

“More than you need to know?”

Trout's Notes #D-2
Second 2002 printing with minor revisions
Adapted for webviewing March 2004

Trout's Notes
on
the Genus *Desmodium*
(Chemistry, Ethnomedicine, Pharmacology, Synonyms and Miscellany)

Compiled and edited by K. Trout
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A Better Days Publication

"More than you need to know?"

Trout's Notes #D2 (3-2002)

The Genus Desmodium

(Chemistry, Ethnomedicine, Pharmacology, Synonyms and Miscellany)

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Cover: *Desmodium gangeticum* leaves



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Desmodium gangeticum

Desmodium species (*D. incanum*?)
found growing on the
slopes of Haleakala,
Maui, Hawaii

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LEGUMINOSAE

Papilionaceae: Hedysareae, Desmodiinae

[Also classified as LEGUMINOSAE: Fabaceae.]

Desmodium =Phyllodium =Hedysarum (often
but not always.) =**Meibomia**

Inoculate with Rhizobium **CB-627** .
Commercial cow-pea inoculant works well. [Ed.
As also does *Lespedeza* inoculant.]

Likes alluvial, limestone or sandy soil.
Flowers the second year. DUKE 1981.
Genus includes 170 tropical and subtropical
species. CAIUS 1989: page 42

Genus includes 350-450 spp.
Name is from the Greek, “*desmos*”: “bond” or
“chain” and “*hode*”: “like”; in reference to the
resemblance of the jointed seed pods to links of a
chain. ALLEN & ALLEN 1981

Many species are commonly called *Beggar's
Lice*, *Beggarweed*, *Tick clover* or *Tick trefoil* in
reference to the seeds which are covered with
tiny hooked hairs that enable them to tightly
adhere to fabrics and animal skins (Velcro-like)
and allows seed distribution by passing animals.

The genus is important in establishing erosion
control, ground cover and wildlife protection in
burned or other lands cleared of vegetation. Once
other plants begin to predominate, *Desmodium*s
usually disappear due to the increased shading.

Some such as *D. gangeticum* and *D.
heterocarpon* are of value in controlling weeds
and erosion in sandy areas.

As will be noticed below, many species of
Desmodium are highly valued in folk medicine for
a variety of uses.

A representative few include: febrifuges, treat-
ments for abscesses, acne, catarrh, dysentery, eye
diseases, infections and liver diseases.

While numerous of their many contained alka-
loids are known to be pharmacologically active,
only 4 are active as entheogens. Hallucinogenic
activity has been proven only for DMT and 5-
MeO-DMT and their N-oxides. These water
soluble N-oxides are converted to their parent
compounds when smoked [or they can be dis-
solved in acetic acid and reduced to their parents
by adding an excess of zinc dust (stir for ~30
minutes then neutralize the acid with base and
recover with a nonpolar solvent)]

Others possibly exist but have not yet seen
evaluation in humans. Animal studies published in
GHOSAL 1972a strongly suggest that 5-Methoxy-N-
methyltryptamine may also be active but this must
be viewed as tentative indications since animal
models frequently fail in both directions as predic-
tors of hallucinogenic activity and any human
bioassays are unknown. One or more of the 6-
methoxylated β -carbolines MAY be active but
beyond known and demonstrated anti-cholinest-
erase activity, this is not yet proven. [GHOSAL 1972a
reported them as possibly weakly entheogenic with
a prolonged duration.]

Normacromerine, present in low concentrations
in *D. tiliaefolium* is also suggested as a hallucino-
gen based entirely on animal studies. N-Methyla-
tion of active phenethylamines abolishes
hallucinogenicity in every known instance. IT
seems less than likely that normacromerine and
macromerine are exceptions. It also has apparently
seen no evaluation in humans. (None of the other

phenethylamines present are hallucinogenic.)

An odd side-note:

A rare (and fatal) human disease called 'kuru' is characterized by staggering and madness. [Primary symptoms: Ataxia and decreased coordination leading to dementia, paralysis, slurred speech and visual disturbances. While the incubation period may last up to 30 years, death generally occurs within a month of the appearance of symptoms. There is no known treatment.]

This is a disease, primarily limited to the Highlands of New Guinea, which is caused by a prion (an infectious protein capable of reverse transcription into RNA) and usually is transmitted by the ritual consumption (ritual cannibalism) of the raw brains of infected dead relatives. Due to modern attempts to suppress cannibalism, its incidence is on a steady decline.

Although no doubt entirely coincidental, we find the common name for *Desmodium intortum*, "**Kuru Vine**", to be rather curious in light of the fact many identical phenethylamines, tryptamines, other indolics, and β -carbolines that exist in some species of *Desmodium* also occur in the important forage crop *Phalaris*; a genus which is occasionally implicated in the development of severe neurological disorders in ruminants characterized by "**staggers**" (Unlike *Desmodium*. So far, we unable able to find documentation of similar problems resulting from *Desmodium* spp.)

Many (but not most) species of *Desmodium* are highly valued as forage material

Including, but not limited to: *Desmodium barbatum*, *D. canum*, *D. discolor*, *D. intortum*, *D. latifolium* and *D. nicaraguense*. These are cultivated in some regions as such.

Desmodium heterophyllum also provides good forage but is said to produce a low yield of material.

C.C.J. Culvenor 1973 went so far as to claim "...there are no reports of adverse effects in grazing animals" but L.J. Webb 1948 mentioned "**string halt**" being reported in horses grazing on *D. brachypodum* and "**Chillagoe disease**" similarly thought to result from *D. umbellatum* (both in Australia). [Chemistry has not been reported for either.]

Alkaloids known to be potentially toxic to grazing animals have been reported from *Desmodium* species. However, phenethylamines such as N-Methyltyramine, Hordenine and Candicine have thus far been observed at substantial levels only in the roots.

Others such as Gramine, Tryptophan derivatives and Indole Acetic Acid have been found in the leaves only in small concentrations.

Indole acetic acid and tryptophan derivatives may not be directly toxic to grazing animals but can be metabolized by the gut flora of some ruminants (cattle but not goats or sheep) to 3-Methylindole.

3-Methylindole was demonstrated by Carlson and coworkers to be the direct causative agent of Acute Bovine Pulmonary Emphysema. [Carlson et al. 1972]

While *Desmodium* species may serve as valuable fodder or forage, representing no threat to grazing animals, a blanket assumption of safety for the genus is unwarranted.

***Desmodium adscendens* (Sw.) DC**

[= *Hedysarum adscendens* SWARTZ. = *Hedysarum caespitosum* POIR. = *Desmodium caespitosum* (POIR.) DC. = *Desmodium strangulatum* THW.]

Used medicinally in West Tropical Africa

CAIUS 1989: page 42

Stem-leaf powder used in Ghana for medical treatment of asthma. (Daily dosage is 1 to 2 tablespoons of dry powder given in warm water)

Effective as prophylaxis against asthma attacks; ineffective as treatment for attacks.

Provides protection against acetylcholine- and histamine-aerosol-induced bronchospasms.

Extract inhibits anaphylactic contraction of guinea-pig ileum.

Extracts also reduce sensitivity of smooth muscles to histamine but in the presence of high levels of histamine only prolong the time required to reach maximum contraction.

Chemical evaluations not performed.

M.E. ADDY & E.M.K. AWUMEY 1984

See also pharmacological evaluation by N'GOUEMO *et al.* 1996.

“Mbɛyɛ.ɔ”

“*Amor seco*”, “*Beggar-lice*”, “*Margarita*”

Infusion for nervousness or in baths for vaginal infections.

Believed to re-attract a mate who's affection has strayed.

Considered to have magic powers.

Said to be used as contraceptive.

Also, leaf tea as external wash to cause lactation in dry mothers.

DUKE 1994: page 64

“*Beggarlice*” (English)

“*Pega-pega*” (Panamanian Spanish)

Leaves used for consumption, convulsions, venereal sores & applied (with lime juice) to wounds.

DUKE & VASQUEZ MARTINEZ 1986

Africa: “*Lo a guo*”

Cameroon: “*Tombolombo*”

Ivory Coast: “*Acoumengate*”

Liberia: “*Loa guo*”

Sierra Leone: “*Koli-niki*” (“Leopard's ground nut”), “*Ndogbo-nikil*” (“Bush groundnut”) and “*Te-yundo*” (from the compounded words for “groundnut” and “bush”).

Leaf is used for bronchial asthma, colic, constipation, convulsions, cough, ringworm, venereal sores and for dressing wounds.

AYENSU 1978: page 149.

Negative screening by BOUQUET and by BOUQUET & DEBRAY.

Leaves used for antidote in poisonings, blennorrhoea [Ed.; i.e. an excessive discharge of mucus; also used as an obsolete term for gonorrhoea], colds, constipation,

convulsions, cough, epilepsy, tinea [Ed.; in French, *teigne* may also be used to refer to skin diseases such as ringworm], venereal diseases, and vertigo.

MOTT also includes an interesting ‘magical’ use:

When a person [has a business matter to attend to, is suffering from ‘troubles’ or ‘problems’], a heap of the leaves is made into a mixture with earth and spread on the body. After this, they are [to get up and go out (raise up?) into] the sun; making sure that they are not seen by anyone. After doing, this everything is said to go fine.

[My translation is a bit shaky, the original is below]

[“*Si un Mozombo a une “AFFAIRE”, ils pile des feuilles qu’il mélange à de la terre. Il doit se frotter le corps avec cette préparation au lever du soleil, sans que personne le voie. Alors, tout se passera bien.*”]

Elizabeth MOTTE 1980: page 376.

Occurs in Africa, America, India, Malaysia, Melanesia, Sri Lanka, & Thailand.

SANJAPPA 1991: p. 149.

***Desmodium axillare* (Sw.) Kuntze**

Used medicinally in West Tropical Africa

Known as “*Amor seco*”, “*Pega pega*”

Said to be used similarly to *D. adscendens*.

DUKE 1994: page 64

***Desmodium barbatum* (L.) Benth.**

“*Wild senna*” (British Honduras)

VON REIS ALTSCHUL 1973: entry # 1766.

Used medicinally in Madagascar.

CAIUS 1989: page 42

***Desmodium brachypodium* A. Gray.**

“*Tick trefoil*”

Suspected (along with *Glycine tabacina*) of causing “string-halt” in horses, April 1940. Near Stanthorpe in Queensland, Australia. [Queensland Herbarium Records] WEBB 1948: p. 84.

***Desmodium cajanifolium* (HBK) Kuntze**

Known as “*Amor seco*”

Used to treat shock

DUKE 1994: page 64

Desmodium canum (J.F.GMEL.) SCHINZ &

THELL.

[= *Desmodium supinum* (Sw.) DC. and *Desmodium frutescens* (JACQ.) SCHINDL.]

“*Kaimi clover*”, “*Creeping beggar-weed*.”

Tolerates acid soil and warm, wet climates. Valued in Hawaii and Florida as forage.

Root extract was used in Cuban hospitals to treat wounds (during their wars of independence).

ALLEN & ALLEN 1981: page 229 citing LEÓN & ALAIN 1951.

Desmodium caudatum (THUNB.) DC

[= *Catenaria caudata* (THUNB.) SCHINDL. = *Catenaria laburnifolia* (POIR.) BENTH. = *Hedysarum caudatum* THUNB. = *Hedysarum laburnifolium* POIR. = *Meibomia caudata* (THUNB.) O. KUNTZE = *Meibomia laburnifolia* (POIR.) O. KUNTZE = *Desmodium laburnifolium* (POIR.) DC.]

青酒缸

In roots (4:1 ratio/ major: minor):

N,N-Dimethyltryptamine (major alkaloid) (0.087% by dry weight) (recovered 388 mg of purified alkaloid from 3.39 grams crude alkaloid but would have recovered 446.5 mg. if they had used all of their picrate. If they had used all of their crude alkaloid fraction (11.1 gm) their recovery would have been 1.46 grams.)

Bufotenine-N-oxide (minor alkaloid- 0.03%)

In stem:

Bufotenine (major alkaloid) (0.04% by dry weight) (from 6.9 grams of crude residue from chromatographic fraction. If all picrate had been used: 4.3 gm from 10.75 kg of stems.)

N,N-Dimethyltryptamine (minor alkaloid- 0.0035%)

Bufotenine-N-oxide (minor alkaloid- 0.004%)

UENO *et al.* 1978

[Ed.: It must be noted that their step of partitioning the residue of a methanolic extract between Ethyl acetate and water would have most likely resulted in a partial loss of DMT into the Ethyl acetate. It must also be noted that leaves were not analyzed.]

Collected in May.

Western region of Japan = Chinese drug “*Moh-Ts'ao*”

“*Misonaoshi*”: Japanese name for plant.

UENO *et al.* 1978

Pinyin: qīngjiǔ gāng

Uses: Plant: analgesic, antipyretic, antiseptic, detoxicant and insecticide. Whole plant is decocted for abdominal cramps in women, boils, carbuncles, dysentery, duodenal ulcers, fever, gastroenteritis, influenza, measles and mastitis. [cites N.I.H. 1974]

DUKE & AYENSU 1985

Occurs in Bhutan, Burma, China, India (Western to Eastern Himalayas up to 1350 meters, in Assam, Manipur, Meghalaya, Tripura and Uttara Pradesh), Korea, Japan, Ryukyu, Sri Lanka and Taiwan.

SANJAPPA 1991: page 150.

Desmodium cephalotes (ROXB.) WALL.

[= *Desmodium triangulare* (Retz.) Merr. = *Hedysarum cephalotes* (Roxb.) Wall ex Wight & Arn. = *Hedysarum triangulare* Retz. = *Hedysarum umbellatum* Roxb.]

In Stem-Roots (from 3.2 kg.):

Hordeanine (major) (120 mg.)

Tyramine (87 mg.)

Phenethylamine (24 mg.)

Candicine (46 mg.)

(±) salsolidine (28 mg.)

choline (57 mg.)

unidentified quaternary base (22 mg.)

In leaf (total leaf alkaloid 0.0048%):

Phenethylamine (major)

Tyramine (minor)

Salsolidine (trace)

GHOSAL & MEHTA 1974

[= *Desmodium triangularis* (Retz.) Merr.]

“*Karabija*”

Roots are used for rheumatism.

Unspecified parts used for diarrhea, eye cataracts, and stomach-ache.

JAIN 1991: p. 72.

“*Different parts are used*” for bronchial spasms and cough, as a cure for dysentery and as a central stimulant. GHOSAL & MEHTA 1974

Occurs throughout India (in Eastern Himalayas up to 1500 meters).

Also in Australia, Bangladesh, Bhutan, Burma, Cambodia, China, Malesia, Nepal, Sri Lanka and Thailand.

SANJAPPA 1991: page 163.

Grows in the Northern Circars, Hills of the Deccan and Carnatic and Western Ghats in India. Said to occur up to 3000 feet. Component of forest undergrowth, occurring with teak in the south and with Sal in the north of India.

GHOSAL & MEHTA 1974

Desmodium dichotomum (RETZ.) MERR.

[= *Desmodium diffusum* (Willd.) DC = *Desmodium quinquangulatum* (Roxb.) Wight = *Hedysarum articulatum* Roxb. = *Hedysarum dichotomum* Willd. = *Hedysarum diffusum* Willd. = *Hedysarum quinquangulatum*]

“*Chirola*”

Whole plant is used for fevers and stomach-ache.

JAIN 1991: p. 72.

Occurs in Burma, China, Eritrea, Ethiopia, India (in Peninsula, Bihar, Gujarat, Rajasthan, Uttar Pradesh and W. Bengal), Indonesia, Nigeria and Sudan.

SANJAPPA 1991: page 152.

Desmodium discolor VOGT.

Brazilian shrub grown as forage.

UPHOF 1968: p. 176.

Desmodium distortum MACB.

Called “*Engorda caballo*” [“Horse fattener”] in Guatemala.

VON REIS ALTSCHUL 1973: #1767.

Desmodium dunni

Used as beans in China.

von Reis Altschul 1973: #1770.

Desmodium floribundum

Hypaphorine in root and stem-leaf

GHOSAL 1972a (citing MEHTA 1973: p. 38)



Desmodium gangeticum



Desmodium gangeticum DC.

[= *Desmodium maculatum* (L.) DC. = *Aeschinomene gangetica* (L.) Poir. = *Aeschinomene maculata* (L.) Poir. = *Hedysarum collinum* Roxb. = *Hedysarum gangeticum* L. = *Hedysarum maculatum* L.]

Observations noted during 1993 field trials.

Container grown had 1/4 the branches of field planted specimens.

Incredibly tough plants even as seedling. Very drought tolerant.

Handles extreme sun exposure although both the leaf and plant size stays smaller. Foliar feeding burns easily.

Shade to partial shade grown plants started flowering later but leaf size was much larger. Set seeds later but in much heavier groupings. Seed production started at several months of age on plants in full sun. With those in shade; it was several months later, if at all. Plants showing good nodulation had the largest and best growth but did not flower the first year.

Plants stunted in heavy clay.

Did well in potting soil.

Did well in sandy loam.

Highest losses occurred in rich soil.

Will repeat in 1994.

Flower colors observed, sometimes mixed on a given plant: white, pink, purple and pink and purple.

K.TROUT 1993-observation. Yellowish-white flowers in heavier axillary groupings than usual during August in 4 year old plants. 1997.

Thrives in good garden dirt. Plant 1 ft. to 18” apart.

Easy from seed. New plants start readily from dropped seeds. May not set seed in colder climates the first year.

Needs some winter protection to ensure survival in spring. Top surface of leaves often turns red in winter.

tlc by J. APPLESEED (unpublished research 1994-1996) detected no alkaloids until the end of the second year of growth at which point 5-MeO-DMT started to show up in small amounts. DMT began to become detectable during the third year; co-occurring with 5-MeO-DMT. (Roots and aerial portions assayed.) Plants grown from seed obtained via otj and JLH.

“Small shrub to 4” covered with grey downy hair. Very rare outside of India, where it finds use in herbal medicine. Its Sanskrit name *saumya* means “rich in soma juice” and had led scholar David Flattery to postulate the Vedic Soma potion was perhaps a Peganum/Desmodium ayahuasca analog, due to its concentrations of tryptamines.”

...otj 1995 catalog

Note on the Chemistry summary which follows:

The published data is reported as encountered.

All discrepancies have been left intact.

Where it says ? gm, this indicates that Ghosal recovered an oil but did not note its weight.

Desmodium gangeticum DC.

Aerial parts: **From 1 kg.: (Fresh wet wt.)**
DMT ? grams of oil
 (weight of first crop not given)
 + 0.41 gm (second)

Thick colorless oil as chloroform soluble acetate

DMT-N-oxide 0.21 + 0.12 gm
 (Hygroscopic solid) as chloroform soluble acetate

5-MeO-DMT 0.57 gm.
 Colorless plates from light petroleum-benzene 50:50

5-MeO-DMT-N-oxide

Pale brown gum 0.18 gm.
 N_b -Me-H⁺ -harman
 "Almost crystalline" 0.03 gm.
 6-MeO-2-Me- β -carbolinium cation 0.07 gm
 Amorphous; Light brown Purified 0.04 gm
 BANERJEE & GHOSAL 1969
 [Citing GHOSAL & MUKHERJEE 1966 for isolation and characterization and JOHNS *et al.* 1966b and GHOSAL & BANERJEE 1968]
 [Also reported in GHOSAL *et al.* 1972e]

Fresh has over 3X the alkaloids than either dried or preserved material.
 Air dried has 0.01-0.03% total alkaloids.
 Dry plant has higher proportions of 5-MeO-DMT:DMT than fresh material.
 BANERJEE & GHOSAL 1969

(A similar phenomenon also observed in *Phalaris tuberosa*.
 If the data can be extrapolated, it might imply that macerating the leaves with ethanol immediately upon harvest might maximize alkaloid content by destroying enzymatic activity and beginning the extraction process.)

"Assays with fresh green or air dried and preserved plants indicated that the alkaloid content of the aerial portions of green plant material was more than three times the amount present in dry and preserved samples."
 The roots of *D. gangeticum* showed no such phenomenon.
 GHOSAL & BHATTACHARYA 1972

Roots (Dried)	Refs.	(From 1.6 kg dry) 1
Phenethylamine	1, 3, 4	0.28 gm. (impure) 1
A β -Hydroxy-phenethylamine (New & unidentified-See β -keto below?)		1
N,N-Dimethyl- β -keto-phenethylamine (New compound)	3	
N-Methyl-tyramine	1, 3, 4	0.5 gm. 1
Hordenine (Major base)	1, 3, 4	0.82 gm. + 1
Candicine	1, 2, 3, 4	
Unidentified phenethylamine	1, 4	0.18 gm. 1
DMT	1, 3, 4	0.38 gm 1 [0.02%]
DMT-N-oxide	1, 3, 4	0.12 gm. (impure) 1 0.07 gm from ca. 2 kg 2
Hypaphorine	1, 2, 3, 4	
Choline	2	

1. GHOSAL & BANERJEE 1969
 2. GHOSAL *et al.* 1970b
 3. GHOSAL & BHATTACHARYA 1972. [Harvest June-Sept. 1967.]
 4. GHOSAL *et al.* 1972e

3 Above obtained yield of 0.4 gm total alkaloid from 1.6 kg. dried and milled roots. Compare with 1 above. Seasonal or local variability? Or other?.....

Trivia of potential interest:
 Phenethylamine can be steam distilled. bp 197-198° C.
 Hordenine sublimes at 173-174° C and 11 mm.
 N-Methyltyramine should be as simple to remove.
 OR:
 DMT and 5-MeO-DMT can also readily be converted to their N-oxides by the action of hydrogen peroxide in ethanol. (1 ml 30% hydrogen peroxide per 4 ml of ethanol) (Separates as flocculant solid.)
 Trituration with petroleum ether (grinding with solvent in mortar and pestle) will extract the phenethylamines, while the N-oxides remain behind in the residue.
 Recovery can be made by dissolving the N-oxides in dilute acetic acid (or dissolving in water and acidifying with acetic acid), reducing with zinc dust (add an excess amount to the solution and stir for 30 minutes), basifying the resulting solution and extracting the resulting free bases into a good organic solvent.

Seeds:
 N,N-Dimethyltryptamine
 N,N-Dimethyltryptamine-N-oxide
 A β -carboline
 Unidentified indole bases
 GHOSAL & BHATTACHARYA 1972

N,N-Dimethyltryptamine-N-oxide 1.
 6-Methoxy-2-methyl- β -carbolinium cation 1.
 Phosphatidyl ethanolamine 2.
 Phosphatidyl serine 2.
 Phosphatidyl inositol 2.
 Sphingomyelin 2.
 1. GHOSAL *et al.* 1970b
 2. RASTOGI *et al.* 1971

I must agree with Jonathan OTT (1993: 259) that FLATTERY is grasping for straws in assuming additive plants were used in *soma*.

If one has any familiarity with neurochemistry, the above components of seed make the observation that *D. gangeticum* is "Known as *saumya* or *amsúmat* "rich in *soma* juice". " quite fascinating.

Green Plant (Stem and Leaf):
 (2 kg. yielded 1.3 gm. of bases)
 N,N-Dimethyltryptamine
 N,N-Dimethyltryptamine-N-oxide
 5-Methoxy-N,N-dimethyltryptamine
 5-Methoxy-N,N-dimethyltryptamine-N-oxide
 N_b -Methyl-H⁺-harman (Leptocladine)
 6-Methoxy- N_b -methyl- β -carbolinium cation (Previously unreported in nature)
 Quaternary indole bases
 GHOSAL & BHATTACHARYA 1972

[6-Methoxy- N_b -methyl- β -carbolinium cation was found to possess anticholinesterase activity by GHOSAL *et al.* 1977b]

Desmodium gangeticum

Desmodium gangeticum DC.

DMT in root, stem-leaf and fruit
DMT-N-oxide in root, stem-leaf and fruit
Hypaphorine in root
5-MeO-DMT in stem-leaf
5-MeO-DMT-N-oxide in stem-leaf
6-Methoxy-N-methyl- β -carbolinium cation in stem-leaf
N_b-Methyl-H⁴-harman in stem-leaf
GHOSAL 1972a

Desmodium gangeticum

DMT and 5-MeO-DMT in whole plant, root, stem and leaf
cites BANERJEE & GHOSAL 1969
and GHOSAL & BANERJEE 1969
and GHOSAL & BHATTACHARYA 1972

also

“Hordenine, or peyocactin, is a stimulant found in whole *Desmodium gangeticum* at a level of 0.05% [Footnote1] and in *Dutaillyea oreophila* leaves at 0.013% [BAUDOUIN *et al.* 1981]

OTT 1994

[Ed. Hordenine is also known as Anhaline.]

A lactone (C₁₆H₃₀O₂) was recovered from the roots.

ALLEN & ALLEN 1981: p. 229, cited AVASTHI & TEWARI 1955a and 1955b.

Commercially, *D. gangeticum* is sold as cut pieces of root mixed with short stems.

ICMR (1976) p. 347.

Commercial material may actually be other *Desmodium* species and sometimes species of *Flemingia*.

AHUJA 1965: pp. 32-33.

Used in Indian medicine:

Root extracts: asthma, diarrhea, dysentery and chronic fever.

Aerial portion extract: Aphrodisiac, for biliousness, eye diseases and as uterine stimulant.

GHOSAL & BHATTACHARYA (1972)

Aerial portions used as an antidote for snake bite and scorpion stings.

GHOSAL *et al.* 1972e

“*Desmodium gangeticum* DC. (Syn. *Hedysarum gangeticum* Linn.)

Ben. - *Salpani*

Hind. - *Sarivan*

Kan. - *Shaliparni*

Mar., *Kon* and *Salvan*

Tam. - *Pullaadi*

Tel. - *Gitanaram*

Habitat: Grows wild in lower Himalayan regions and throughout the plains of India.

Parts used: Whole plant, root and bark.

Ayurvedic description

Sanskrit: *Shaalaparna, Shaalaparni*

Synonyms: *Aakuparnikaa, Amshumati, Atiguha, Atiruha, Deerghamoolika, Dhruva, Guha, Mahaakleetaanika, Parninee, Peethanee, Saumya, Sthira, Triparni, Vidaarigandha*

Properties: Rasa - Madhura, Tikta

Guna - Guru, Snigdha?

Veerya - Ushna

Vipaaka - Madhura

Actions, Uses: Angamardaprashamana, Ateesaaraghna, Brihmana, Chardighna, Garavishahara, Hridya, Krimighna, Kshataghna, Mehaghna, Mootrala, Rasaayana, Shoshahara, Shothahara, Shwaasahara, Snehana, Stambhana, Trishnaghna, Vishamajwaraghna, Vrishya.

“Medicinal properties and uses: It is a bitter tonic, febrifuge, digestive, anticatarrhal, alterative and tonic (Nadkarni, 1954).

The root of *D. gangeticum* is one of the ingredients of a famous Ayurvedic preparation *Dashamoola kwaatha*, which is considered to be antipyretic, alterative and a bitter tonic. It is reported to be beneficial in the treatment of typhoid, biliousness and also as a diuretic and aphrodisiac.”

“The aerial portions contained two previously known indole-3-alkylamines and their N_b-oxides, N_b-Methyl-H⁴-Harman, and 6-Methoxy-2-Methyl- β -carboline..... In addition, fresh plant materials showed large numbers of uncharacterized indoles and 5-oxy indoles of low Rf values. (GHOSAL and BANERJEE, 1968)”

“Pharmacology: The aqueous extract of the root of *D. gangeticum* exhibited anti-inflammatory, antibacterial and antifungal activities. The drug showed inhibitory effect on the isolated frog’s heart. It had a relaxant effect on the smooth muscles of intestines of rabbit and dog and on the isolated rat uterus. The drug had mild diuretic effect and it inhibited respiration in moderate doses. It was found to be non-toxic in acute toxicity studies. (PREMA, 1968)

The total alkaloid fraction of stem and leaves of *D. gangeticum* and total alkaloids of roots of *D. pulchellum* exhibited curariform activity on frog’s rectus muscles. (BHATTACHARYA and SANYAL, 1969).”

INDIAN COUNCIL OF MEDICAL RESEARCH 1987: pp. 345-349, citing:

BHATTACHARYA & SANYAL 1969

GHOSAL & BANERJEE 1968

PREMA 1968

See also PRASAD & ANSARI 1966-1967

Total alkaloid fraction of stem and leaf exhibited curariform activity, non-toxic, relaxant to smooth muscles, mild diuretic and respiratory inhibitor.

Roots had a nicotine type effect on intestine and carotid blood pressure.

B. OLIVER-BEVER 1983

cites BHATTACHARYA & SANYAL 1969 and ALL contained references therein. and

PREMA 1968, and

GHOSAL & BHATTACHARYA 1972

See also GHOSAL *et al.* 1972e

“*Desmodium gangeticum* DC. is common on the lower hills and plains throughout India; on the Himalayas it ascends to 5,000 feet. It is spread east to Pegu and Ceylon, the Malay Peninsula and Archipelago, and is distributed to China, the

Trout's Notes on the Genus Desmodium

Philippine Islands and tropical Africa.

The plant is considered antipyretic and anticatarrhal. The root is used as a febrifuge by Hindu physicians."

Arabic: *Organsi*

Bengal: *Salpan, Salpani, Salvani*

Bombay: *Daye, Salparni, Salwan*

Canarese: *Murelehone*

English: *Tick Trefoil*

Guam: *Atis-aniti*

Gujerati: *Salwan*

Hindi: *Salpan, Salpani, Salun, Salwan, Shalparni*

Khasi: *Nai-khong*

Malayalam: *Pullati*

Marathi: *Darh, Ranbal, Salparni, Salwan*

North-West Provinces: *Pustboeni*

Philippines: *Mankit*

Porebunder: *Ekanipandhiyo*

Punjab: *Shalparni*

Sanskrit: *Anshumati, Astamati, Devi, Dhruva, Dirghamula, Dirghanghni, Dirghapatra, Dirghapatrika, Ekamula, Guha, Kitavinashini, Kumuda, Nishchala, Patini, Pivari, Salaparni, Sarvanukarini, Saumya, Shalani, Shalidala, Shaliparni, Shalipatra, Shophaghni, Shothaghni, Shubhapatrika, Sthira, Subhagam Sudula, Sudha, Suparni, Suparnika, Supatri, Surupa, Tanvi, Triparni, Vataghni, Vidari, Vidarigandha, Vrihiparnika*

Santal: *Tandibhedijanetet'*

Sinhalese: *Aswenna*

Tamil: *Pulladi*

Telegu: *Gitanaram, Kolakuporna, Nallanelapariki, Peddantrinta*

Urdu: *Shalwan*

Uriya: *Salopornni*

Yoruba: *Emimo, Ewe-emo*

CAIUS 1989: page 43

"*Gitanaram*" "*Kolapanna*" (Common names used in upper East Godvari district, Andhra Pradesh, India)

Root decoction is antipyretic and used in cough and asthma. SUDHAKAR & RAO 1985

India: "*Salparni*", "*Sthira*", "*Vidarigandha*"

Ivory Coast/ Upper Volta: "*Gayoukri*", "*Prikou*"

Southern Nigeria: "*Aberodefe*", "*Amo aberodefe*", "*Emimo*", "*Ewe-emo*" [*emo* is in reference to the adhesive seeds]

Leaf is used for urinary problems.

Root used as astringent and diuretic, for abdominal tumors, asthma, chest and brain affections, diarrhea, fever, chronic fever and nasal polyps.

Also reported as anticatarrhal and febrifuge. Used for dysentery and worms (parts used not given.)

AYENSU 1978: page 149.

"*Chapof*", "*Gitanaram*", "*Kolapanna*", "*Salparni*"

Root is used for asthma, cough, dysentery, fevers, a snake bite antidote and vomiting.

Whole plant is used for bronchitis, fever and as a tonic.

Unspecified parts are used for dysentery and eye infections.

JAIN 1991: p. 72.

***Desmodium gangeticum* DC.**

Native to the Asian tropics and Australia.

Called *Bergboontjes* by speakers of Dutch.

VAN WIJK 1911

Bengali: *Salpáni*

Hindu: *Sarivan*

Sanskrit: *Salaparni*

Small shrub common in the lower Himalayan regions and on the plains of India.

Used for fever and catarrh.

Chief of the 10 ingredients in *Dasamula kvatha*.

DEY 1986: page 114

"*Salparni*"

Undershrub distributed in the outer Himalayas, occurring up to 5000 feet, and "throughout India to Ceylon and Burma, Malay Peninsula and Islands, China, Phillipines and tropical Africa." It is said to be very common in Sal forests.

Used medicinally in *Dasamula*.

Root is most commonly used although occasionally the whole plant is incorporated.

Astringent, diuretic and tonic.

Root decoction is used in folk medicine for fever. Also combined with other drugs for affections of chest and brain and for fevers.

Occurs in the preparations:

"*Chyavanprash*", "*Dashmul Tail*" and "*Shalparni-adi-kwath*"

Drug collection is during the rainy season (flowering time).

AHUJA 1965: pp. 32-33.

Common names: "*Chippi*", "*Latkanni*"

Sanskrit: "*Salaparni*"

Root of plant growing on an ant-hill is made into a paste with water and given in cases of diarrhea. (5-10 gram dosages)

CCRAS 1990: pages 63 and 107.

Woody plant occurring in Old World Tropics.

Used for catarrh and fever (India).

Also used as a green manure.

UPHOF 1968: p. 177.

Leaf and stem alkaloids at 8-10 mg./kg. (oral and parenteral administration) produced effects in albino rats and mice which have been used in animal models to indicate hallucinogenic activity.

Observed symptoms from the total leaf and stem alkaloids include: Excitation and or jumping movements, hyperactivity, tremors, paralysis of hindlimbs, tapping with forelimbs, convulsions and respiratory arrest.

The alkaloids derived from the seeds produced similar behavioral changes but there was no significant changes in behavior when given the total root alkaloids.

GHOSAL & BHATTACHARYA 1972

Occurs in tropical Africa, Australia, Bhutan, Burma, China, India (all; in Himalayas up to 1400 meters), Malesia, Nepal, Pakistan, Ryukyu, Sri Lanka, Taiwan, Thailand and Vietnam. SANJAPPA 1991: page 153-154.

Desmodium guianense DC

Used medicinally in Guiana.

CAIUS 1989: page 42

Desmodium gyrans DC

[= *Desmodium motorium* (HOULT.) MERR. = *Desmodium roylei* WIGHT & ARN. = *Codariocalyx gyrans* (L.F.) HASSK. = *Codariocalyx motorius* (HOULT.) OHASHI = *Hedysarum motorium* HOULT. = *Hedysarum gyrans* L.f. = *Meibomia gyrans* (L.f.) O.KUNTZE.]

In stem/ leaves:

DMT-N-oxide 2

5-MeO-DMT 1, 2

Leptocladine 1, 2

1. GHOSAL 1972a

2. GHOSAL *et al.* 1970b

Leaves (from 2 kg.) (Total alkaloids 0.036%)

β -Phenethylamine (0.11 gm.)

N,N-Dimethyltryptamine (82 mg.)

DMT-N-oxide (0.18 gm.)

Bufotenine (68 mg.)

5-Methoxy-N-methyltryptamine (97 mg.)

5-Methoxy-N,N-dimethyltryptamine (35 mg.)

5-MeO-DMT-N-oxide (trace)

Uncharacterized indole-3-alkylamines (27 mg.)

Uncharacterized β -carboline (26 mg.)

GHOSAL *et al.* 1972a

Roots (from 0.5 kg.) (Total alkaloids 0.33%):

Hypaphorine (1.2 gm.)

Choline (0.4 gm.)

Minor alkaloids (52 mg.) i.e. DMT, DMT-N-oxide and two uncharacterized indole-3-alkylamines.

Traces of unidentified β -phenethylamines

GHOSAL *et al.* 1972a

Roots:

5-Methoxy-N,N-dimethyltryptamine

Hypaphorine

GHOSAL 1972a

Desmodium gyrans seemed to prefer being on the dry side.

Only those in clay soil thrived in sun. Those in shade and partial shade did not get as big but did well in sandy loam or potting soil. None flowered the first year. Responded well to foliar feeding with fish. Urea seemed to check marked tendency towards going chlorotic.

Plants did not survive 1993-1994 winter in Taylor, Texas (17° F low). Around half a dozen seedlings came up in past year's flats during April 1994. They did not survive past the seedling stage (thought due to local acid rain – measured ~ pH 4).

K.TROUT 1993 field trial observations

Leaves have aphrodisiac, diuretic, febrifugal and tonic properties.

Roots used (in Indian medicine) as a remedy for asthma and coughs, as an antidiysenteric, an emollient and a laxative.

Occurs in “northern parts of Bengal, N. Circars, Deccan and Hills of Carnatic and also W. Ghats, up to 3000 ft, in grass lands and forest undergrowth widespread but nowhere very common.”

GHOSAL *et al.* 1972a

Asian tropics.

Known as *Gyred cock's head/ Move plant/ Moving plant/ Telegraph plant/ Whirling plant.*

French- *Herbe vivante/ Herbe vive/ Perpetum mobile [Maurit.]/ Sainfoin animé/ Sainfoin oscillant.*

German- *Beweglicher klee/ Süssklee/ Büschelkraut/ Drenender klee/ Kreisende fesselhülse/ Kreisender hahnenkopf/*

Telegraphen bundelhülse/ Telegraphenpflanze/ Wandelklee

Dutch- *Draaiende desmodium/ Telegraaf plant*

Van WIJK 1911

“*Bhunakra*”, “*Ote-atil*”

Root is used medicinally for rheumatism and given symbolically to lovers to keep them together.

Leaf and flowers are used for wounds.

JAIN 1991: p. 72.

D. gyrans; “Telegraph Plant”

Tracks the sun with slow jerky movements even when no wind is present.

Soak seeds 12 hours. Plant 1/2” deep in loamy soil.

Keep warm and lightly moist. Bright light.

BANANA TREE 1993 catalog and packet label

Occurs throughout most of India, up to 2500 meter, and also in Australia, Bangladesh, Bhutan, Burma, China, Malesia, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.

SANJAPPA 1991: page 158.

Desmodium gyroides DC.

[= *Codariocalyx gyroides* (ROXB.) HASSK. = *Hedysarum gyroides* ROXB. = *Meibomia gyroides* (ROXB. ex LINK) O.KUNTZE.]

Whole plant is combined with 4 leaves of *Ocimum sanctum*, made into a paste and put inside of a banana. This is “*given to a lady for conception.*” TARAUFDER 1983

Also noted by Jain to be used medicinally to promote conception. JAIN 1991: p. 72.

Shrub-like plant occurring in Asian tropics.

Used as a green manure.

UPHOF 1968: p. 177.

Occurs in the tropical Himalayas from Garhwal to Arunachal Pradesh, Assam, Bihar, Meghalaya, Nagaland and West Bengal. Besides India, it is also found in Bhutan, Burma, China, Malesia, Nepal, Sri Lanka, Thailand and Vietnam. SANJAPPA 1991: page 152.

***Desmodium heterocarpon* (L.) DC**

[= *Desmodium polycarpon* (POIR.) DC. = *Desmodium trichocaulon* DC. = *Hedysarum heterocarpon* L.]

[As *Desmodium polycarpon* DC.]

Throughout India, Ceylon and Malaya. Occurs as far as China, Japan, the Philippines, Polynesia and East Africa.

Used by Santals for fainting and convulsions.

Malay: “*Kachang kaya betina*”, “*Kalubar*”, “*Katubar*”, “*Rumput kerbau d'rapah*”

Mundari: “*Piribit*”

Santali: “*Baephol*”

Telugu: “*Chepputatta*”

Uriya: “*Krishnupani*”, “*Salpani*”

Fr. Jean Ferdinand CAIUS 1989

“*Sarivan*”

Root is used for fevers.

Unspecified parts reported being used for cough, fainting and as a tonic.

JAIN 1991: p. 72.

Occurs throughout India (up to 2350 meters), also Australia, Bangladesh, Bhutan, Burma, China, Japan, Malaysia, Pacific Islands, Ryukyu, Sri Lanka, Taiwan, Thailand and Vietnam.

SANJAPPA 1991: page 154-155.

***Desmodium heterophyllum* (WILLD.) DC**

[*Desmodium triflorum* (L.) DC. var. *majus* WIGHT & ARN. = *Hedysarum heterophyllum* Willd. = *Hedysarum reptans* ROXB. = *Meibomia heterophylla* (WILLD.) O.KUNTZE.]

Malay: “*Akar sisik naga*”, “*Akar telinga tikus*”, “*Omba-omba*”

Mauritius: “*Trefle lievre*”

Found in tropical regions of the eastern Himalaya, Khasia, Assam and, following Gulf, to Penang and Malacca. Fairly common presence in plains of the Peninsula and also Ceylon. Occurs to the Malay Archipelago, the Philippines, China and the Mascarene Isles.

Used medicinally in Mauritius as a diuretic, for dysentery and as a cooling medicine.

CAIUS 1989: pages 42 and 43.

[as *Desmodium heterophyllum* Vogt]

Trailing shrub occurring in South-East Asia to the Philippine Islands.

Recommended as fodder for cattle.

UPHOF 1968: p. 177.

Occurs in Andaman, the Peninsula of India, East India and the Nicobar Islands, also in Australia, Bangladesh, Bonin, Burma, China, Malesia, Nepal, Pacific Islands, Ryukyu, Taiwan, Thailand and Vietnam.

SANJAPPA 1991: page 155.

***Desmodium intortum* URB.**

[= *Desmodium hjalmarsonii* STANDL. = *Desmodium trigonum* (SW.) DC. = *Hedysarum intortum* Mill. = *Meibomia intorta* (MILL.) BLAKE.]

“*Kuru Vine*”, “*Greenleaf*”, “*Beggarlice*”

Cuna Indians regard as a love potion.

[Said to be frequently confused with *Desmodium aparines* (Link) DC]

DUKE 1981: pp. 77-79 citing P.F. MILLS 1968

Page 59 of MILLS says little more (obtained via ILLS) Still need to see page 60-?

Highly regarded as fodder and graze for cattle.

ALLEN & ALLEN 1981: p. 229.

***Desmodium lasiocarpum* DC**

[= *Desmodium latifolium* DC.]

“Suspected” OTT 1993: p. 246

“*Desmodium lasiocarpum* DC is found throughout the tropics of the Old World. It occurs in the Himalayas, ascending to 4000 feet in Sikkim, and spreads to Burma and Ceylon. It is distributed [in] the Malay Archipelago, the Philippine Islands, Madagascar, and tropical Africa.

In Gold Coast native doctors mix the roots with small hot peppers and use them in an enema to cure blood in the urine.

Used medicinally in West Tropical Africa.

Ashanti: *Kohemi koko*

Benin: *Yalelegbe*

Burma: *Kinbun*

Ewe: *Ledalede*

Fulani: *Takabeh, Takamahi*

Hausa: ‘*Danke dafi, Ka danka dafi, Ma da dafi*

Rano: *Damgere*

Menole: *Nane, Nanci*

Santali: *Simmathasura*

Tamil: *Anguchabadi, Chinanduri, Chimbada,*

Chimbattai, Chirubulladi, Chivamadu, Kidameri,

Kubayam, Kuchattinbadi

Telugu: *Adiviyantinta, Gaba, Magalinga, Tellanelapariki*

Timne: *Agbintmarabana, Egbuntemoer*

Twi: *Otokataka*

Uriya: *Ronodalo*

Yoruba: *Abashoka, Aberodefe, Berodefe, Emimo, Ewe emo, Ewe omo*”

Fr. Jean Ferdinand CAIUS 1989

Herbaceous plant from tropics of Africa and Asia.

In Nigeria it is used as a food for horses.

UPHOF 1968: p. 177.

***Desmodium laxiflorum* DC**

[= *Desmodium macrophyllum* DESV. = *Desmodium recurvatum* (ROXB.) WIGHT & ARN. = *Desmodium rotleri* SPRENG. = *Hedysarum recurvatum* ROXB. = *Hedysarum rotleri* Spreng. = *Hedysarum roxburghii* SPRENG. = *Meibomia laxiflora* (DC.) O.KUNTZE.]

Powdered roots given to cure unconsciousness.
JAMMU-TAWI 1982: page 545

***Desmodium laxiflorum* DC.**

(Used by Bhils in Mount Abu area (border of Rajasthan and Gujarat states, western India)

Root is used in chronic fevers and vomiting.
SEBASTIAN & BHANDARI 1984

Boiled roots drunk for puerperium in the Philippine Islands.
VON REIS ALTSCHUL 1973: #1776.

“*Kadakatru*”

Roots are used to treat fever, applied to small-pox, also given for unconsciousness or vomiting.
JAIN 1991: p. 72.

Occurs in most of India including Andaman, and the Nicobar Islands, also in Bangladesh, Bhutan, Burma, China, Indonesia, Malaysia, Nepal, Pakistan, Philippines, Taiwan, Thailand and Vietnam.
SANJAPPA 1991: page 156.

***Desmodium microphyllum* (THUNB.) DC.**

“*Chattomara*”

Root is used as medicinal abortifacient.
JAIN 1991: p. 72.

In all of India up to 2400 meters. Also found in Bhutan, Burma, China, Japan, Malesia, Nepal, Pakistan, and Sri Lanka.
SANJAPPA 1991: page 157. According to SANJAPPA this is the same species as *D. parvifolium* DC.

***Desmodium nemorosum* F. MUELL.**

Reputed poisonous to stock by F.M. BAILEY 1909: p. 140.
WEBB 1948: p. 84.

***Desmodium nicaraguense* OERST.**

Desmodium nicaraguensis OERST. ex BENTHAM, according to ALLEN & ALLEN 1981

“*Desmodium nicaraguense*. This shrub, a native of Central America’s Pacific slope from Mexico to Nicaragua, is so nourishing to livestock that in Guatemala and El Salvador it is known as “*engorda caballo*” (horse fattener) or “*engorda cabras*” (goat fattener). Its leaves and young branches are eaten by livestock of all kinds and are locally considered excellent forage. The plant grows wild and in abundance, both in wet or dry thickets and on rocky hillsides. It grows to 6m tall, but livestock usually keep it cropped back. Although the shrubs recovers quickly after grazing, it is killed outright if cropped too close. The foliage contains about 22 percent crude protein and can be harvested for hay or silage (up to 7 cuttings a year have been achieved in Costa Rica). The crop is easily established by direct sowing, seedling transplants, or cuttings, and the plants can sustain heavy competition from grasses and other vigorous plants.”
NATIONAL ACADEMY OF (THE?) SCIENCES, WASHINGTON 1979
Tropical Legumes: Resources for the Future. page 125.

***Desmodium nigaraguens* (U.S.A.)**

+ Alkaloid screening SMOLENSKI *et al.* 1972

Desmodium nigaraguense

Called “*Engorda-caballo*” [“*Horse fattener*”] in Honduras. Planted as forage.
VON REIS ALTSCHUL 1973: #1768.

***Desmodium oldhami* OLIV.**

Leaves used for tea in Japan.
ALLEN & ALLEN 1981: page 229

Perennial herbaceous plant from Japan. Use for tea also mentioned by UPHOF 1968: p. 177.

***Desmodium paniculatum* (L.) DC.**

[= *Meibomia paniculata* (L.) O.KTZE. = *Meibomia pubens* (T&G) RYDB. = *Meibomia dillenii* (DARL.) O.KTZE. = *Desmodium dillenii* DARL. = *Desmodium perplexum* SCHUB. = *Desmodium glabellum* (MICHX.) DC.]

“*Panicled tickclover*.”

Flowering from July to September.
STUBBENDIECK & CONRAD 1989: page 165. Line drawing on page 164.

“Suspected” OTT 1993: page 246

Desmodium parvifolium DC.

“*Beggarlice*” (English),
 “*Pega-pega*” (Panamanian Spanish)
 Eaten as a vegetable by the Indians.
 DUKE & VASQUEZ MARTINEZ 1986: p. 75

Desmodium pulchellum BENTH. ex BAKER

[= *Dicerma pulchellum* (L.) DC. = *Hedysarum pulchellum* L.
 = *Meibomia pulchella* (L.) O.KUNTZE = *Phyllodium pulchellum* (L.) DESV.]

排錢草

Whole plant (0.3% Total alkaloids):

5-Methoxy-N,N-dimethyltryptamine	0.2-0.25%
Bufotenine	} minor components totalling 0.0018%
N,N-Dimethyl-tryptamine	
DMT-N-oxide	

“The alkaloids are readily extractable with alcohol containing acetic acid and separable by column chromatographic resolution over Brockman alumina. Elution with benzene gave the major base [5-MeO-DMT], mp 69° (Yield 0.2-0.25%), while the minor components migrated out as a brown gum (yield 0.0018%) [Bufotenine, DMT and DMT-N-oxide] upon washing with ether-methanol (1:1). Subsequent elution with methanol yielded two other bases.”

S. GHOSAL & B. MUKHERJEE 1964

[Editor's addition]

However;

“the basic extract of the whole plant contains three other related compounds (besides the four bases mentioned above), viz.”

5-Methoxy-N-methyltryptamine (as an oil)

Gramine (as an oil, isolated as picrate in yellow needles from ethanol.)

5-Methoxy-N,N-dimethyltryptamine-N-oxide (as a viscous brown impure oil, purified as a pale violet oil and isolated as picrate in fine crimson-red needles from ethanol.)

GHOSAL & MUKHERJEE 1965

Plant (4 kg. whole plant, dried, finely ground and defatted.)

5-Methoxy-N,N-dimethyltryptamine (Major base. Colorless plates from 8.36 gm. of chromatographic fraction residue)

5-Methoxy-N,N-dimethyltryptamine-N-oxide (17 mg. impure pale violet oil contaminated with lesser amounts of gramine.)

5-Methoxy-N-methyltryptamine (HCl as needles; from 472 mg of impure residue containing 4 alkaloids.)

Bufotenine

N,N-Dimethyltryptamine

N,N-Dimethyltryptamine-N-oxide

Gramine (yellow needles from 320 mg of impure chromatographic fraction residue.)

(note; numbers above do not generally reflect pure compounds)

GHOSAL & MUKHERJEE 1966

And finally (all by dry weight unless specified otherwise):

Young seedling stem & leaf

(0.12% Total alkaloid)	% of total	Actual %
Gramine	2%	~0.002%
N,N-DMT	62%	~0.074%
N,N-DMT -N-oxide	19%	~0.023%
Bufotenine	9%	~0.011%
5-Methoxy-N-methyltryptamine	8%	~0.010%
5-Methoxy-DMT	Detected	Trace

Root of young seedling (0.37% Total alkaloid)

	% of total	Actual %
N,N-Dimethyl-tryptamine	73%	~0.27%
27 mg. in 10 gm.		
DMT-N-oxide	3%	~0.011%
DMT-N-methyl cation	11%	~0.041%
5-Hydroxy-N-methyltryptamine	6%	~0.022%
5-Methoxy-N-methyltryptamine	Detected	Trace
6-Methoxy-N-methyl-β-carbolinium cation	Detected	Trace
6-Methoxy-tetrahydro-harman	7%	~0.026%
Unidentified base	Detected	Trace

According to the above; Whole plant of young seedlings will yield 3.4 gm. of DMT per kg.

Mature stem and leaf (1.4% Total alkaloid)

	% of total	Actual %
Gramine	7%	0.098%
N,N-DMT	21%	0.294%
DMT-N-oxide	5%	0.070%
5-Hydroxy-N-methyltryptamine	4%	0.056%
Bufotenine	8%	0.112%
Bufotenine-N-oxide	Detected	Trace
5-Methoxy-N-methyltryptamine	11%	0.154%
5-Methoxy-DMT	34%	0.476%
5-Methoxy-DMT-N-oxide	5%	0.070%
6-Methoxy-N _b -methyl-H ⁴ -β-carboline	2%	0.028%
Unidentified bases	3%	0.042%

Mature plant seeds (0.02% Total alkaloid)

	% of total	Actual %
DMT	4%	~0.001%
5-Methoxy-N-methyltryptamine	8%	~0.002%
5-Methoxy-DMT	10%	0.002%
DMT-N-oxide	Detected	Trace
2-Methyl-β-carbolinium cation	13%	~0.003%
6-Methoxy-tetrahydro-harman	26%	~0.005%
6-Methoxy-2-methyl-tetrahydro-β-carboline	3%	~0.001%
6-Methoxy-1,2-dimethyl-β-carbolinium cation	8%	~0.002%
Unidentified bases	28%	~0.006%

Desmodium pulchellum

Mature plant root (1.1% Total alkaloid)

	% of total	Actual %
DMT	41%	0.451%
as 790 mg. of pale yellow viscous liquid from 1.8 kg dried roots.		
DMT-N-oxide	11%	0.121%
as 222 mg.+ of brown gum from 1.8 kg dried roots.		
DMT Metho cation		
(N-Methyl-DMT cation)	14%	0.154%
as 430 mg. of colorless prisms (as methiodide) from 1.8 kg dried roots.		
5-Hydroxy-		
N-methyltryptamine	7%	0.077%
as 240 mg. of brown viscous liquid from 1.8 kg dried roots.		
Bufotenine	Detected	Trace
Bufotenine-N-oxide	Detected	Trace
5-Methoxy-DMT	12%	0.132%
as 230 mg. of colorless rectangular plates from 1.8 kg dried roots.		
5-MeO-DMT		
Metho cation	6%	0.066%
as 160 mg. of straw colored plates (as methiodide) from 1.8 kg dried roots.		
6-Methoxy-N ₁ -methyl-		
H ⁴ -β-carboline	9%	0.099%
Unidentified bases	Detected	Trace
27 mg.+ of unidentified 3-alkylindole as a brown oil from 1.8 kg dried roots and 18 mg.+ of an unidentified 5-Hydroxy-3-alkylindole as straw colored microneedles was also recovered.		

Mature plant green fruit (0.01% Total alkaloid)

	% of total	Actual %
DMT	12%	~0.001%
DMT-N-oxide	72%	~0.007%
2-Methyl-β-carbolinium cation	8%	<0.001%
6-Methoxy-1,2-dimethyl-β-carbolinium cation	2%	<0.001%
Unidentified bases	6%	<0.001%

Data above is from GHOSAL *et al.* 1972c

- Gramine in stem-leaf
- DMT in root, stem-leaf and fruit
- DMT-N-oxide in root, stem-leaf and fruit
- DMT metho cation in root and stem-leaf
- 5-Hydroxy-N-methyltryptamine in root
- Bufotenine in root and stem-leaf
- 5-MeO-MMT in stem-leaf
- 5-MeO-DMT in root, stem-leaf and flower
- 5-MeO-DMT-N-oxide in stem-leaf
- Harman in fruit and seed
- 6-Methoxy-tetrahydro-β-carboline in stem-leaf
- 6-Methoxy-tetrahydroharman in root and seed
- N₁-Methyl- H⁴-harman in seed

GHOSAL 1972a

[The fully aromatic β-carbolines were found to possess anticholinesterase activity by GHOSAL *et al.* 1977b]

DMT and 5-MeO-DMT in whole plant, root, stem, leaf and fruit
OTT 1994 citing GHOSAL & MUKHERJEE 1964, 1965 & 1966 and GHOSAL *et al.* 1972c

A new glycoside (the 1-Glucosylrhamnoside of physicion) was identified in seeds.

ICMR 1976: p. 347, citing TIWARI & BANSAL 1971

Widely distributed throughout India.

Bark decoction used antidotally to poisoning, for diarrhea, eye diseases and hemorrhages.

Flowers are given for biliousness.

GHOSAL & MUKHERJEE 1964 and GHOSAL *et al.* 1972c

“*Desmodium pulchellum* Benth. is found throughout India, Ceylon and Malaya.

A decoction of the bark is used in diarrhoea, haemorrhage, and diseases of the eye.

It is generally believed in Assam that if a branch is kept under or anywhere in the house it drives away bedbugs from it.

The flowers are given for biliousness.”

Assam: *Ursi*

Bengal: *Jatasalpar*

Burma: *Toungtamin*

Canarese: *Jenukaddi, Kadukuralite, Kadumuduru, Tigure*

Garhwal: *Thap*

Hindi: *Jat salpar*

Jharna: *Takamala*

Leyte: *Calaicai*

Malayalam: *Kattumutira*

Philippines: *Manguit*

Sanskrit: *Jatasalpara*

Santali: *Birkapi*

Tagalog: *Payang-payang*

Telugu: *Karrantinta, Kondotinta, Sarivi*

Uriya: *Jotasaloporni, Kodakotirichunddo, Krishnoporni*

Visayan: *Calayacay, Caliacay*

CAIUS 1989: page 44

“*Chapor*”, “*Dheknanadak*”, “*Jeetedari*”

Said to repel bedbugs.

Root is used for burning sensations in the abdomen.

Flowers are used for dental caries.

Stem bark is given for headache.

Active biologically as a hypotensive agent.

JAIN 1991: p. 72.

“*Chinese also use Desmodium pulchellum (L.) BENTH. to expel rheumatic fever and convulsions (in children). They consider it good for rheumatism and toothache, believing it dissolves internal blood clots and builds new red cells.*

Malayans use the root decoction for puerperium. Filipinos use the leaves for pocks and ulcers.” cites NIH 1974

DUKE & AYENSU 1985: Page 322

P’ ai-chien-ts’ ao; “*String of coins*”; *Radix Desmodii Pulchelli*
HU, Shiu-ying 1980

Occurs throughout the hills of India also in the eastern Himalayas and Meghalaya. Found also in Burma, China, Malesia, Nepal, Ryukyu, Taiwan, Thailand and Vietnam.
SANJAPPA 1991: page 160.

Desmodium racemosum (THUNB.) DC

[= *Desmodium oxyphyllum* DC]

山马蝗

Pinyin: *Shān mǎ huáng*

English: *Chinese desmodium*

Uses: Tincture a respiratory stimulant, decoction a diaphoretic [citing L.M. PERRY 1980]

Chem.: Kaempferitrin [citing JIANGSU NEW MEDICAL COLLEGE (eds.) 1979]

DUKE & AYENSU 1985: page 323

Shan-ma-huang

Chinese Desmodium

Herba Desmodii Racemosi

HU, S.-Y. 1980: #1181

5-MeO-DMT in whole plant

OTT 1994 cited HSU 1970

5-Methoxy-N,N-dimethyltryptamine (whole plant)

HSÜ *et al.* 1982 cited HSÜ, Hong-Yen 1970

Also mentioned in HSÜ *et al.* 1986

“*Nusubitonasi*” (Japan)

Pounded seeds are eaten as a steamed ball.

VON REIS ALTSCHUL 1973: #1771.

Desmodium ramosissimum G.DON

[= *Desmodium mauritanum* (WILLD.) DC]

Perennial herb from tropical Africa.

Used for dysentery, eye diseases and fever.

Also as an excitant in some parts of Africa.

UPHOF 1968: p. 177.

Used medicinally in West Tropical Africa, Madagascar and La Reunion.

CAIUS 1989: page 42

Desmodium repandum (VAHL.) DC

[= *Desmodium scalpe* DC = *Desmodium strangulatum*

WIGHT & ARN. = *Hedysarum repandum* VAHL. = *Meibomia repanda* (VAHL.) O.KUNTZE = *Meibomia scalpe* (DC.)

O.KUNTZE.]

“*Kuluko la kuku*” (Shambaa)

Leaf juice is given to infants for abdominal pains.

Roots are used for treating large sores.

KOKWARO 1976: page 135.

[as *Desmodium scalpe* DC.]

Bamenda: “*Mmerku mini*”

La Reunion: “*Colle-colle*”, “*Fausse pistache marrone*”

Occurs in Ceylon and the hills of the Western Peninsula to Malaya (infrequent in the latter except for local occurrences). Also found in Abyssinia, the Mascarene Isles and Natal.

Root: Aperient, deobstruent, emmenagogue and stomachic.

Used medicinally in West Tropical Africa.

In Cameroon, it is cooked in food for indigestion.

CAIUS 1989: page 45

Occurs in India (in Arunachal, Gujarat, Manipur, Meghalaya, the Peninsula, Pradesh and Rajasthan). Found also in Tropical Africa, Australia, Burma, Bhutan, China, Laos, Malaysia and Thailand.

SANJAPPA 1991: page 161.

Desmodium retroflexum DC

Indo-China: “*Dai phong nuï*”

Occurs in Assam, Sylhet, Tenasserim and occasional in China.

Root: Aperient, deobstruent, emmenagogue and stomachic.

Used medicinally in Indo-China.

CAIUS 1989: page 44-45

Desmodium salicifolium (POIR.) DC

“*Mtaroro*” (Ngoni)

Leaves are pounded and used for eye ailments.

KOKWARO 1976: page 135.

Woody herbaceous plant from tropical Africa.

Used as a green manure in some African plantations.

UPHOF 1968: p. 176.

Desmodium styracifolium (Osbeck) Merr. [=

Desmodium capitatum (Burm.f.) DC. = *Desmodium*

retroflexum (L.) DC. = *Hedysarum capitatum* Burm.f. =

Meibomia capitata (Burm.f.) O.Kuntze = *Nicolsonia*

styracifolia (Osbeck) Desv.]

广东金钱草

Pinyin: *Guǎng dōng jīn qián cǎo*

English: *Coin-leaved desmodium*

Decoction is used as diuretic, gall stones, relief (!?) of gonorrhea, hepatitis and stones in urinary tract.

DUKE & AYENSU (1985: Vol 1, page 323; citing NIH 1974

Sold in Hong Kong and Taiwan as:

Chin-chien-tsao and

Pien-ti-hsiang

HSÜ *et al.* 1986

Known as:

Chin-ch'ien-ts'ao

Coin-leaved Desmodium

Herba Desmodii Styracifolii

S.-Y. Hu 1980

“*Tung Tsiu Se T'so*”

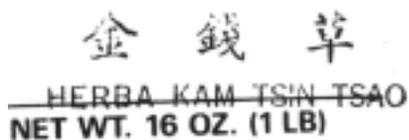
“...*medicine*” (China)

VON REIS ALTSCHUL 1973: #1772

Dried plant material, purchased, in 1994, as this plant, from apothecaries in San Francisco's Chinatown, did not show the presence of any alkaloids that reacted with Ehrlich's reagents.

Sold under the name of *Herba Kam Tsin Tsaio*; packaged by the Lam Hoi Trading Co., Flat G, 20/F, 85 Connaught Rd., West, Hong Kong.]

The Apotheker was given a xerox of a page from DUKE & AYENSU showing both the Chinese characters and a drawing of the plant. The plant material appeared to conform to the description for the species and cost \$4 for a one pound package. The material was sold as a treatment for “*gravel*”



They were familiar with both this species and also *D. racemosum* but insisted that neither is commonly used anymore. They first attempted to substitute *Albizia julibrissin* bark and *Ophiopogon japonica* tubers as a “*better*” substitute for *D. racemosum* (They evidently assumed it was intended for use as a respiratory stimulant. Both plants are known to contain physiologically active substituted phenethylamines.)

[After much insistence, they finally sold me several ounces of dried flowers and buds that they claimed to be *D. racemosum* but which did not conform to its description nor even to that of a *Desmodium* species. No alkaloids were detected in whatever it was that they sold us. Plant parts were inadequate for determining the actual species.]

tlc 1994 by J. APPLESEED.

Occurs in India (in Assam, Karnataka, Kerala, Meghalaya and Sikkim). Found also in Bangladesh, Burma, China, Malaysia, Sri Lanka and Thailand. SANJAPPA 1991: page 162.

Desmodium tiliaefolium (G. DON)

“Another sought-after, alkaloid-rich, rare *Desmodium* species. This is a very hardy plant, ours have been thriving outdoors for several winters, going dormant during freezes.”
...otj 1995 catalog

Desmodium tiliaefolium (USA)

Negative alkaloid screening
SMOLENSKI *et al.* 1972

Abrine in root

Hypaphorine in root and stem-leaf

Ghosal 1972a

Roots (from 2.3 kg. of dried material):

Tyramine (48 mg. of straw colored leaflets)

Hordenine (12 mg. of needles)

3,4-Dimethoxy- β -phenethylamine (14 mg. of brown gum)

β -Hydroxy-N-methyl-3,4-dimethoxy- β -phenethylamine (28 mg. of brown gum) (Thought by Ghosal to have never before been encountered in nature. See as **Normacromerine** in our work on Phenethylamines (#C13). This is the only known occurrence of this alkaloid outside of the CACTACEAE.)

N,N-Dimethyl-3,4-dimethoxy- β -phenethylamine (from 41 mg. of impure brown liquid; also recovered an additional 9 mg.)

Salsoline (32 mg. of straw colored microneedles)

Salsolidine (72 mg. as thick brown liquid)

Tryptamine (17 mg. of pale brown gum)

Abrine (N-Methyltryptophan) (13 mg)

Hypaphorine (68 mg. of needles)

Also has 4 quaternary β -phenethylamines and tetrahydroisoquinolines.

Also Choline (83 mg.)

and Betaine (6 mg.)

Stems have basically the same alkaloids but at low concentrations.

Leaves have mainly carboxylated tryptamines, only traces of phenethylamines

GHOSAL & SRIVASTAVA 1973b

“*Desmodium tiliaefolium* G. Don is found along the Himalayan from the Upper Punjab to Tavoy, ascending up to 9,000 ft.

The root is used as a diuretic, and is prescribed in bilious complaints.”

Arabic: *Sadkoofi*

Hindi: *Chamkat, Chamra, Chamyat, Gurshagel, Laber, Marara, Martan, Motha, Murt, Muss, Pri, Sambar, Shamru*

Jaunsar: *Martoi, Matoi*

Kangra: *Bre, Kathi*

Kumaon: *Chamlai,*

Murri: *Kalanchi*

Persian: *Mushkzamin*

Punjab: *Chamra, Chamyar, Dudshambar, Gurkats, Kalimort, Kathi, Laber, Marara, Pirhi*

Simla: *Laber*

Urdu: *Nagarmotha*

CAIUS 1984: p. 45

***Desmodium tortuosum* (Sw.) DC**

[= *Hedysarum purpureum* MILL. = *Hedysarum tortuosum* SWARTZ. = *Meibomia purpurea* (MILL.) VAHL. = *Meibomia tortuosa* (SWARTZ) O.KUNTZE.]

“Beggarweed”

Perennial herb occurring in the tropics and subtropics. Used as manure in warm regions. UPHOF 1968: p. 177.

Native to tropical America. Now introduced and naturalized in Old World tropics. In India: naturalized in Gujarat, Karnataka, and Uttar Pradesh. SANJAPPA 1991: page 162.

***Desmodium triflorum* DC**

[= *Hedysarum triflorum* L. = *Meibomia triflora* (L.) O.KUNTZE = *Nicholsonia triflora* (L.) GRISEB.]

Leaf

(total alkaloids 0.01-0.015% by dry weight):

- β-phenethylamine (major)
 - Tyramine
 - Indole-3-acetic acid
 - N,N-Dimethyltryptophan methyl ester
 - Hypaphorine
 - Hypaphorine methyl ester
 - Trigonelline
 - Choline
 - Betaine
- GHOSAL *et al.* 1971c

Leaf [Relative % of total alkaloid fraction]

(0.01% total alkaloids by dry weight):

- β-phenethylamine [17%]
- Tyramine [9%]
- Hordenine [Trace]
- Indole-3-Acetic acid [12%]
- DMT-N-oxide [Trace]
- N,N-Dimethyltryptophan [5%]
- S-(+)-N,N-Dimethyltryptophan methyl ester [5%]
- Hypaphorine [8%]
- Hypaphorine methyl ester [Trace]
- Trigonelline [Trace]
- S-(-)-Stachydrine [2%]
- Choline]
- Betaine] [39%]
- Other bases]

GHOSAL *et al.* 1972d

Stems [Relative % of total alkaloid fraction]

(0.008% total alkaloids by dry weight):

- β-phenethylamine [15%]
- Tyramine [7%]
- Hordenine [Trace]
- Indole-3-Acetic acid [Trace]
- N,N-Dimethyltryptophan [Trace]
- DMT-N-oxide [3%]
- S-(+)-N,N-Dimethyltryptophan methyl ester [2%]
- Trigonelline [4%]
- S-(-)-Stachydrine [3%]
- Choline]
- Betaine] [62%]
- Other bases]

GHOSAL *et al.* 1972d

Roots (8.3 kg dry wt) (0.01% Total alkaloids):

	% of total	yield
β-phenethylamine	6%	68 mg
Tyramine	11%	97 mg
Hordenine	3%	26 mg
3,4-Dihydroxy-phenethyl-trimethyl-ammonium cation (as hydroxide)	3%	28 mg
Indole-3-Acetic acid	Trace	
DMT-N-oxide	4%	41 mg
N,N-Dimethyl-tryptophan	Trace	
S-(+)-N,N-Dimethyltryptophan methyl ester	3%	25 mg
Hypaphorine methyl ester	2%	25 mg
Hypaphorine (as HCl)	5%	37 mg
Trigonelline	1%	13 mg
S-(-)-Stachydrine	2%	21 mg
Choline]	
Betaine] 58%	23 mg
Other bases]	

GHOSAL *et al.* 1972d

Roots

(Total alkaloids 0.01-0.018% by dry weight):

- Hypaphorine (major)
 - N,N-Dimethyltryptophan
 - DMT-N-oxide
 - β-phenethylamine
 - Unidentified quaternary β-phenethylamine
 - Betaine
 - Choline
- GHOSAL *et al.* 1971c

Tryptamine in stem-leaf
Hypaphorine in root and stem-leaf
GHOSAL 1972a

DMT-N-oxide in root
OTT 1994 cited GHOSAL *et al.* 1972d

Desmodium triflorum

Sweethearts, “*Kolante*”, “*Cacoyer*” - Dominica
Medicinal: Species of *Desmodium* are used in baths.

Common in waste grounds in the West Indies.

A small perennial weed with a prostrate habit. The leaves are obovate, trifoliate. The flowers are very small and red-mauve. The pods are 1 cm long and segmented along the sides, usually 3-6 jointed.

HONEYCHURCH 1980

Used in the treatment of asthma and cough.

Also “offers protection against acetylcholine and histamine-aerosol-induced bronchospasms”

ADDY & AWUMEY 1984

Also reported by GHOSAL *et al.* 1972d who recorded a 30 minute onset and a four hour duration of activity. They additionally found that the LD₅₀ of the total alkaloid fraction was 215.5 mg/kg when given ip to mice.

Leaves used as galactagogue, for diarrhea, dysentery and convulsions.

Roots for coughs, asthma and applied to wounds and abscesses.

Common throughout plains of India and in the Himalayas up to 7000 ft.

GHOSAL *et al.* 1972d

Cosmopolitan tropics.

French- *Trèfle noir* [Bourb.]

VAN WIJK 1911

“*Jaharipana*” “*Khataldi*” (names used by Bhils in Mount Abu area (border of Rajasthan and Gujarat states, in western India)

Leaf paste used on wounds, eruptions and abscesses

SEBASTIAN & BHANDARI 1984

In eastern Rajasthan:

Leaves are used as a remedy for diarrhea, dysentery and applied to wounds and abscesses.

SINGH & PANDEY 1980

“*Desmodium triflorum* DC. is common throughout India: it is cosmopolitan in the tropics.

The fresh leaves are applied to wounds and abscesses that do not heal well. They are used internally as a galactagogue.

A paste of the bruised leaves with kamala is applied to indolent sores and itch. In the mofussil, the fresh juice of the plant is given to children for coughs.

In Ceylon, it is used in dysentery.

In Gold Coast it is recommended both as a laxative and as a cure for dysentery.”

Used medicinally in West Tropical Africa, and Mauritius.”

Bengal: *Kodalía, Kudaliya*

Bombay: *Janjimer, Ranmethi*

Ceylon: *Sirupullady*

Guam: *Agsom, Apo*

Gujerati: *Jhinopanddhio*

Hindi: *Kudaliya*

La Reunion: *Trefle noir*

Marathi: *Ranmeti*

Mauritius: *Trefle des chasseurs, Outoupilli, Kodalía*

Mende: *Koli-niki*

Mundari: *Jajaladbihir, Jajalad tasad*

North-Western Provinces: *Kudalig*

Porebunder: *Jhinkopanddhio*

Sinhalese: *Hinundupiya*

Tagalog: *Pacpaclangao*

Tegulu: *Muntamandu, Mumuddamoddu*

CAIUS 1989: pages 42, 45

“*Khataldi*”, “*Kunnappalai*”, “*Pookarisa*”, “*Tinikoriamani*”

Leaves are used medicinally for abscesses, diarrhea, dysentery, diseases of the nails, eruptions, toothaches, and wounds.

Whole plant used for body aches and swellings.

Unspecified parts used for breast pain, colic, diarrhea, menorrhoea, sores, spleen complaints, and whitlow.

Jain 1991: p. 72.

“*Marlomin*”:

Boiled into tea which is used for rheumatism in Haiti.

Said to be eaten greedily by stock in British Honduras.

Also said to be fodder plant in savannas of Colombia (called “*Angelica*”)

Leaves are eaten as a vegetable in Burma.

VON REIS ALTSCHUL 1973: #1769.

Native to Old and New World tropics.

Used in cases of dysentery.

Recommended as a green manure and cover-crop.

UPHOF 1968: p. 177.

In India: throughout plains up to 2500 meters in Kashmir. Also occurs in Africa, America, Australia, Bhutan, Burma, China, Malesia, Pacific Islands, Pakistan, Ryukyu, Sri Lanka, Taiwan, and Thailand.

SANJAPPA 1991: page 163.

***Desmodium triquetrum* (L.) DC**

[= *Hedysarum triquetrum* L.]

Pinyin: *hú lu chá*

Uses: Plant: Applied to abscesses; a tonic for dyspepsia, hemorrhoids, infantile spasms; insecticide, vermicide.

Chem.: Leaves contain potassium oxide, silicic acid, tannin.

Notes: Burmese use the plant to treat worms. Indonesians use the leaves externally for lumbago and internally for gravel.

DUKE & AYENSU 1985: vol. 1 page 324; cited PERRY 1980

***Desmodium triquetrum* (= *Pteroloma triquetrum*)**

Hu-lu-ch'a; *Bottle-gourd Tea*; *Herba Desmodii Triquetri*
HU *et al.* 1980

“*Pak Lo Sit*”: “...used as medicine.” (China)

“*Laught thay*”: “...used to kill the worm.” (Burma)

Used as a ‘remedy’ [*heilmitel*] in N. Sumatra.

VON REIS ALTSCHUL 1973: #1773

“*Adakkachokki*”, “*Salparni*” [Ed. last common name also used for *D. gangeticum*.]

Leaf is used for abdominal pains, coughs, and colds.

Whole plant is given for fevers.

Root is used to treat snakebite.

JAIN 1991: p. 72.

Occurs in India (in Andaman, Bihar, Karnataka, Meghalaya, the Nicobar Islands, Orissa, Punjab, Tamil Nadu, and Uttar Pradesh). Found also in Australia, Bhutan, Burma, China, Indo-China, Malaysia, New Caledonia, Pacific Islands, Sri Lanka and Thailand.

SANJAPPA 1991: page 163-164.

***Desmodium umbellatum* (L.) DC**

[= *Desmodium australe* (WILLD.) DC = *Desmodium grandifolium* DC. = *Hedysarum arboreum* ROXB. = *Hedysarum australe* WILLD. = *Hedysarum umbellatum* L.]

“*Par-po*”:

Young tips chewed with betel nut and put in mouth of sick babies. (Solomon Islands)

“*Sauthava*”:

Leaves are eaten as remedy for scaly skin resulting from too heavy of usage of “*yanjona*” [Kava kava] (*Serua* in Fiji Islands)

VON REIS ALTSCHUL 1973: #1775

“*Damie*”

Leaf used medicinally for fevers

Fruit is eaten as food.

JAIN 1991: p. 72.

Wood is used for fuel in Taiwan.

ALLEN & ALLEN 1981: page 229.

“Supposed by some to cause “Chillagoe disease” of horses.”

WEBB 1948: p. 84; cited BAILEY 1909

Found in the Paleotropics. (In India, this species occurs in Andaman and Nicobar Islands, and possibly also in Gujarat).
SANJAPPA 1991: page 165.

***Desmodium velutinum* (WILLD.) DC**

[= *Desmodium latifolium* DC. = *Desmodium plukenetti* (WIGHT & ARN.) MERR. & CHUN = *Desmodium virgatum* Zoll. et MOR. ex PRAIN = *Hedysarum latifolium* ROXB. = *Hedysarum velutinum* WILLD. = *Meibomia velutina* (WILLD.) O.KUNTZE.]

Said to be poisonous. (Sierra Leone)

VON REIS ALTSCHUL 1973: #1777

“*Latakari*”

Dried shoots are used for brooms

JAIN 1991: p. 72.

Common names: “*Chitkiboota*”, “*Latkan*”

CCRAS 1990: page 63

Occurs throughout India (up to 1350 meters in the Himalayas). Found also in Africa (tropical), Bhutan, Burma, China, Laos, Madagascar, Malesia, Nepal, Sri Lanka, Thailand and Vietnam.

SANJAPPA 1991: page 165.

***Desmodium* spp. not identified**

Unidentified species known as “*Ya-dab-kamlang-phra*” in Siam.

“*Medicinal root used as neurotic.*”

VON REIS ALTSCHUL 1973: #1774

Unidentified species known as “*Llina caiba*” by Cuna and “*Pega-pega*” by Panamanian Spanish speakers.

Macerated fruits are given to induce reciprocal affection in a desired lover in Ailigandi. [see similar usage under *Desmodium adscendens*.]

DUKE & VASQUEZ MARTINEZ 1986: page 75.

Unidentified species known as “*Zángò-dá-mà.pindì*”

“*Pour résorber une HERNIE SCROTALÉ, les Aka font des scarifications au niveau des testicules. Ils pilent quelques feuilles qu'ils font réchauffer quelques instants sur le feu et les appliquent sur les scarifications. Une grande feuille permet de les maintenir en place et sert en même temps de bandage hernaire.*”

Elizabeth MOTTE 1980: page 376.

Footnotes

¹ This value is derived from combining the figures for roots and above ground parts.

Alkaloid Summary

for the genus *Desmodium*

Compiled and edited by K. Trout

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[Note: “Whole Plant” indicates only that the analyzed extract was prepared from the whole plant. It does not necessarily imply that the alkaloid in question occurs in the whole plant.] All discrepancies from Ghosal and coworkers have been left intact.

Phenethylamines:

β -Phenethylamine

Desmodium cephalotes

In stem-roots (24 mg. from 3.2 kg) [7]

Major alkaloid in leaf (Low concentration.) [7]

Desmodium gangeticum

Roots (Amount not given.) [6, 17] (0.28 gm. from 1.6 kg of dried roots.) [5]

Desmodium gyrans

Leaves (0.0055% by dry weight; 0.11 gm. from 2 kg of dry leaves) [14]

Desmodium triflorum

Leaf [~ 0.002% by dry weight; 17% of 0.01% total alkaloids] [16]

Stems [~ 0.001% by dry weight; 15% of 0.008% total alkaloids] [16]

Roots [$< 0.002\%$ by dry weight; 6% of 0.01% Total alkaloids] {68 mg. from 8.3 kg of dry roots} [16]

Major alkaloid in Leaf / Minor in roots. (Amounts not given) [13]

A β -Hydroxyphenethylamine [Not identified.]

Desmodium gangeticum

Roots (New alkaloid. Amounts not given.) [Unidentified in this paper. Probably is the same compound as the β -ketophenethylamine mentioned in Ghosal and Bhattacharya (1972).] [5]

N,N-Dimethyl- β -keto-phenethylamine

Desmodium gangeticum

Roots (Previously unreported) [6]

Tyramine

Desmodium cephalotes

In stem-roots: 87 mg from 3.2 kg dried material. [7]

Minor alkaloid in leaf. [7]

Desmodium tiliaefolium

Roots (48 mg. from 2.3 kg. - dry weight) (also present in stems in lower concentrations?) [11]

Desmodium triflorum

Leaf. Minor. (Amount not given) [13] [9% of 0.01% total alkaloids] (dry weight) [16]

Stems [7% of 0.008% total alkaloids] (dry weight) [16]

Roots [11% of 0.01% Total alkaloids] {97 mg. from 8.3 kg} (dry weight) [16]

N-Methyltyramine

Desmodium gangeticum

Roots (Amount not given.) [6, 17]

Roots (~ 0.031% by dry weight; 0.5 gm. from 1.6 kg. of

dried roots.) [5]

Hordenine

Desmodium cephalotes

Major alkaloid in stem-roots (120 mg. from 3.2 kg of dried plant material.) [7]

Desmodium gangeticum,

Roots (Amount not given.) [6] (Major base. Amount not given.) [17]

Roots [~ 0.051% by dry weight; 0.82 gm.+ from 1.6 kg. of dried roots.] [5]

Desmodium tiliaefolium

Roots (12 mg. from 2.3 kg. - dry weight) (also present in stems in lower concentrations?) [11]

Desmodium triflorum

Leaf [Trace] [16]

Stems [Trace] [16]

Roots [3% of 0.01% Total alkaloids] {26 mg. from 8.3 kg of dry material} [16]

Candicine

Desmodium cephalotes

Stem-Roots (46 mg. from 3.2 kg dry weight) [7]

Desmodium gangeticum

Roots. (0.55 gm. of impure from 1.6 kg of dried roots.) [5] [Said by [17] to have been the first reported

isolation of this compound from the Leguminosae.] [17]

Roots (Amount not given.) [6, 12]

3,4-Dimethoxy- β -phenethylamine

Desmodium tiliaefolium

Roots (14 mg. from 2.3 kg. - dry weight) (also present in stems in lower concentrations?) [11]

β -Hydroxy-N-methyl-3,4-dimethoxy- β -phenethylamine

[= Normacromerine]

Desmodium tiliaefolium

Roots (Amount not given. 28 mg of impure gum from 2.3 kg of dry roots.) (in stems in lower concentrations?) [11]

N,N-Dimethyl-3,4-dimethoxy- β -phenethylamine

Desmodium tiliaefolium

Roots (Amount not given. 41 mg of impure liquid from 2.3 kg. of dry roots plus an additional 9 mg of alkaloid.) (also present in stems in lower concentrations?) [11]

3,4-Dihydroxy-phenethyl-trimethyl-ammonium cation

(as hydroxide)

Desmodium triflorum

Roots [3% of 0.01% Total alkaloids] {28 mg. from 8.3 kg} (dry weight) [16]

Tetrahydroisoquinolines:

Salsolidine

Desmodium cephalotes

Traces in leaf. [7]

Stem-Roots (28 mg. from 3.2 kg dry weight) [(\pm) salsolidine] [7]

Desmodium tiliaefolium

Roots (72 mg. from 2.3 kg. - dry weight) (also present in

stems in lower concentrations?) [11]

Salsoline

Desmodium tiliaefolium

Roots (32 mg. from 2.3 kg. - dry weight) (also present in stems in lower concentrations?) [11]

Indoles other than tryptamines (including tryptophans):

Indole-3-acetic acid

Desmodium triflorum

Leaf [12% of 0.01% total alkaloids] (dry weight) [16]
(Minor alkaloid) [13]
Stems [Trace] [16]
Roots [Trace] [16]

Gramine

Desmodium pulchellum

Whole plant (Minor alkaloid) [9] (Amount not given) [10]
Stem and Leaf of young seedlings. [2% of 0.12% Total alkaloid] {~ 0.002% by dry weight} [15]
Stem and leaf of mature plant [7% of 1.4% Total alkaloid] {0.098% by dry weight} [15]
Stem-leaf (Amounts not given) [4]

Abrine (N-Methyltryptophan)

Desmodium tiliaefolium

Roots (13 mg from 2.3 kg. - dry weight) (also present in stems in lower concentrations?) [11]
Root (Amount not given) [4]

N,N-Dimethyltryptophan

Desmodium triflorum

Leaf [5% of 0.01% total alkaloids] (dry weight) [16]
Stems [Trace] [16]
Roots [Trace] [16] [Amount not given] [13]

S- (+) N,N-Dimethyltryptophan methyl ester

Desmodium triflorum

Leaf [5% of 0.01% total alkaloids] (dry weight) [16]
(Minor. Amount not given) [13]
Stems [2% of 0.008% total alkaloids] (dry weight) [16]
Roots [3% of 0.01% Total alkaloids] {25 mg. from 8.3 kg.} (dry weight) [16]

Hypaphorine (N,N-Dimethyltryptophan metho cation)

Desmodium floribundum

Root and stem-leaf. (Amount not given.) [4] [Primary source for this analysis is the Ph.D Thesis of Rakesh Mehta (1973) from Banaras Hindu University.]

Desmodium gangeticum

Roots (Amount not given.) [4, 5, 12, 17]

Desmodium gyrans

Roots [4]
Roots (0.24% by dry weight; 1.2 gm. from 0.5 kg. of dry roots) [14]

Desmodium tiliaefolium

Roots (68 mg. from 2.3 kg. - dry weight) (also present in stems in lower concentrations?) [11]
Root and stem-leaf (Amount not given) [4]

Desmodium triflorum

Leaf [8% of 0.01% total alkaloids] (dry weight) [16]
Minor in leaf. (amount not given) [13]
Stem [2% of 0.008% total alkaloids] [16]
Roots [5% of 0.01% total alkaloids] {37 mg. from 8.3 kg as HCl} (dry weight) [16]
Root and stem-leaf (Amount not given) [4]
Major in roots. (amount not given) [13]

Hypaphorine methyl ester

Desmodium triflorum

Leaf. (Minor. Amount not given) [13] [Trace] [16]
Stems [Trace] [16]
Roots [2% of 0.01% Total alkaloids] {25 mg. from 8.3 kg} (dry weight) [16]

Tryptamines:

Tryptamine

Desmodium tiliaefolium

Roots (17 mg. from 2.3 kg. - dry weight) (also present in stems in lower concentrations?) [11]

Desmodium triflorum

Stem-leaf (amount not given) [4]

N-Methyltryptamine

Not yet reported from **any** *Desmodium* species in spite of 5-Hydroxy-N-methyltryptamine, 5-Methoxy-N-methyltryptamine and N-Methyltryptophan (Abrine) all having been found as bio-synthetic products within the genus.

N,N-Dimethyltryptamine

Desmodium caudatum

Major alkaloid in roots [0.087% by dry weight. Ed.: Procedure likely resulted in some loss.] [21]
Minor alkaloid in stem [0.004% dry wt.] [21]

Desmodium gangeticum

Aerial parts [? gm. of thick oil + 0.41 gm (latter as chloroform soluble acetate) obtained from 1 kg of fresh wet material.] [3]
Green Plant (Stem and Leaf) [4, 6]
Roots (Amount not given) [4, 6] [0.38 gm. from 1.6 kg. of dried roots. i.e. 0.02% DMT] [5]
Seeds [6]
Fruit [4]

Desmodium gyrans

Leaves (82 mg. from 2 kg of dry) [14]
Roots (Minor alkaloid.) [14]

Desmodium pulchellum

Whole plant (Minor alkaloid) [8] (Mention.) [9]
(Amount not given) [10]
Stem and leaf of young seedling [~ 0.074% by dry weight; 62% of 0.12% Total alkaloid] [15]
Stem and leaf of mature plant [0.294% by dry weight; 21% of 1.4% Total alkaloid] [15]
Root of young seedling [~ 0.27% dry weight; 73% of 0.37% Total alkaloid] [15] [i.e. 27 mg. in 10 gm. of dried material]

Desmodium alkaloid summary

Root of mature plant [0.451% by dry weight; 41% of 1.1% Total alkaloid] [Also, in same paper: 1.8 kg dried roots yielded 0.7 gm + 0.09 gm; i.e. 0.043%.] [15]
Fruit (green) of mature plant [12% of 0.01% Total alkaloid] {~ 0.001% by dry weight} [15]
Seeds (ripe) of mature plant [4% of 0.02% Total alkaloid] {~ 0.001% by dry weight} [15]
Root, stem-leaf and fruit (Amounts not given) [4]

N,N-Dimethyltryptamine-N-oxide

Desmodium gangeticum

Aerial parts [0.21 gm. + 0.12 gm. (latter as chloroform soluble acetate) from 1 kg. of fresh wet material.] [3]
Green Plant (Stem and Leaf) [4, 6, 13]
Roots (Amount not given.) [6, 17] (0.12 gm. + 0.02 gm. from 1.6 kg. of dried roots.) [5]
Fruit [4]
Seeds [6, 12]

Desmodium gyrans

Leaves (0.18+ gm. from 2 kg) [14]
Stem / leaf [12]
Roots. Minor alkaloid. Amount not given. [14]

Desmodium pulchellum

Whole plant (Minor alkaloid) [8] (Mention.) [9] (Amount not given) [10]
Stem and leaf of young seedling [0.023% by dry weight; 19% of 0.12% Total alkaloid] [15]
Stem and leaf of mature plant [0.070% by dry weight; 5% of 1.4% Total alkaloid] [15]
Root of young seedling [~ 0.011% by dry weight; 3% of 0.37% Total alkaloid] [15]
Root of mature plant [0.121% by dry weight; 11% of 1.1% Total alkaloid] [Also, in same paper: 1.8 kg of dried roots yielded 0.18 gm + 0.042 gm; i.e. 0.012%.] [15]
Fruit (green) of mature plant [~ 0.007% by dry weight; 72% of 0.01% Total alkaloid] [15]
Seeds (ripe) of mature plant [Trace] [15]
Root, Stem-leaf and Seeds [12]
Root, stem-leaf and fruit (Amounts not given) [4]

Desmodium triflorum

Leaf [trace] [16]
Stems [3% of 0.008% total alkaloids] (dry weight) [16]
Roots [4% of 0.01% Total alkaloids] {41 mg. from 8.3 kg} (dry weight) [16]
Minor in roots. (amount not given) [13]

N,N-Dimethyltryptamine metho cation

Desmodium pulchellum

Root and stem-leaf (Amounts not given) [4]
Root of young seedling [~ 0.041% by dry weight; 11% of 0.37% Total alkaloid] [15]
Root of mature plant [0.154% by dry weight; 14% of 1.1% Total alkaloid] [Also, in same paper: 1.8 kg of dried root yielded 0.43 gm; i.e. 0.24%.] [15]

5-Hydroxy-N-methyltryptamine

Desmodium pulchellum

Stem and leaf of mature plant. [0.056% by dry weight;

4% of 1.4% total alkaloid.] [15]
Root of young seedling [~ 0.022% by dry weight; 6% of 0.37% Total alkaloid] [15]
Root of mature plant [0.077% by dry weight; 7% of 1.1% Total alkaloid] [15]
Root (Amount not given) [4]

Bufotenine

Desmodium caudatum

Major alkaloid in stem (0.04% by dry weight.) [21]

Desmodium gyrans

Leaf (68 mg. from 2 kg. of dry leaves.) [14]

Desmodium pulchellum

Whole plant (Minor alkaloid) [8] (Mention.) [9] (Amount not given) [10]
Stem and leaf of young seedling [~ 0.011% by dry weight; 9% of 0.12% Total alkaloid] [15]
Stem and leaf of mature plant [0.112% by dry weight; 8% of 1.4% Total alkaloid] [15]
Root of mature plant. {Trace} [15]
Root and stem-leaf (Amount not given) [4]

Bufotenine-N-oxide

Desmodium caudatum

Minor alkaloid in roots. [0.03%] [21]
Minor alkaloid in stem. [0.004%] [21]

Desmodium pulchellum

Stem and leaf of mature plant. {Trace} [15]
Root of mature plant. {Trace} [15]

5-Methoxy-N-methyltryptamine

Desmodium gyrans

Leaf (97 mg. from 2 kg. of dried leaves) [14]

Desmodium pulchellum

Whole plant (Minor alkaloid) [8] (Amount not given) [9]
Stem-leaf (Amounts not given) [4]
Stem and leaf of young seedling [~ 0.010% by dry weight; 8% of 0.12% Total alkaloid] [15]
Stem and leaf of mature plant [0.154% by dry weight; 11% of 1.4% Total alkaloid] [15]
Root of young seedling. [Trace] [15]
Seeds (ripe) of mature plant [~ 0.002% by dry weight; 8% of 0.02% Total alkaloid] [15]

5-Methoxy-N,N-dimethyltryptamine

Desmodium gangeticum

Aerial parts (0.057% by wet weight; 0.57 gm. from 1 kg. of fresh wet material.) [3]
Stem-leaf [4]
Green Plant (Stem and Leaf) [6]

Desmodium gyrans

Leaves (35+ mg. from 2 kg) [14]
In stem/ leaves [4]
Roots [4]

Desmodium pulchellum

Whole plant (0.2-0.25% by dry weight.) [8] (Major alkaloid) [9] (Amount not given. Plates crystallized from 8.36 grams of impure chromatographic fraction residue; from 4 kg of dried whole plant.) [10]

Stem and leaf of young seedling [Trace.] [15]
 Stem and leaf of mature plant [0.476% by dry weight;
 34% of 1.4% Total alkaloid] [15]
 Root of mature plant [0.132% by dry weight; 12% of
 1.1% Total alkaloid] [Also, in same paper; 1.8 kg. of
 dried roots yielded 0.23 gm; i.e. ~ 0.013% by dry
 weight.] [15]
 Seeds (ripe) of mature plant [0.002% by dry weight;
 10% of 0.02% Total alkaloid] [15]
 Root, stem-leaf and flower (Amounts not given) [4]

Desmodium racemosum

Whole plant. (Amount not given) [18]

5-Methoxy-N,N-dimethyltryptamine-N-oxide

Desmodium gangeticum

Aerial parts [0.18 gm. from 1 kg of fresh wet material]
 [3]
 Stem-leaf [4]
 Green Plant (Stem and Leaf) [6]

Desmodium gyrans

Leaves (trace) [14]

Desmodium pulchellum

Whole plant (Minor alkaloid) [First reported occur-
 rence of this alkaloid.] [9] (Minor alkaloid) [17 mg. as
 an impure violet oil, contaminated with gramine, was
 obtained from 4 kg. of dried whole plant.] [10]
 Stem and leaf of mature plant [0.070% by dry weight;
 5% of 1.4% Total alkaloid] [15]
 Stem-leaf (Amounts not given) [4, 17]

5-Methoxy-N,N-dimethyltryptamine metho cation

Desmodium pulchellum

Root of mature plant [0.066% by dry weight; 6% of
 1.1% Total alkaloid] [15]

β-Carbolines:

As has been noted by Allen and Holmstedt (1980) [2], all
 identifications of β-carbolines, especially with regards
 to degree of saturation, should be regarded with
 caution due to similar properties and relative ease of
 interconversion. The below are given as reported.

A β-carboline [Not identified.]

Desmodium gangeticum

Seeds. [6]

Harman [= 1-Methyl-β-carboline]

Desmodium pulchellum

Fruit and seed (Amount not given) [4]

Leptocladine [= N_b-Methyl-H⁴-harman = 2-Methyl-H⁴-
 harman = 1,2-Dimethyl-H⁴-β-carboline]

Desmodium gangeticum

Aerial parts (0.03 gm. from 1 kg. of fresh wet material)
 [3]
 Green Plant (Stem and Leaf) [6]
 Stem-leaf (Amount not given.) [4]

Desmodium gyrans

Stem/ leaves (Amount not given.) [4]

Desmodium pulchellum

Seed (Amount not given) [4]

N_b-Methyl-β-carbolinium cation [= 2-Methyl-β-
 carbolinium cation]

Desmodium pulchellum

Fruit (green) of mature plant [< 0.001% by dry weight;
 8% of 0.01% Total alkaloid] [15]
 Seeds (ripe) of mature plant [~ 0.003% by dry weight;
 13% of 0.02% Total alkaloid] [15]

6-Methoxy-tetrahydro-β-carboline

Desmodium pulchellum

Stem-leaf (Amounts not given) [4]

6-Methoxy-tetrahydroharman [= 6-Methoxy-1-
 methyl-H⁴-β-carboline]

Desmodium pulchellum

Root and seed (Amounts not given) [4]

6-Methoxy-N_b-methyl-H⁴-β-carboline [= 6-Methoxy-2-
 methyl-H⁴-β-carboline]

Desmodium gangeticum

Green Plant (Stem and Leaf) (Previously unreported in
 nature) [6]

Desmodium pulchellum

Stem and leaf of mature plant [2% of 1.4% Total
 alkaloid] {0.028% by dry weight} [15]
 Root of young seedling [7% of 0.37% Total alkaloid {~
 0.026% by dry weight} [15]
 Root of mature plant [9% of 1.1% Total alkaloid]
 {0.099% by dry weight} [15]
 Seeds (ripe) [3% of 0.02% total alkaloids.] {~ 0.001%
 by dry weight} [15]

6-Methoxy-N_b-methyl-β-carbolinium cation [= 6-
 Methoxy-2-methyl-β-carbolinium cation.]

Desmodium gangeticum

Fresh aerial parts (0.07 gm. from 1 kg.) (Purified; 0.04
 gm.) [3]
 Stem-leaf (Amount not given.) [4]
 Seeds [12]

Desmodium pulchellum

Seeds [12]

6-Methoxy-1-methyl-N_b-methyl-β-carboline [= 6-
 Methoxy-1,2-dimethyl-β-carboline]

Desmodium pulchellum

Seeds (ripe) of mature plant [26% of 0.02% Total
 alkaloid] {~ 0.005% by dry weight} [15]

6-Methoxy-1-methyl-N_b-methyl-β-carbolinium cation [=
 6-Methoxy-1,2-dimethyl-β-carbolinium cation]

Desmodium pulchellum

Root of young seedling {Trace} [15]
 Fruit (green) of mature plant [2% of 0.01% Total
 alkaloid] {< 0.001% by dry weight} [15]
 Seeds (ripe) of mature plant [8% of 0.02% Total
 alkaloid] {~ 0.002% by dry weight} [15]

Unidentified alkaloids reported:

Unidentified β-phenethylamines

Desmodium gangeticum

Roots. 0.18 gm. from 1.6 kg [5]

Desmodium gyrans

Desmodium alkaloid summary

Roots traces [14]

Unidentified quaternary β -phenethylamine

Desmodium triflorum

Minor in roots. (amount not given) [13]

Four quaternary β -phenethylamines and tetrahydroisoquinolines.

Desmodium tiliaefolium

Roots (Amount not given) [11]

Uncharacterized indole-3-alkylamines

Desmodium gyrans

Leaves (27 mg. from 2 kg) [14]

Roots 2 Minor alkaloids. [14]

Unidentified indole bases

Desmodium gangeticum

Seeds [6]

Unidentified quaternary indole bases

Desmodium gangeticum

Green Plant (Stem and Leaf) [6]

Unidentified β -carboline

Desmodium gangeticum

Seeds [6]

Desmodium gyrans

Leaves (26 mg. from 2 kg) [14]

Unidentified bases

Desmodium gangeticum

Water soluble unidentified bases. Unspecified plant parts. [12]

Desmodium pulchellum

Stem and leaf of mature plant [0.042% by dry weight; 3% of 1.4% Total alkaloid] [15]

Root of young seedling also mature plant [Traces in both] [15]

Fruit (green) of mature plant [$< 0.001\%$ by dry weight; 6% of 0.01% Total alkaloid] [15]

Seeds (ripe) of mature plant [$\sim 0.006\%$ by dry weight; 28% of 0.02% Total alkaloid] [15]

Desmodium triflorum

Leaf, Stems, Roots [16]

Unidentified quaternary base

Desmodium cephalotes

Root (22 mg. from 3.2 kg) [7]

Other simple bases:

Betaine

Desmodium tiliaefolium

Roots (6 mg. from 2.3 kg.) (also present in stems in lower concentrations) [11]

Desmodium triflorum

Leaf [16]

Stems [16]

Roots [16]

Minor in Root and Leaf. (Amounts not given) [13]

Choline

Desmodium cephalotes

Stem-Roots (57 mg. from 3.2 kg) [7]

Desmodium gangeticum

Root (Amount not given.) [5, 12]

Desmodium gyrans

Leaf (92 mg from 8.3 kg. dry roots.) [14]

Roots. (0.4 gm. from 0.5 kg) [14]

Desmodium tiliaefolium

Roots (83 mg. from 2.3 kg. of dried roots.) (also present in stems in lower concentrations) [11]

Desmodium triflorum

Leaf [16]

Stems [16]

Roots [23 mg from 8.3 kg. of dry roots] [16]

Minor in Leaf and Roots. (Amounts not given) [13]

S- (-) - Stachydrine

Desmodium triflorum

Leaf [2% of 0.01% total alkaloids] (dry weight) [16]

Stems [3% of 0.008% total alkaloids] (dry weight) [16]

Roots [2% of 0.01% Total alkaloids] {21 mg. from 8.3 kg} (dry weight) [16]

Trigonelline

Desmodium triflorum

Leaf Minor. (Amount not given) [13] [Trace] [16]

Stems [4% of 0.008% total alkaloids] (dry weight) [16]

Roots [1% of 0.01% Total alkaloids] {13 mg. from 8.3 kg} (dry weight) [16]

A couple of Nonalkaloidal Substances and some Phospholipids:

Glycoside (New - the 1-Glucosylrhannoside of physcion)

Desmodium pulchellum
Identified in seeds. [19]

A Lactone (C₁₆H₃₀O₂)
Desmodium gangeticum
Roots. [1]

Phosphatidyl ethanolamine
Desmodium gangeticum
Seeds [20]

Phosphatidyl inositol
Desmodium gangeticum
Seeds [20]

Phosphatidyl serine
Desmodium gangeticum
Seeds [20]

Sphingomyelin
Desmodium gangeticum
Seeds [20]

1. ALLEN & ALLEN 1981: p. 229, citing AVASTHI & TEWARI 1955a & 1955b
2. Allen & Holmstedt 1980
3. Banerjee & Ghosal 1969
4. Ghosal 1972a *Planta Medica* 21 (2): 200-209.
5. Ghosal & Banerjee 1969
6. Ghosal & Bhattacharya 1972
7. Ghosal & Mehta 1974
8. Ghosal & Mukherjee 1964
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10. Ghosal & Mukherjee 1966
11. Ghosal & Srivastava 1973b
12. Ghosal *et al.* 1970b
13. Ghosal *et al.* 1971c
14. Ghosal *et al.* 1972a
15. Ghosal *et al.* 1972c
16. Ghosal *et al.* 1972d
17. Ghosal *et al.* 1972e
18. Hsü *et al.* 1982
19. ICMR 1976 p. 347, citing TIWARI & BANSAL 1971
20. Rastogi *et al.* 1971
21. Ueno *et al.* 1978



Desmodium gangeticum

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A Desmodium species (D. incanum?) found growing on the slopes of Haleakala, Maui, Hawaii

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