
		Methiodide cluster of needles (H ₂ O)	230-231					
		Nitrate crystal (C ₂ H ₅ OH)	212-213					
		Oxalate Glistening leaflets (C ₂ H ₅ OH)	265-266					
		Picrate yellow needles (C ₂ H ₅ OH)	261-263					

Compound	Formula	Crystal form	m.p. °C	Solubility ^{[α]_D}	Mol. wt.	Botanical sources	Ref.
Dioscorine	C ₁₅ H ₁₉ N ₂ O	Greenish yellow plate (EtOH)	43.5	Sol. in H ₂ O, EtOH, acetone, CHCl ₃ . Slightly sol. in ether, benzene, pet. ether	221.29	<u>Dioscorea hispida</u> Dennst. <u>Dioscorea hersuta</u> Blume.	27,4
		Aurichloride (hydrate) citron-yellow needles	171				

* $\lambda_{\max} = 215 \text{ m}\mu$
($\epsilon = 10,160$)

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Dioscorine		Chloroplatinate	211					27, 4
		Orange yellow platelets						
		Hydrobromide	207					
		White crystal (EtOH, acetone)						
		Hydrochloride dihydrate. Needle or diamond shaped (EtOH)	204		+4.66			
		Methaurichloride	188					
		Yellow leaflets (H ₂ O)						

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D^{20}$	Mol. wt.	Botanical sources	Ref.
Dioscorine		Methiodide	213			289.36		27, 4
		Picrate	187					
		yellow needled						
		Oxalate	69.5-70.5					
Hyoscyamine, 3-tropanyl- s-tropate; l-tropic acid ester with tropine; l- tropine tro- pate; Daturine; Duboisine; l-hyoscyamine Levsin.	C ₁₇ H ₂₃ O ₃ N $ \begin{array}{c} \text{HC} - \text{CH} - \text{CH}_2 \\ \quad \quad \\ \text{NCH}_3 \quad \text{CHCO} \quad \text{CH}_2 \\ \quad \quad \\ \text{CH}_2 \quad \text{CH} \quad \text{CH}_2\text{OH} \\ \quad \\ \text{CH}_3 \quad \text{H} \end{array} $	Silky tetra- gonal needles (EtOH)	108.5	1:281 H ₂ O 1:69 ether, 1:150 benzene, 1:1 CHCl ₃ Freely sol. in EtOH, dil. acid	$[\alpha]_D^{20} =$ -21 (C=1 EtOH)		<u>Hyoscyamus</u> <u>niger</u> L. <u>Atropa</u> <u>bella-</u> <u>donna</u> L. <u>Datura</u> <u>stramo-</u> <u>nium</u> L.	4, 27

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Bot. sources	Ref.
Hyoscyamine		Hydrobromide (deliquescent crystal)	152					27,4
		Hydrochloride	149-151					
		Methylbromide (Crystal)	210-212					
		Sulfate (Needle, EtOH)	206		$[\alpha]_D^{15} = -29$ C=2			
		Oxalate (Prism)	176					
		Aurichloride Yellow plate (dil. HCl)	--					
		Platinichloride	206					
		Picrate (leaflets)	165-166					

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Meteloidine. 5-(5,6,7-tropametriol) tiglate, 6,7-dihydroxy-5-tigloyloxytropane.	$C_{13}H_{21}O_4N$ $ \begin{array}{c} \text{HO} - \text{HC} - \text{CH} - \text{OH} \\ \qquad \qquad \\ \text{N} \text{CH}_3 \quad \text{CH}_2 \\ \qquad \\ \text{CH}_2 \quad \text{CHOCOC} = \text{CHCH}_3 \\ \\ \text{CH}_3 \end{array} $	Plate needle from benzene Hydrobromide dihydrate (Chisel-shaped needle) (H ₂ O)	141-142 250	Freely sol. in alc., CHCl ₃ , acetone. Sparingly sol. in H ₂ O, ether, Benzene	0°		<u>Datura meteloides</u> D.C. <u>Datura ferox</u> L. <u>Erythroxylum australe</u> F. Muell.	48, 57

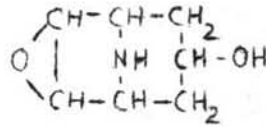
* absorption spectra = 217 m μ
($\epsilon = 12,200$)

Compound	Formula	Crystal form	m.p. °C	Solubility $[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Meteloidine		Aurichloride hemihydrate stout yellow needle (dil, EtOH) Picrate, yellow plates (EtOH)	149-150 177-180				48, 37
Nor-atropine	$C_{16}H_{21}O_3N$	Crystal (acetone-ether) Monohydrate	113-114 73	Moderately sol. in ether, acetone, H_2O	0° 275		4, 13

Compound	Formula	Crystal form	m.p. °C	Solubility	[α] _D	Mol. wt.	Botanical sources	Ref.
Norepinephrine	$ \begin{array}{c} \text{H}_2\text{C}-\text{CH}-\text{CH}_2 \\ \quad \quad \\ \text{H} \quad \quad \text{NH} \\ \quad \quad \quad \\ \quad \quad \quad \text{HC}-\text{CH}-\text{CH}_2 \\ \quad \quad \quad \quad \quad \\ \quad \quad \quad \text{H} \quad \quad \text{CH}_2\text{OH} \\ \quad \quad \quad \\ \quad \quad \quad \text{CHOCO-CH} \\ \quad \quad \quad \\ \quad \quad \quad \text{C}_6\text{H}_5 \end{array} $	<p>Aurichloride</p> <p>Dull-yellow leaflets (EtOH dil.)</p> <p>Hydrochloride</p> <p>Silky filaments (EtOH-acetone)</p> <p>Oxalate (Crystal H₂O)</p> <p>Picrate (needles)</p> <p>Sulfate (Long needle)</p>	<p>156-157</p> <p>193</p> <p>247-248</p> <p>227</p> <p>257</p>					4, 13

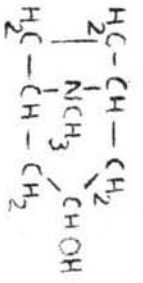
Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Norhyoscyamine Syn. 1-tropic acid 3-nor-tropanyl ester, Pseudohyoscyamine, Solandrine.	$C_{16}H_{21}O_3N$ $ \begin{array}{c} \text{H}_2\text{C} \\ \\ \text{H}_2\text{C}-\text{CH}-\text{CH}_2 \\ \quad \\ \text{N} \quad \text{H} \\ \\ \text{CH} \\ \\ \text{CH}_2 \\ \\ \text{CH} \\ \\ \text{CH}_2 \\ \\ \text{CH} \\ \\ \text{CH}_2\text{OH} \end{array} $	Crystal (acetone)	140.5	Slightly sol. in H_2O , ether. Sol. in EtOH, $CHCl_3$, Sparingly sol. in acetone.	$[\alpha]_D^{20} = -23$ (in alc.)	257.34	<u>Scopolia</u> <u>japonica</u> <u>Mandragora</u> <u>officinarum</u> <u>Duboisia</u> spp.	4, 27
		Aurichloride Golden scale (H_2O)	178-179					

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Norhyoscyamine.		Chloroplatinate trihydrate	132-141					8, 27
		Reddish yellow prism.						
		Hydrochloride (EtOH-ether)	207					
		Oxalate Prism (acetone-H ₂ O)	245-246					
		Picrate	220					
		Yellow needle H ₂ O (dec.)						
		Sulfate	249					
		Silky needles (acetone-H ₂ O)						

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Norscopoline (Scopoligenin)	$C_7H_{11}O_2N$ 	Prism (EtOH, CHCl ₃ ether)	205-206	Sol. in H ₂ O, EtOH, CHCl ₃ . Sparingly sol. in ether, Pet. ether.		141		50
		Aurichlo- ride.	236					
		Hydrochlo- ride. Board needles H ₂ O	280					

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Nortropine; 3-Nortropamine; Tropigenine; 8-azabicyclo 3,2,1 octan- 3-ol.	$C_{13}H_{17}ON$ $\begin{array}{c} H_2C-CH-CH_2 \\ \quad \quad \\ \quad NH \quad CH-OH \\ H_2C-CH-CH_2 \end{array}$	Colorless leaflets (Toluene)	233			127		50
		Aurichloride	215-216					
		Orange plate (C ₂ H ₅ OH)	(dec)					
		Chloroplatinate	247					
		Orange plate (C ₂ H ₅ OH-H ₂ O)						
		Hydrochloride	285					
		Nitrate Glisten ing leaflets (CH ₃ OH)	186-187					
		Picrate Yellow crystalline powder (C ₂ H ₅ OH-H ₂ O)	170-171					

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	ref.
Poriodine	$C_{12}H_{21}O_2N$ $ \begin{array}{c} H_2C \\ \\ H_2C-CH-NH \\ \\ CH_2 \\ \\ CHOCOCCH_2 \\ \\ CH_2 \\ \\ CH_3 \end{array} $	Hydrobromide Small plate (EtOH-ether)	224-225		0° (H ₂ O)	221	<u>Duboisia</u> <u>myopcroides</u> R. Br.	4,51
		Methiodide Pearly lamina (EtOH-ether)	289 (dec)					
		Oxalate Glistening lamina (H ₂ O)	301-302					
		Picrate Golden yellow prism (Acetone -H ₂ O)	172					

Compound	Formula	Crystal form	m.p. °C	Solubility $(\alpha)_D$	Mol. wt.	Botanical sources	Ref.
Pseudotropine, 3 β -Tropanol; 3-pseudotropanol.	$C_8H_{15}ON$ 	Orthorhombic bipyramidal (Pet. ether+ benzene) Needles benzene-ligroin.	108-109	Freely sol. in water, alc., benzene.	141.21	<u>Datura innoxia</u> . Mill.	27, 4
		Aurichloride Yellow plate and needles (H ₂ O)	225 (dec.)				

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Pseudotropine.		Hydrochloride	282					
		Needles from alc.	(dec.)					
		Picrate	259					
		Dimorphous yellow prism						
		(H ₂ C)						
1-scopolamine.	C ₁₇ H ₂₁ NO ₄	Sirup		1:9.5 H ₂ O	-18°	303.5	<u>Datura</u>	4,
Syn. Hyoscine;				Freely sol	EtOH.		<u>metel</u> L.	27.
6 β ,7 β -Epoxy-3 α -				in hot	-28°			
tropanyl-s-(-)				water,alc.	H ₂ O			
tropate;6,7 Epoxy				ether,CHCl ₃ ,	C=2.7			
tropane tropate;				acetone.				
Tropic acid ester				Sparingly				
with scopine.				sol. in Pet.				
				ether, ether.				

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
l-scopolamine.	$C_{17}H_{21}O_4N$ 	Monohydrate	59				<u>Datura metel</u> Linné.	4, 27
		Hydrobromide	195					
		Orthorhombic sphenoidal crystal (H ₂ O)						
		Hydrochloride	200					
		Crystal (acetone)						
		Aurichloride	209					
		Yellow needles or tablets (H ₂ O)	(dec.)					
		Auribromide	192					
		Reddish scale from dil. aq. HBr.						
		Picrate	188					
Yellow prism (H ₂ O)								
Methyl bromide Monohydrate	214							

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Tigloidine. Syn. Tiglylpseudotropine; β - Tigloyloxytropane; Tiglic acid ester with pseudotropine; Tiglyssin.	$C_{13}H_{21}NO_2$ $ \begin{array}{c} \text{HC}-\text{CH}-\text{CH}_2 \\ \quad \quad \\ \text{H}_2\text{C}-\text{N}-\text{CH}-\text{CH}_2 \\ \quad \quad \\ \text{CH}_3 \quad \text{CHOC}=\text{C} \\ \quad \\ \text{CH}_2 \quad \text{CH}_3 \\ \\ \text{CH}_3 \end{array} $	Colorless syrup. Hydrobromide Tabular crystal (H ₂ O) Aurichloide Golden yellow plates (acetone-H ₂ O)	234-235 213.5- 214	Sol. in CHCl ₃	0°	223.31	<u>Duboisia</u> <u>myoporoides</u> R.Br. <u>Latura</u> <u>inoxia</u> Miller.	4, 52,

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Tigloidine		Methiodide Squar plates (EtOH-ether)	244-245					4,52
Tropine. Syn. β -Tropanol; 2,3-dihydro- β - α - hydroxy-8-methyl nor tropidine; 2,3-dihydro- β - α - hydroxy tropidine.	$C_8H_{15}ON$	Hygroscopic plate from ether.	63-64	Freely sol. in H_2O , alc. Sol. in ether, $CHCl_3$		141.21	<u>Atropa</u> <u>belladonna</u> Linne'. <u>Datura</u> <u>innoxia</u> . Mill.	27, 4

Compound	Formula	Crystal form	m.p. °C	Solubility [α] _D	Mol. wt.	Botanical sources	Ref.		
Valeroidine	$C_{13}H_{23}O_3N$ $ \begin{array}{c} \text{HC} - \text{CH} - \text{CH}_2 \\ \quad \quad \\ \text{H}_2 \quad \text{OH} \quad \text{O} \\ \quad \quad \\ \text{HC} - \text{CH} - \text{CH}_2 \\ \quad \quad \\ \text{NCH}_3 \quad \text{CHOC} \quad \text{CH}_3 \\ \quad \quad \\ \text{CH}_2 \quad \text{CH}_2 \quad \text{CH}_3 \\ \quad \quad \\ \text{CH}_2 \quad \text{CH}_2 \quad \text{CH}_3 \end{array} $	Laminae crystal.	85	-9° (EtOH)		<u>Duboisia</u> <u>nyoporoides</u> R.Br.	53		
		Aurichloride Yellow oil.			-4° (H ₂ O)				
		Hydrobromide	170-		+5°				
		Small needle	172		(H ₂ O)				
						+2.5° (EtOH)			
		Methiodide	205.5-						
Six-sided laminae (EtOH-ether)	206								

Compound	Formula	Crystal form	m.p. °C	Solubility	$[\alpha]_D$	Mol. wt.	Botanical sources	Ref.
Valeroidine	$ \begin{array}{c} \text{HC} - \text{CH} - \text{CH}_2 \\ \quad \quad \\ \text{H}_2\text{C} - \text{N} - \text{CH} - \text{CH}_2 \\ \quad \quad \\ \text{CH} - \text{CH} - \text{CH}_2 \\ \quad \\ \text{CH}_3 \quad \text{CH}_3 \\ \text{CHO} \quad \text{OH} \\ \text{O} \quad \text{O} \end{array} $	Oxalate	202					53
		Prismatic needles						
		Oxidation product	136		-16.6°			
		Pearly laminae (acetone)				(EtOH)		
		Hydrolysis product	200					
		Yellow tubulas crystal (acetone- ether)						
		Picrate Needles (H ₂ O)	152-153					