MEDICINAL PLANTS
— IN MONGOLIA —

World Health Organization
Western Pacific Region

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Contents

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Preface

This volume—one in a series on medicinal plants in Member States of WHO's Western Pacific Region—introduces Mongolian traditional medicine and details the nature and uses of medicinal plants found in the country.

Traditional medicine has always played a major role in Mongolia. Traditional medicine continues to be practiced widely, playing a vital role in the health-care needs of a large portion of the population. Folk medicine, based on the experiences of nomadic people, has its own unique medical theory, techniques and medications in Mongolia. Some aspects of Mongolian folk medicine—along with elements from other Asian systems, such as Tibetan medicine, Ayurveda and traditional Chinese medicine—have been integrated into the Mongolian medical system.

Traditional medicine practices and knowledge, including the use of medicinal plants, have been passed from one generation to the next via oral traditions. Without systematic documentation of the role of indigenous plants in Mongolia, we risk losing information about herbal medicine in Mongolia. This volume serves to help record and document this important traditional medicine system.

Researchers and practitioners from various branches of science—including "otoch manramba" or doctors of traditional medicine, pharmacists, pharmacologists, medical doctors, botanists and chemists—teamed up to develop this book. The authors pored over hundreds of books and manuscripts to document the properties of medicinal plants in Mongolia.

This publication presents the medicinal plants used most commonly in Mongolia. Each monograph contains colour pictures of the plant and a wide array of information, from the Tibetan and English names to the microscopic characteristics of the plant.

This book should increase understanding of the value of medicinal plants in Mongolia and increase the evidence base for the safe and efficacious use of herbs in health care.

Shin Young-Soo, MD, Ph.D.
WHO Regional Director for the Western Pacific

Achillea asiatica Serg.

WHO

WHO

Mongolian name
Aziin tologch ovs

Tibetan name
Bambo

English name
Asiatic Yarrow

Synonym: *A. setacea* auct. non Waldst. et Kit. [1]

Description: Perennial herb, with rhizome. Stem 20–50 cm tall, whitish because of long, slender, entangled hairs, erect, branched only at the inflorescence. Basal leaves 10–20 cm long, 1–2 cm wide, cauline leaves smaller, sessile, lanceolate, two to three times pinnatisected, linear and acute segments not more than 3 mm in width, closely arranged. Heads, with 2–5 mm long peduncles, form a dense corymb, like a brush. Ligulate flowers usually purple, sometimes white, ca. 3 mm long. Disk flowers yellow.

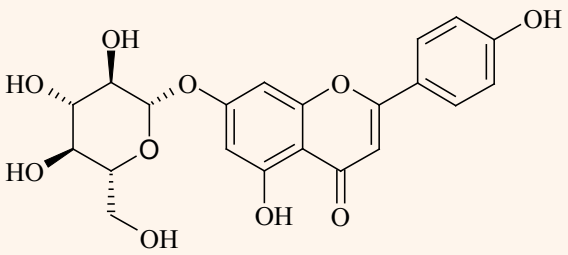
Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong. Alt., Ikh n.

Habitat: Sandy terraces on western and eastern slopes of mountains, forest fringes [2–5]

Parts used: Root and whole herb.

Traditional Uses: The taste is bitter and hot, and the potency is coarse and sharp. It is used for the following: treating persistent fever. It is an ingredient in the following traditional prescriptions: Agar-11, Ar ur-7, Gavar-9, Ganman-7, Gurgum-8, Dilmanmar, Tsarvan-15, Shinjyd-21, and Dorjjan [5–8].

Chemical constituents: sugars [9], organic acids, 0.2–0.5% essential oil: hamazulene, α-pinene, β-pinene, sabinene, camphor, limonene, cineole, *n*-cymol [10,11], coumarins: umbelliferone, scopoletin [12], flavonoids [13]: kaempferol [12], vitexin, isovitexin, orientin, isoorientin [13], apigenin, diosmetin, gentauredin, apigenin-7-*O*-glucoside [14], sesquiterpene lactones: 8α-angeloyloxy-2α,4α,10β-trihydroxy-6βH,7αH,11βH-1(5)-guaien-12,6α-olide, 8α-angeloxy-1β,2β,4β,5β-diepoxy-10β-hydroxy-6βH,7αH,11βH-guaien-2,6α-lide, 8α-angeloxy-4α,10β-dihydroxy-2-oxo-6βH,7αH,11βH-1(5)-guaien-12,6α-olide, 8-desacetyl-matricarin, 8α-tigloxy-artabsin, 8α-tigloxy-3-oxa-artabsin, 8α-angeloxy-artabsin, 3-oxa-achillicin, 8-acetoxy-artabsin, and 8-angeloxy-3-oxa-artabsin [15].



Apigenin-7-*O*-glucoside

Bioactivities: Anti-inflammatory, haemostatic, and bile-expelling [16].

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Acorus calamus L.

WHO

Mongolian name
Egel godil-ovs

Tibetan name
Shudag nagbo

English name
Sweet flag

Synonym: *A. asiaticus* Nakai [1]

Description: Perennial, with 50–100 cm tall and grooved triangle stems. Creeping rhizomes with abundant slender roots. Leaves bright green, lanceolate. Inflorescence 7 cm long and thick spadix. Flowers bisexual, actinomorphic, with six white narrow tepals.

Distribution: Khang., Mong-Dag., Khyang., Dor. Mong.

Habitat: Lake and lake shores [2–4]

Parts used: Roots and rhizome

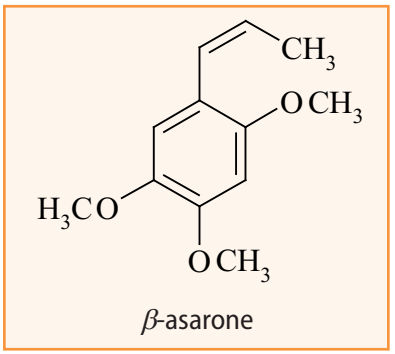
Traditional Uses: The taste is hot and bitter, and the potency is sharp and coarse. It is used for the following: treating diphtheria and malignant carbuncle, improving the power of the stomach and appetite, and heart function. Also used to halt diarrhea, enhance bone growth, destroy parasitic worms (nematocide), to treat fever from bacterial infection, desiccate suppuration, healing the lymph system, some skin diseases, and to treat tumuors.

It is an ingredient of the following traditional prescriptions: Shingun-8, Shudag-4, Senden-6, Dinman 12, Donjugohaw, Menbo-9, Ulchu-18, Chun-5, Archun, Boichun, Gurchun, Sugchun, Shichun, Ludud 18, Shur-25, and Yamala-3 [4–7].

Microscopic characteristics:

Rhizome: Stele is of a rounded parenchyma enclosing large spaces. Oleoresinous cells and abundant starch grains are found. Vascular bundle numerous, small, ovate and concentric type. Secreting cells are present in the parenchyma [8].

Chemical constituents: sugars [9], organic acids and their derivatives, terpenoids: *trans*-2-ethoxy-2(10)-pinene, 4-ethoxy-1-*n*-menthene, *endo*-isocamphanone, carvenone, *n*-menthadien-1(7),2-ol-8, selinadienol [10], 1.4–5.8% essential oil [9,11]: α-pinene, camphene, camphor, borneol, calamen, β-pinene, calamin, calamol, azulene [9], sesquiterpenes: calamenone, isocalamendiol [12], acoragermacrone, germacrone, pre-isocalamendiol [13], and others [14], aromatic compounds: α-asarone [15–17], γ-asarone, *cis*-isoeugenol methyl ether, *trans*-isoeugenol methyl ether and others [17], flavonoids, quinones [18], 4.6% fat [9]. β-asarone [17,19,20], acorenone, (*Z*)-sesquilavandulol, and dehydroxy-isocalamendiol [19] are the main components.



β-asarone

Bioactivities: Spasmolytic, anticonvulsant, antibacterial, antifungal, bile-expelling [9], sedative, anesthetic [21], immunosuppressive [22], and cytotoxic [23].

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Aquilegia sibirica Lam.

WHO

WHO

Mongolian name
Sibiri Udval, Khokh udval, Zusten tsetseg

Tibetan name
Udval ombo

English name
Siberian Columbine

Synonym: *A. bicolor* Ehrh. [1]

Description: Perennial herb, with rhizome. Stem 25–70 cm tall, glabrous, more or less branched near the inflorescence. Leaves one to two times ternate, leaflets wide reniform, with long petiolule, divided not reaching the middle into three segments. Flowers blue, 5 cm in diameter, sepals 2–3 cm long, 1–2 cm wide, petals blue, with yellowish or light margin, shorter than sepals. Spur curved like a hook. Follicles five, 2 cm in length.

Distribution: Khovs., Khent., Khang., Khovd, Dund. Khalkh.

Habitat: Larch and birch forests in forest-steppe belt [2–5].

Parts used: Herb, leaves, and flowers

Traditional Uses: The taste is sweet, bitter and astringent, and the potency is blunt, heavy and cooling. It is used for the following: treating hot disorders of the lung, improving the lymphatic system, and for polyuria. Also used to detoxify, treat fever, liver fever, improve the function of the stomach and intestine, as a hemostasic, and for tightness of the throat caused by inflammation. It is an ingredient of the following traditional prescriptions: Sorol-5, Zandan-18, Jonsh-21, Zandan-8, Managseljor, Tanchin-25, Bayagzava-13, Bragshun-7, Givan-9, Udval-5, Gavur-7, 14, 17, Gurgum-7, Gurgum-8, and Gurgumchogdan [5–9].

Microscopic characteristics:

Leaf: Leaf is dorsiventral. Palisade double-layered, spongy parenchyma five- to seven-layered. Vascular bundle collateral. Anomocytic stomata occur on the lower surface of the leaf. The outer walls of the epidermal cells are thick, wavy.

Stem: The transverse section stem is rounded. Epiderm thick-walled. Parenchymatous cells of grand tissue four- to six-layered. Vascular bundle collateral. Sclerenchyma outer side of vascular bundle are visible. Conjoint phloem and xylem occur parenchyma with lignified walls [10].

Chemical constituents: Alkaloids [11].

Qualitative and quantitative assay: Alkaloids in the plant are confirmed by the brown precipitation reaction with Wagner's reagent. Total alkaloid content is determined by a gravimetric method [10].

Qualitative and quantitative standards: Loss on drying, not more than 8.0%. Ash, not more than 2.5%. Organic matter, not more than 2.0% and mineral matter, not more than 0.2%. Water-soluble extractive, not less than 30.0%, and total alkaloid, not less than 2.0% [10].

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Artemisia macrocephala Jacquem. ex Besser

WHO

WHO

Mongolian name
Eerem sharilj, Tsarvan

Tibetan name
Tsarvon

English name
Largehead Wormwood

Synonyms: *A. griffithiana* Boiss., *A. sieversiana* var. *pygmaea* Kryl., *A. akbaitalensis* O.Fedtsch., *A. krylovians* Steinb., *Pyrethrum pamiricum* O.Fedtsch. [1]

Description: Annual herbs, which are grey because of whitish slant hairs. Stems solitary or several, 6-25cm tall, erect, or branched from the base. Leaves, except the cauline petiolate, with dissected auricles at the base. Leaf blade oblong ovate to broadly ovate, 1.5–4 cm long, 1–2 cm wide, densely hairy on both surfaces, light grey, twice pinnatisected, with two pairs of primary segments, final segments ternate, linear oblong or narrow spatulate, 1–4 mm long, 5–15 mm

wide, rounded at the apex. Bracts sessile, ovate or linear lanceolate. Heads globular, 4–10 mm in diameter, with long peduncle, drooping, forming raceme or broad panicle. Achene oblong-ovate.

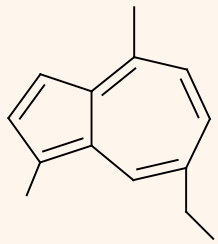
Distribution: Khovs. (Khovsgol lake), Khent., Khang., Mong-Dag., Dund. Khalkh, Ikh n., Khovd, Mong. Alt., Alt. ovor (east), Alash.

Habitat: Mostly on rocks in dry beds of large and small rivers [2–4].

Parts used: Herb and flowers

Traditional Uses: The taste is bitter and hot and coarse. It is used for the following: treating inflammation of the throat, lung diseases, and fever from tumors. It is an ingredient of the following traditional prescriptions: Jugan-25, Tsarvon-5, Tsarvon-48, and Zembe-5 [4–7].

Chemical constituents: The aerial part contains 0.15–2% essential oil: azulene, α-pinene, β-pinene, camphene, limonene, *n*-cymol, 1,8-cineole, camphor, borneol, hamazulene, thujone, *n*-cresol, sabinene, myrcene, α-terpinene, γ-terpinene, isoborneol and other terpenoids [8,9]. Flowers contain 0.42–0.61% essential oil, and 7.43–10.5% of the essential oil is hamazulene [8].


Hamazulen

Bioactivities: Essential oil, especially hamazulene shows anti-inflammatory and anesthetic activities [10].

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Asparagus dahuricus Link

OHO

OHO

Mongolian name
Daguur khereen nuden, Ukhriin idee, Zeerenshil

Tibetan name
Neshin

English name
Dahurian Asparagus

Synonym: *A. gibbus* Bunge, *A. tuberculatus* Bunge ex Iljin [1].

Description: Perennial, 30–90 cm tall erect stems, with obliquely upward growing branches. Cladodes 10–50 mm long, glabrous, green, borne in clusters by 3–8. Stem apexes and cladodes glabrous or with small gristly alternate warts. Scale leaves on the stem short, with an acute spur. Peduncles 4–7 mm long. Petals of male flowers 4–6 mm long. Berry orbicular, red, turning almost black at maturity.

Distribution: Khang., Khent., Mong-Dag., Khyang., Dund. Khalkh, Dor. Mong., Olon n., Dor. Gobi.

Habitat: Meadows in mountain steppe and steppe zone [2–5].

Traditional Uses: The taste is sweet and astringent, and the potency is warm and light. It is used for the following: Enhancing longevity, healing kidney diseases, fever of lung, inflammation of the throat and tonsilitis, lymph diseases, xerostomia, chronic diseases of the lung, and diabetic diseases. Also used for treating wounds, phlegm and bile diseases, and improving appetite. It is an ingredient of the following traditional prescriptions: Boljar-8, Brogni-6, Brega-14, Vanlag-37, Dofel-13, Dovchin-13, Dosel-22, Sugmel-7, Dajid-13, Jats-14, Zava-9, and Sojid-11 [5–10].

Microscopic characteristics:

Root: The transverse section is rounded. Periderm is many layered and compact. Inner side of root has distinct parenchymatous cells with thin-walled and vascular bundles [11].

Chemical constituents: Roots contain sugar [5] and saponins [11].

Qualitive and quantitative assay: Saponins in the plant are detected by reactions to produce a foam with lead acetate. Total saponin content is determined by gravimetric analysis [11].

Qualitive and quantitative standards: Loss on drying, 9%. Ash, not more than 8.5%. Organic matter, not more than 0.5%, and mineral matter, not more than 1.0%. Water-soluble extractive, not less than 10.0%. Total saponin content, not less than 0.5% [11].

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7. Danzanpuntsag., Crystal rosary. XVIIIth century.
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FABACEAE

Astragalus mongholicus Bunge

WHO

WHO

Mongolian name
Mongol khunchir, Khunchir

Tibetan name
Sradgar

English name
Mongolian Milkvetch

Description: Flowering stems and many basal leaves, emerging from a rhizome, form a bush. Stems 10–25 cm tall, with many leaves. Leaves two to three times pinnatisected. Flowers big, calyx green with violet shade, corolla white, abundant. Fruit nut-like achene

Distribution: Khovs., Khang., Mong-Dag.

Habitat: Mountain meadows and river banks in the mountain forest-steppe belt [1–5]

Part used: Root

Traditional Uses: The taste is sweet and the potency is hot. It is used for the following: treating light swelling, water swelling and phlegm, and improving physical energy and strength. It is also used to soothe a purulent inflammation, for wound-healing, to treat lung fever, oliguria and hemorrhoids. It is an ingredient of the following traditional prescription: Jurur-6 [5,6]

Microscopic characteristics:

Root: The transverse section is rounded. The cork consists of many rows of cells. Phelloderm, 3–5 rows of collenchymatous cells. Endodermis developed under the cork. In the inner part of endodermis pericycle fibres are developed. Vascular bundles in the pith region. Parenchymatous cells contain starch granules [7].

Chemical constituents: Root contains flavonoids: formononetin, 3-hydroxy-formononetin, 2,3-dihydroxy-7,4-dimethoxyflavone, 7,3-dihydroxy-4-methoxyflavone 7-*O*-glucoside, 7,3-dihydroxy-4-dimethoxyflavone, saponins: astragaloside I-X, isoastragaloside I-IV, polysaccharides, Above-ground parts contain astragaloside quercetin, isorhamnetin, rhamnocetin, isorhamnetin 3-β-D-glucopyranoside, propingoside, coumarin, tannins, and saponins [5,8].

Qualitative and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction and reaction with lead tetraacetate. Total flavonoid content is determined by spectrophotometry at 430 nm and calculated as quercetin [7].

Qualitative and quantitative standards: Loss on drying, 8.0%. Organic matter, not more than 0.5% and mineral matter, not more than 1.0%. Total flavonoid content, not less than 3.0% [7].

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Berberis sibirica Pall.

WHO

Mongolian name
Sibiri toshlog, Sharmod

Tibetan name
Jirba

English name
Siberian Barberry

Synonym: *B. altaica* Pall. [1]

Description: Thorny shrub up to 1 meter tall, strongly branched stem, with 3–5 partite spines. Leaves entire, alternate, with marginal prickles, oblong-lanceolate, or oblanceolate, up to 20 mm long, 8 mm wide. Berry red, oblong, many-seeded.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khovd, Mong-Alt., Gobi-Alt. (Gurvan saikhan, Gurvan bogd)

Habitat: Rocks and screes in forests and slopes in mountain forest-steppe belt [2–5].Part used: Shoot

Traditional Uses: The taste is sour and bitter, and the potency is cool and coarse. It is used for the following: As a poison antidote, treating diseases of the lymph and the eye, bile disorders, and overcoming diarrhea. It is an ingredient of the following traditional prescriptions: Arur-18, Bavru-8, Bongar-13, Bragshun-5, Braivu-17, Givan-11, Gurgum-3, 7, Dashun-6, 23, Dumtal, Degd-6, 8, 15, 20, and Lish-16 [5–7].

Chemical constituents: Protoberberine alkaloids, particularly berberine (0.36%) [8]. Leaves contain flavonoids, fruit contains organic acids and ascorbic acid [9].

Qualitative and quantitative assays: Alkaloids in the plant are determined by the precipitation reaction. Total alkaloid content is determined by a gravimetric method [10].

Qualitative and quantitative standards: Loss on drying, not more than 13.0%. Ash, not more than 23.0%. Organic matter, not more than 2.0% and mineral matter, not more than 0.5%. Total alkaloid, not less than 0.4% [10].

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Bergenia crassifolia (L.) Fritsch

WHO

WHO

Mongolian name
Zuzaannavchit (Badgar) Badaan

Tibetan name
Gadur

English name
Leather Bergenia

Synonym: *B. bifolia* Moench, *Saxifraga crassifolia* L. [1]

Description: Rhizome 10–18 mm in diameter, several meters long, with abundant scars on the surface. Outer side of the rhizome dark brown, with many small roots. Stem 30–50 cm tall, perennial herbs. Leaves entire, glabrous, membranous, broad elliptic or almost round, with rounded, cordate or cuneate base. Pentamerous purple flowers in terminal panicle like corymb. Capsule with two wings at the tip. Seeds dark brown or black.

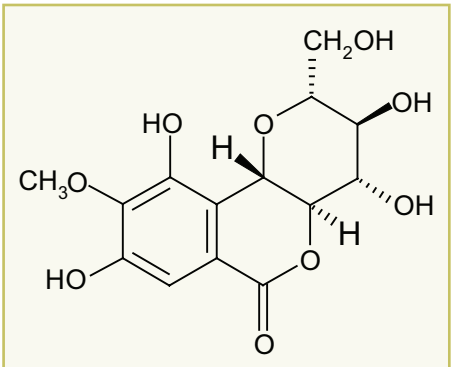
Distribution: Khent., Khang.

Habitat: Cedar forests in alpine belt [2–4].

Parts used: Leaf and root/rhizome.

Traditional Uses: The taste is sweet and astringent, and the potency is hot and light. It is used for the following: treating typhoid and lung fever, treating disorders of the stomach and intestine, treating diarrhea, and for inflammation of the lung. It is an ingredient of the following traditional prescriptions: Valo-25, Gabed-6, Jisergundel, Loman jalbo, Srolo-3, and Chisron dermon-9 [4–8].

Chemical constituents: Rhizome contains tannins, phenol carboxylic acids and their derivatives, (+)-catechin and catechin gallate [9], isocoumarin: bergenin [10]. Leaves contain 6–30% tannins [11], 12.18% arbutin, hydroquinone [12], rododendrine [9], pectin: bergenan [13], catechin: gallocatechin, catechin gallate [11], flavonoids: quercetin, kaempferol, leucoanthocyanidin: leucocyanidin, leucdelifinidin [9,14], coumarin: ellagic acid, isocoumarin: bergenin [9,12].



Bergenin

Qualitative and quantitative assays: Tannins in the rhizomes and leaves are identified by reaction with ammonium iron (III) sulphate and titrated with potassium permanganate. Arbutin in the leaves gives a dark brown precipitate with iron (II) sulphate. Arbutin is determined by titration using iodine as the titrant and starch as the indicator [15].

Qualitative and quantitative standards:

For rhizomes: Loss on drying, not more than 13.0%. Ash, not more than 10.0%. Organic matter, not more than 0.5% and mineral matter, not more than 1.0%. Tannins 15–17% [16].

For leaves: Loss on drying, not more than 12.0%. Ash, not more than 4.0%. Organic matter, not more than 0.5% and mineral matter, not more than 0.5%. Tannins, not less than 15% and arbutin, not less than 5% [15].

Bioactivities: Anti-inflammatory, antibacterial, anti-ulcerous, antidiarrheal [9].

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Bupleurum scorzonerifolium Willd.

OHM

OHM

Mongolian name
Khaviskhana navchit Bersh

Tibetan name
Lalapud

English name
Red Thorowax

Synonyms: *B. falcatum* var. *scorzonerifolium* Ledeb., *Eufalcatum* var. *scorzonerifolium* Wolff, *B. falcatum* subsp. *scorzonerifolium* K.-Pol., *B. baldense* Ledeb., *B. kirillowii* Turcz. ex K.-Pol., *B. falcatum* Turcz. [1]

Description: Perennials with tap root. Stem curved, solitary or several, 20–50 cm tall. Radical leaves lanceolate, 7–10 mm wide, with long stalks and 5–7 distinct longitudinal ribs, cauline leaves sessile, linear or linear-lanceolate, tapering to both ends. Many flowered umbels form a panicle. Bracts small, 1–4 mm long, lanceolate, green, shorter than secondary umbels. Mericarps with blunt thick grooves.

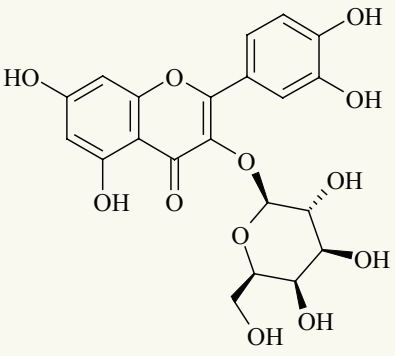
Distribution: Khovs., Khang., Khent., Mong-Dag., Khyang., Dund. Khalkh, Dor. Mong.

Habitat: Slopes and forest fringes in mountain steppe and forest-steppe belts [2–5].

Parts used: Herb, fruits

Traditional Uses: The taste is bitter and the potency is severe and cool. It is used for the following: treating parasitic worm diseases, stomach diseases, and cold diseases. It is an ingredient of the following traditional prescription: Agar-17 [5–7].

Chemical constituents: Essential oil: myrcene, α-pinene, β-pinene, limonene, *n*-cymol, phellandrene [8], sabinene, camphene, carvone, α-thujone, linalool, bornyl acetate, γ-terpinene and others, flavonoids: quercetin, isorhamnetin, rutin, narcissin, isoquercetin [9], hyperin, coumarin: umbelliferone, scopoletin, esculetin [10], lignans: 2,3-*E*-2,3-dihydro-2-(3′-methoxy-4′-*O*-β-D-glucopyranosyl-phenyl)-3-hydroxymethyl-5-(3″-hydroxypropenyl)-7-methoxy-1-benzo[b] furan and 2,3-*E*-2,3-dihydro-2-(3′-methoxy-4′-hydroxy-phenyl)-3-hydroxymethyl-5-(3″-hydroxypropenyl)-7-*O*-β-D-glucopyranosyl-1-benzo[b]furan [11], isochaihulactone, chaihunaphthone [12], saponins: 3-*O*-[β-D-glucopyranosyl-(1→ 2)-β-D-glucopyranosyl-(1→ 3)-β-D-fucopyranosyl]-3β,16α,23,28-tetrahydroxy-olean-11,13(18)-dien-30-oic acid-30-*O*-[pentito(1→ 1)-β-D-glucopyranosyl-(6→)] ester (saikosaponin U), and 3-*O*-[β-D-glucopyranosyl-(1→ 3)-β-D-fucopyranosyl]-3β,16α,23,28-tetrahydroxy-olean-11,13(18)-dien-30-oicacid-30-*O*-[pentito(1→ 1)-β-D-glucopyranosyl (6→)] ester (saikosaponin V) [13], eugenin and saikochromone.



Hyperin

Qualitative and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction and the reaction with lead acetate. Total flavonoid content is determined by spectrophotometry at 420 nm and calculated as quercetin [14].

Qualitative and quantitative standards: Loss on drying, not more than 8.0%. Ash, not more than 2.0%. Organic matter, not more than 2.0% and mineral matter, not more than 0.5%. Total flavonoid content, not less than 2.0% [14].

Bioactivities: Bile-expelling, stimulates secretion of gastric acid, and anti-ulcer activity [8]. Hyperin has a liver-protective activity [10]. In biological testing, eugenin and saikochromone have an immunosuppressive activity [12].

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Bupleurum sibiricum Vest ex Roem. & Schult.

WHO

WHO

Mongolian name
Sibiri bersh

Tibetan name
Lalapud

English name
Siberian Thorowax

Synonym: *B. multinerve* var. *angustius* DC., *B. multinerve* Ledeb., *B. multinerve* Wolff., *B. falcatum* Ledeb., *B. flexuosum* Ledeb., B. *dahuricum* F. et M. ex Turcz., *B. latifolium* Freyn [1].

Description: Perennials with tap root. Stem 30–50 cm tall, solitary or several, not branched or with several branches at the tip. Radical leaves linear-lanceolate, tapered to the base, acute at the apex, with 5–7 veins and long stalks, cauline leaves smaller, sessile, ovate, with rounded-cuneate base and acuminate apex. Mid umbel bigger than others, with 5–15 almost equal peduncles. Bracts 2–4, acute, oblong. Bracteoles five,

obovate or ovate-lanceolate, longer than secondary umbels, acute. Mericaps oblong, with narrowly winged ribs, two longitudinal furrows on commissure.

Distribution: Khent., Mong-Dag.

Habitat: Larch and birch forests, their fringes in mountain forest-steppe belt [2,3].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is light, severe, and sharp. It is used for the following: as an anti-parasitic agent. It is also said to be beneficial for stomach diseases, and for colds. It is an ingredient of the following traditional prescription: Zadi-15 [4,5].

Chemical constituents: Essential oil: myrcene, α-pinene, β-pinene, limonene, *n*-cymol, phellandrene, sabinene, camphene, carvone, linalool, bornyl acetate, pinocamphene, perolidol and others [6], flavonoids: quercetin, isorhamnetin, rutin [7].

Bioactivity: Antitumor [8].

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4. Yuthok Yonten Gonpo., Four Medical Tantras, VIII-IXth century.
5. Danzanpuntsag., Crystal rosary. XVIIIth century.
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Cacalia hastata L.

WHO

Mongolian name
Ilden igyyshin

Tibetan name
Yeguushin

English name
Hastate Cacalia

Synonym: *C. suaveolens* auct. non L., *C. glabra* Ledeb., *C. sagittifolia* Mertens, *C. hastata* var. *pubescens* Ledeb., *C. hastata* var. *glabra* Ledeb., *C. hastata* subsp. *hastata* Hara, *Ligularia hastata* Less., *Senecio sagittatus* Sch. Bip., *S. sagittatus* var. *pubescens* Maxim., *S. sagittatus* var. *glaber* Maxim., *Hasteola hastata* Pojark., *Synosma hastata* Pojark., *Koyamacalia hastata* (L.) H. Robinson et R.D. Brettell [1].

Description: Perennial herb with a rhizome, producing large fibrous roots. Solitary stem 60–200 cm tall, erect, glabrous or covered with short hairs. Leaves alternate, 5–25 cm long, as wide as the

length, protruding, dentate, glabrous, sometimes lower surface hairy, hastate, lateral lobes acute. Head 5 mm wide, 10–13 mm thick, cylindrical or narrow-bell shaped, united in raceme or panicle. Achene 5–7 mm long, digitate, smooth, with pappus 1.5–2 times longer than the seed.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Dor. Mong.

Habitat: Larch and birch in forest-steppe belt [2–5].

Parts used: Flowers, leaves

Traditional Uses: The taste is bitter and the potency is cool and sharp. It is used for the following: treating inflammation and wounds, as an anti-bacterial agent, and for joint pain.

It is an ingredient of the following traditional prescriptions: Yanjina-18, Chivdag yuljal-21, Seru-15, Rodman-16, and Khonilon-6 [5–8].

Microscopic characteristics:

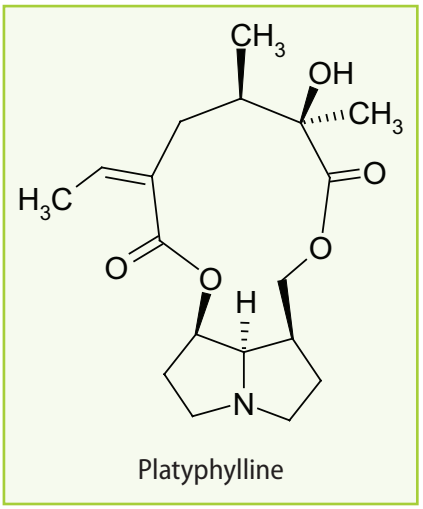
Leaf: Leaf is dorsiventral. Palisade single-layered; spongy parenchyma four- to five-layered, oblong. Epidermal cells little thick, wavy-walled. On both sides anomocytic stomata present. Vascular bundle is closed collateral [9].

Chemical constituents: The aerial parts contain tannins [10], and pyrrolizidine alkaloids: platyphylline, hastacine [11].

Qualitative and quantitative assays: Tannins are identified by reaction with dilute sulfuric acid titrated with potassium permanganate [9].

Qualitative and quantitative standards: Loss on drying, not more than 12.0%. Ash, not more than 12.0%. Organic matter, not more than 2.0% and mineral matter, not more than 2.0%. Tannins, not less than 3% [9].

Bioactivities: Antibacterial [10], anti-inflammatory [11].



Platyphylline

References:

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Carum carvi L.

WHO

Mongolian name
Egel gonid, Ziira, Ziraa

Tibetan name
Gonid

English name
Caraway

Synonyms: *C. decussatum* Gilib., *C. aromaticum* Salisb., *C. officinale* S.F. Gray, *C. rosellum* Woronow, *Apium carvi* Crantz, *Seseli carum* Scop., *Sium carum* [Weber], *S. carvi* Bernh., *Ligusticum carvi* Roth, *Aegopodium carum* Wibel., *Bunium carvi* Bieb., *Foeniculum carvi* Link, *Falcaria carvifolia* C.A.Mey., *Pimpinella carvi* Jessen, *Carvi careum* Bubani [1]

Description: Up to 70 cm tall perennial herbs forming broad bush, branched from the base, with tap root. Leaves oblong in outline, two to three times pinnatisected, segments linear lanceolate or linear. Compound

umbel with 8–16 unequal rays. 1–2 bracts, no bracteoles. Corolla pink or red-pink. Achene 4 mm long, with strong smell.

Distribution: Khent., Khang., Mong-Dag., Mong. Alt., Gobi-Alt.

Habitat: Waterside meadows in forest-steppe and steppe zone [2–5].

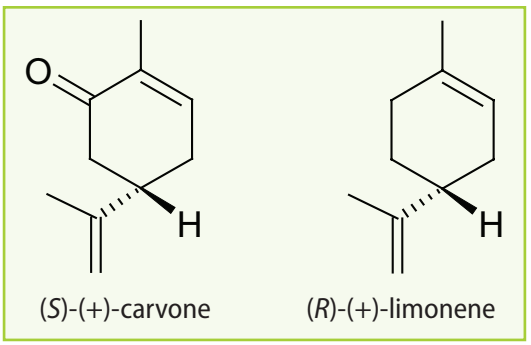
Parts used: Fruit

Traditional Uses: The taste is bitter and hot, and the potency is warm and oily. It is used for the following: treatment of nervous diseases, tumors, eye diseases, bronchial phlegm, inflammation, stomach disorders, and improves peristalsis and appetite. It is an ingredient of the following traditional prescriptions: Ava-7, 14, 15, Manmar, Agar-7, 10, 19, 20, 25, Banjan-25, Bongar-10, Bonnag-15, Brunag-29, Balo-25, Bragshun-9, Braibu-21, Gavur-7, 8, 9, 13, 14, 18, Givan-8, 10, 11, 20, Gunbrum-7, Gurgum-7, Dudziseljor, Deva-5, 10, and Degd-4 [5–7].

Microscopic characteristics:

Fruit: Epicarp polygonal tabular cells and with striated cuticle. Parenchymatous cells of mesocarp 6-layered. Five vascular bundles surrounded by sclerides. Above each vascular bundle a secretory cell is present. Endosperm thick-walled, contains oil globules, aleurone grains and crystals of calcium oxalate [8].

Chemical constituents: Fruit contains 2.6–7.67% essential oil: (*S*)-(+)-carvone (up to 65%) and (*R*)-(+)-limonene (up to 50%) as the main components [9], α-pinene, β-pinene, sabinene, limonene, dihydrocarvone, isodihydrocarvone, carvacrol, dihydrocarvacrol, carveol, γ- terpinene, myrcene, α-thujone, β-thujone and other terpenoids [9–17], steroids: stigmasterol and its palmitate and stearate esters; flavonoids: quercetin, kaempferol glycoside, isoquercitrin, 0.02–0.48%; coumarins: umbelliferone, scopoletin, gerniarin [18], phenol-carboxylic acid and its derivatives [19], fat 18.4–21.18%, which contains 0.2% sugar, 66% triglycerides, 5.1% free fatty acids [18,20–22].



(*S*)-(+)-carvone (*R*)-(+)-limonene

Bioactivities: Spasmolytic, mucolitic, and antibacterial [23], laxative [24].

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Chaerophyllum gracile Freyn. & Sint.

WHO

WHO

Mongolian name
Nariin Ukher-gonid (Yamaakhai)

Tibetan name
Java

English name
Rough Chervil

Description: 50–120 cm biennials, with thick taproot. Leaves three to four times pinnate. White compound inflorescence. Calyx dentate. Petals white, oblong. Secretory vittae in fruit grooves 2–3.

Distribution: Khovs., Khent., Khang., Mong-Dag., Mong. Alt., Dund. Khalkh, Ikh n., Olon n., Dor. Gobi, Gobi-Alt.

Habitat: Crops and abandoned fields, inhabited places, along roads, mountain and hill slopes, ravines, rocky areas and screes [1–3].

Part used: Root

Traditional Uses: The taste is bitter and the potency is warm. It is used for the following: enhances vigour and power, has a sedative effect and enhances breathing. It is an ingredient of the following traditional prescriptions: Sugmel-7, Sojed, Braibu-17, and Banlag-37 [3–6].

Chemical constituents: Root contains 0.03–0.5% coumarins [7,8], sugars: glucose, galactose, arabinose, rhamnose [9], quinones: gracillisquinones A and B [10].

Qualitive and quantitative assays: Protein is determined by the titration method using 0.1 mol/l sulphuric acid as the titrant, and sugar is titrated with potassium permanganate. Pectins are determined by gravimetric analysis [11].

Qualitive and quantitative standards: Loss on drying, not more than 6.0%. Ash, not more than 4.9%. Matter, not more than 4.0%, of which mineral matter, not more than 1.5%. Stem and leaves of this plant, not more than 0.5%. Root of other plants, not more than 1.5%. Protein, not more than 12.0%. Sugar, not more than 47.6%. Pectin, not more than 7.8% [11].

Bioactivities: Antitumour [12] and antibacterial [7].

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Chelidonium majus L.

WHO

WHO

Mongolian name
Ikh Shuudergene

Tibetan name
Donroiselva

English name
Greater Celandine

Synonym: *C. luteum* Gilib. [1]

Description: Perennial herbs forming bush, with big rhizome, contain orange colored latex like rust. Dark scales around the root neck. Stem branched, 40–80 cm tall. Basal leaves with curly hairs, 10–30 cm long, pinnatisected, final segments big, lateral segments small and in 3–4 pairs, upper side green, lower side whitish or grey. Few flowered umbel in axils of terminal leaves. Petals bright yellow, 10–15 mm long. Capsule grey, 2–5 cm long, 2–3 cm wide.

Distribution: Khent., Khang., Mong-Dag., Khyang.

Habitat: Larch and birch forests in forest-steppe belt [2–5].

Part used: Herb

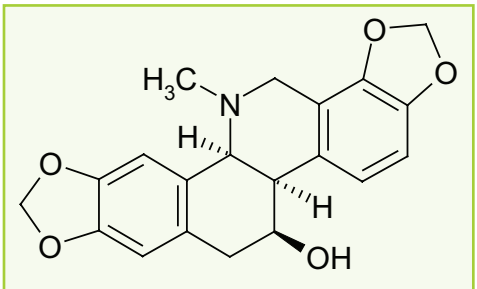
Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treating typhoid fever, xerostomia, bile disorder, burn wounds, alleviating fever, soothing pain, dermatitis, and papilloma. It is an ingredient of the following traditional prescriptions: Bashaga-7, Davichujin, Donroiselva-7, Yutigdumshitan, Lkhamobuntig, Chuchin-25 [5–8].

Microscopic characteristics:

Leaf: Leaf is dorsiventral. Palysade single-layered, large, scattered; spongy parenchyma 2–3 layered. Epidermal cells thin, wavy walled. Anomocytic stomata occur only on the lower surface of the leaf. Stoma relatively large. Vascular bundles are visible centre of the spongy parenchyma [9].

Stem: The transverse section is rounded. Epidermis two-layered, relatively thick. Lower epidermis has parenchyma with thick-walled of cortex. Near the vascular bundle appearing thick-walled, large parenchyma. Collateral vascular bundle surrounded by stem. Upper vascular bundle occurs with high developed sclerenchyma [9].

Chemical constituents: 1.4–4.32% organic acids, 0.01% essential oil [10], saponins [11,12], flavonoids [10], phenol carboxylic acid [13], alkaloids: chelerythrine, sanguinarine [14], chelidonine, berberine, coptisine [13], chelidimerine [15], chelirubine [16,17]. The main alkaloids are chelidonine, chelerythrine, sanguinarine, berberine [13].



Chelidonine

Qualitive and quantitative assays: Alkaloids in the plant are identified by a precipitation reaction, and total alkaloid content is determined by titration using perchloric acid as the titrant and crystal violet as the indicator [9].

Qualitive and quantitative standards: Loss on drying, not more than 7.0%. Ash, not more than 8.0%. Organic matter, not more than 1.0% and mineral matter, not more than 0.5%. 70% ethanol-soluble extractive, not less than 25.0%. Total alkaloid content, not less than 0.2% [9].

Bioactivities: Sedative, anesthetic [10], spasmolytic [10,18], antifungal [19], antiviral [13,20], antibacterial [10], hypotensive, analgesic [10,18], cytostatic, cytotoxic [14], antitumor, antimicrobial [13], stimulation of the dopaminergic system and inhibition of the serotonergic system [21].

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Chiazospermum erectum Bennh.

WHO

WHO

Mongolian name
Tsekh Galuuntavag

Tibetan name
Barbada

English name
Erect Corydalis (Erect Hypecoum)

Synonym: *Hypecoum erectum* L. [1].

Description: Annual herb, with many stems and grey green basal leaves growing in bunch. Stem dichotomously branched near the inflorescence. Leaf blades oblong, twice pinnatisected, final segments hair-like narrow. Two sepals triangle, scale like. Flowers yellow, irregular, forming dichasium at the tip of stems and branches. Petals different, external two blades bigger, rectangular, fan like, indistinctly trilobate, internal two blades trilobate, lateral two lobes flat, but mid lobe spoon-like, dentate. Silique 5–8 cm long, dehiscing by two valves, septae thin, strictly transverse.

Distribution: Khent., Khang., Mong-Dag., Khyang., Dund. Khalkh, Dor. Mong., Dor. Gobi

Habitat: Sandy steppes, stony and debris steppe slopes, sandy and pebble riverbanks [2–5].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool, severe, and sharp. It is used for the following: treating typhoid fever, poisoning, and blood fever, soothing pain, decreasing fever, and expelling bile. It is an ingredient of the following traditional prescriptions: Ar ur-4, 10, Banjan-12, 25, Banzido-11, 12, Bashaga-7, Bongar-17, 18, Brunag-29, Gavur-18 Givan-20, Gurgum-7, 8, Deva-5, 8, 10, 15, Degd-8, 10, 15, 20, Degdiin tuulga, Pagril-13, Chun-18, Tanchin-25, and Barbadin [5–8].

Microscopic characteristics:

Stem: Epidermal cells thick. Inner part of epiderm developed parenchyma with chlorophyll. Parenchymatous cells contain prism crystals of calcium oxalate [9].

Chemical constituents: Herb contains 0.89–2% alkaloids: protopine [10–12], 8-oxyhunnemane, 8-oxyallocryptopine, (-)-hyperectine tautomer, allocryptopine, oxyhydramtinine, berberine [11], cryptopine, fumaritine, sanguinarine, sinactine, *d,l*-stilopine [13], hypecorine, hypecorinine [11,12,14].

Qualitive and quantitative assays: Alkaloids in the plant are identified by a precipitation reaction, and total alkaloid content is determined by a titration method [9].

Qualitive and quantitative standards: Loss on drying, not more than 9.0%. Ash, not more than 18.2%. Organic matter, not more than 0.2% and mineral matter, not more than 0.5%. Water-soluble extractive, not less than 26.6%. Total alkaloid content, not less than 0.6% [9].

Bioactivities: antioxidant [14], anti-inflammatory, antipyretic, antiviral, antibacterial [10].

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Cotoneaster melanocarpus Lodd., G.Lodd. & W.Lodd.

WHO

WHO

Mongolian name
Khar yrt chargai, Ar-yrt Chargai

Tibetan name
Dadrig

English name
Black-fruited or Black Cotoneaster

Synonyms: *C. vulgaris* Lindl., *C. integerrima* var. *fructanigro* Medik., *C. vulgaris* var. *melanocarpa* Bunge, *C. vulgaris* var. *haematocarpa* Rupr., *C. nigra* Fries, *C. polonicus* Jastrz ex Rostaf., *C. nigrus* Wahlenb., *C. integerrima* var. *melanocarpa* Kryl., *Mespilus cotoneaster* L., *M. cotoneaster* var. *nigra* Ehrh. [1].

Description: Shrub up to 2 m tall. Leaves 2–3 cm long, 1.5–2 cm wide, ovate or oval, with retuse tip, leaves on the vegetative shoots acute at the tip, with sparse hairs on the upper surface and yellowish wooly or whitish soft

hairs on the lower surface. 2–15 light-rose flowers form loose raceme or raceme like panicle. Peduncles drooping and hairy. Receptacle glabrous. Sepals triangle, ciliate. Petals light-rose, twice length of sepals, bracts not deciduous, narrow oblong. Berry 7–9 mm in diameter, white grey, with 2–3 hairy pyrenes.

Distribution: Khovs., Khent., Khang., Mong-Dag., Mong. Alt. (east), Dund. Khalkh, Gobi-Alt., Dor. Mong., Ikh n.

Habitat: Steppe stony and rocky slopes, birch, larch and pine forests, their fringes [2–5].

Parts used: Shoot and fruit

Traditional uses: The taste is sweet and sour, and the potency is cool. It is used for the following: treatment of diarrhea, improvement of appetite, for dissemination blood in joints, acts as a haemostatic, and for detoxification and vomiting. Also used for inflammation of the stomach and intestine. It is an ingredient in the following traditional prescriptions: Agar-7, Ar ur-18, Bilva-11, Dadrig-6, Gurgum-13, Indra-17, and Delmanmar [5–7].

Chemical constituents: Shoot contains cyano compounds, e.g. prunazine. Leaves contain ascorbic acid [8], phenol carboxylic acids, their derivatives: chlorogenic and neochlorogenic acids [8,9], 0.96% flavonoids, 9.5% anthocyanin [8], catechin [9]. Fruit contains ascorbic acid, flavonoids and anthocyanins [8].

Bioactivity: Antibacterial activity [8].

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Crataegus sanguinea Schrad.

WHO

WHO

Mongolian name
Chas ulaan doloogono

Tibetan name
Jur ura

English name
Redhaw Hawthorn

Synonym: *Phaca macrostachys* Turcz. [1]

Description: Big bushy plant with tap root and 30–60 cm tall stem, having white and black mixed hairs. Leaves odd-pinnate, leaflets in 10–18 pairs, 4–10 mm wide, obovate or oval, obtuse at the apex, thick, hairy only on the lower side. Flowers yellow or yellowish in sparse raceme. Ovary and legumes glabrous, dangled in the long stalk.

Distribution: Khovs., Khang., Mong-Dag., Dor. Mong., Mong. Alt., Dund. Khalkh, Ikh n. (Uvs lake), Olon n., Gobi-Alt.

Habitat: Sandy terraces on western and eastern slopes of mountains, forest fringes [2–5].

Part used: Fruit

Traditional Uses: The taste is sweet and sour, and the potency is cool and blunt. It is used for the following: treating arrhythmia, decreasing blood pressure, reducing liver fever and fever of bile disorder. It is an ingredient of the following traditional prescriptions: Agar-7,15, Ava-7,15, Ar ur-5, Ravo-4, and Boigor-6 [5–9].

Microscopic characteristics:

Fruit: Outer epidermal cells thick-walled and with 4–6 angular. Thick-walled, unicellular, single trichomes rarely occur on surface of epidermis. Mesocarp with round and ovate shaped parenchymatous tissue containing clusters of calcium oxalate prisms in druses; and reddish-yellow and brown-yellow caratinoids. Inner side of mesocarp shows sclereid and collateral vascular bundle [10].

Chemical constituents: Fruit contains sugar, tannins, triterpenoids, long-chain fatty acids, 1.87–4.2% organic acids, steroids, ascorbic acid, carotene, catechin, leucoanthocyanidin, anthocyanin [11], flavonoids: hyperin and quercetin, and saponins [12].

Qualitive and quantitative standards: Loss on drying, not more than 14.0%. Ash, not more than 3.0%. Organic matter, not more than 1.0% and mineral matter, not more than 0.5% [12].

Bioactivities: Antihypertensive, antiatherosclerotic, antianginal, antiarrythmic [11].

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Dactylorhiza salina (Turcz. ex Lindl.) Soo

WHM

Mongolian name
Martsnii tsakhiram

Tibetan name
Ban lag

English name
Salt Orchis

Synonyms: *Orchis salina* Turcz. ex Lindl., *Dactylorchis salina* (Turcz. ex Lindl.) Verm. [1]

Description: Perennial mesophytes, with thick palmate roots. Stem 10–30 cm tall, somehow thick. Leaves 4–10 cm long, 1–3 cm wide, oval, oblong-obovate, divaricated, basal leaves curved down, longitudinally rolled, upper leaves reach to the inflorescence base or longer than that. Flowers quite big, pink in 3–12 cm long terminal spike-like inflorescence. Lip almost entire, 7–9 mm long, 7–10 mm wide, spur 9–14 mm long.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong-Alt., Dund. Khalkh, Dor. Mong., Ikh n., Olon n., Zyyngar.

Habitat: Damp and swampy alkaline meadows in almost all natural zones and belts in Mongolia [2,3].

Part used: Root tubers

Traditional Uses: The taste is sweet and astringent, and the potency is heavy and oily. It is used for the following: treating edema and inflammation, generating vigor and enhancing life. It is an ingredient of the following traditional prescriptions: Banlag-3, 8, 10, 37, Dajid-13, and Dovapel-13 [4–7].

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Dianthus superbus L.

WHO

WHO

Mongolian name
Goyo Bashir, Javkhaalig Bashir

Tibetan name
Bashaga

English name
Lilac Pink

Description: Perennial herb with long creeping rhizome. Stem 10–70 cm tall, glabrous, solitary or 2–3, with several shoots at the base. Leaves 3–6 cm long, 2–7 mm wide, linear-lanceolate, or linear, glabrous, but scabrous along margins. Flowers 2–5, in terminal loose corymbiform inflorescence. Bracts 4–6, ovate, abruptly tapering to the apex. Calyx 20–25 cm long, cylindrical, tapering to the apex, green or pinkish-violet. Corolla 35–45 mm long, pinkish-violet, sometimes white. Petal 15 mm long, fimbriate-dissected into filiform lobes, claw hairy. Fruit capsule.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Dund. Khalkh, Dor. Mong., Ikh n.

Habitat: Larch and birch forests in forest-steppe belt [1–5].

Parts used: Herb, flowers

Traditional Uses: The taste is sweet and sour, and the potency is cool. It is used for the following: aids in delivery of baby and placenta, dries out lymph disorders, for uterine diseases and inducing contractions. Also used as a diuretic, hemostatic, and anti-inflammatory. An overdose causes bleeding. It is an ingredient of the following traditional prescriptions: Bashaga-7, Digda-4, Ruda-6, and Zandan-18 [5–9].

Chemical constituents: Herb contains pectins [10], saponins: dianosides G, H and I, azukisaponin [11], dianthus-saponin A, B, C and D [12], cyclopeptides: dianthins A-F, [13,14], longicalycinin A [15], alkaloids, pyrocatechin tannins, flavonoids: orientin, homoorientin [16], 4-methoxydianthramide B [13]. Flowers contains saponins, flavonoids [17].

Qualitive and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction. Total flavonoid content is determined by spectrophotometry at 420 nm and calculated using the comparision curve of rutin [18].

Qualitive and quantitative standards: Loss on drying, not more than 13.0%. Ash, not more than 2.0%. Organic matter, not more than 2.0%, and mineral matter, not more than 0.5%. Total flavonoid content, not less than 1.2% [18].

Bioactivities: anti-DPPH free radical, 15-lipoxygenase [10], anticonvulsant [17].

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Dianthus versicolor Fisch. ex Link.

OHM

OHM

Mongolian name
Alag bashir

Tibetan name
Umodeujin

English name
Colour-changing Pink, Versicolor Pink

Description: Thick roots produce many flowering stems, but not vegetative shoots. Stem 10–35 cm tall, erect, branched, leaves with short, stiff, sparse hairs, or glabrous. Leaves 3–6 cm long, 2–7 mm wide, narrow linear, acute. Solitary or two to three flowers at the tip of stems and branches. Bracts mostly four, ovate, tapering abruptly into long and lanceolate-linear tip. Uppermost bract very close to the flower. Sepals 13–18 mm long, tube-like, tapering to the apex. Petals 20–25 mm long, pink, their limbs 10–12 mm long, unevenly dentate at the tip.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Mong-Alt., Khovd, Gobi-Alt., Dor. Mong., Dund. Khalkh, Olon n., Ikh n.

Habitat: Slopes of mountains and hills in forest-steppe and steppe zone [1–5]

Parts used: Herb, flowers

Traditional Uses: The taste is astringent and the potency is cool. It is used for the following: treating pneumonia, typhoid, typhoid fever, and scurvy disease. It is an ingredient of the following traditional prescriptions: Bashaga-7, Digda-4, Ruda-6, and Zandan-18 [5–8].

Chemical constituents: Herb contains saponins, ascorbic acid; flowers contain saponins [9] and flavonoids [9,10]: apigenin, luteolin, chrysoeriol, diosmetin, acacetin, isoorientin-7-*O*-rutinoside, isoorientin-7-*O*-rhamnosyl-glactoside, isovitexin-7-*O*-rutinoside, isovitexin-7-*O*-rhamnosyl-galactoside, isoscoparin-7-*O*-rutinoside, isoscoparin-7-*O*-rhamnosyl-galactoside, isoscoparin-7-*O*-galactoside, isoorientin-7-*O*-galactoside, isovitexin-2″-*O*-rhamnoside, apigenin-6-glucoside (isovitexin), luteolin-7-*O*-glucoside, apigenin-7-*O*-glucoside [11–13], isovitexin-7-*O*-glucoside (saponarin) [11–14].

Bioactivities: Antihypertensive, hemostatic, and uterine stimulant [9].

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Dracocephalum foetidum Bunge

WHO

WHO

Mongolian name
Omkhii Shimeldeg

Tibetan name
Briyangu

English name
Fetid Dragonhead

Synonyms: *D. moldavicum* L., *D. moldavicum* L. var. *foetidum* Palib.

Description: Annual herbs, forming globular bush, with 8–30 cm tall stems, which branches from the base. Shoots ascending, prostrate, as long as flowering stems. Leaves 1–3 cm long, 0.3–1.5 cm wide, oblong or oblong-ovate, obtuse, crenate, with long stalks and glands on the lower surface. Six flowers form pseudo whorl in axils of terminal leaves. Bracts oblong, with 3–5 teeth and an awn at the tip. Calyx 7–9 mm long, two lipped, upper lip cleft to the one third and lobed into broad ovate portions, lower lip with lanceolate teeth, lobes and teeth both bear awn. Corolla blue, blue-purple.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khovd, Mong. Alt., Gobi-Alt., Dor. Mong., Dund. Khalkh, Olon n., Ikh n., Alash.

Habitat: River banks, bottom of creek valleys, sandy steppes, stony steppe slopes [1–5].

Part used: Herb

Traditional Uses: The taste is bitter and astringent, and the potency is cool and light. It is used for the following: treating stomach and liver disorders, as a hemostatic, for healing wounds, as an antibacterial, and for stomatitis. It is an ingredient of the following traditional prescriptions: Tsarvon-4, Bragshun-9, Elegnii gurgum-7, Anar-8, Bavu-7, Chun-9, Chagdar, Sarichun, Jonsh-21, Zandan-8, Ar ur-8, Briyagu-9, Gavar-13, Yanjima-25, and Dumazi-25 [5–9].

Microscopic characteristics:

Leaf: Leaf is dorsiventral. Palisade single layered, spongy parenchyma tree to six-layered. Vascular bundle collateral. Epidermis of the leaf numerous glandular and non-glandular trichomes are visible. Epidermal cells wavy. Both epidermis have anomocytic stomata [10].

Chemical constituents: 0.46–1% essential oil: α-pinene, β-pinene, α-thujone, camphene, $\triangle^3$-carene, myrcene, β-phellandrene, γ-terpinene, *n*-cymol, limonol, limonene, neral, geranial, geraniol, linalool, and geranyl acetate [11,12], flavonoids: diosmetin, acacetin, and its glycoside [13], triterpene glycosides [10].

Qualitative and quantitative assays: The following is a suitable TLC procedure to identify triterpene glycosides: silica gel, chloroform-methanol (9:1) solvent system, detection reagent: 20% sulfuric acid; observed as a pink spot. Triterpene glycoside content is determined gravimetrically [10].

Qualitative and quantitative standards: Loss on drying, not more than 10.0%. Ash, not more than 22.0%. Organic matter, not more than 0.5%, and mineral matter, not more than 0.5%. Triterpene glycoside content, not less than 0.8% [10].

Bioactivities: Essential oil shows antibacterial [12] and antifungal [13] activity.

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Echinops latifolius Tausch

OHM

OHM

Mongolian name
Orgon navchit taijiin jins

Tibetan name
Jan tser

English name
Broadleaf Globe thistle

Synonyms: *E. dahuricus* Fisch., *E. gmelinii* Turcz., *Sphaerocephalus dauricus* O. Kuntze ex Kom. [1]

Description: Perennials with woody rhizomes. Stem 30–75 cm tall, erect, with entangled hairs and those near the tip are tomenta, mixed with glands. Leaves simple, upper surface tomentose and whitish, basal ones with long stalks, up to 20 cm long, up to 10 cm wide, bipinnatipartite, with awn bearing teeth or lobes along the margin. Inflorescence globose, 4–6 cm in diameter, consisting of uniflorous heads. Heads covered with 2 cm long stiff hairs. Seeds 5–7 mm long.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Dor. Mong., Dund. Khalkh.

Habitat: Mountain slopes in forest-steppe and steppe zone [2–5].

Parts used: Flower, leaves, and roots

Traditional uses: The taste is sweet and bitter and the potency is sharp and severe. It is used for the following: eliminating phlegm and for edema. It is an ingredient in the following traditional prescription: Durjid-3 [5–8].

Chemical constituents: Roots contain alkaloids, coumarins, and flavonoids: hyperine [9].

Bioactivities: Diuretic, anti-inflammatory activity, hemostatic [10], and antibacterial [9].

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Ephedra monosperma J.G.Gmel. ex C.A.Mey.

Mongolian name
Fedchenkogiin Zeer-gene

Tibetan name
Tsedum

English name
Oneseed Ephedra

Synonym: E. minima K.S.Hao [1].

Description: 3–20 cm tall, small, prostrate semi-shrub, with creeping shoots. Branches slender, yellow green, erect, finely scabrous, branchlets erect, sometimes pendent, twisted to the tip, light green, simple or once more branched. Sheath yellowish, membranous, acutely toothed to the half. Epispermal tube flexuous. Fruits red, juicy, monospermous.

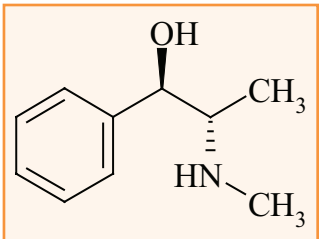
Distribution: Khovs., Khent., Khang., Mong-Dag., Khovd, Mong. Alt., Gobi-Alt (Ikh Bogd)., Dor. Mong., Dund. Khalkh, Olon n., Ikh n., Dor. Gobi, Zyyngar

Habitat: Mountain and hill slopes in forest-steppe and steppe zone [2–5].

Part used: Herb

Traditional uses: The taste is bitter and astringent and the potency is cool. It is used for the following: treating hot disorders of the bile and spleen, congestion, fever, wounds, and dysentery. Also beneficial for lung disorders and polyuria. It is an ingredient of the following traditional prescriptions: Gagol-11, Gurgum-7, Gurchun, Sugmel garbo-17, and Dudzi-5 [5–9].

Chemical constituents: Herb contains alkaloids: ephedrine, pseudoephedrine, norephedrine, norpseudoephedrine, methylephedrine, and methyl-pseudoephedrine [10], tannins, anthocyanins, leucoanthocyanins [5]. Ephedrine and pseudoephedrine are the main components, and the ephedrine content is higher than pseudoephedrine [10].



Ephedrine

Bioactivities: Adrenomimetic and bronchodilator [11].

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Erysimum flavum (Georgi) Bobrov

OHM

OHM

Mongolian name
Shar (altain) Gontig

Tibetan name
Gontog va

English name
Broadlinearleaf Erysimum

Synonyms: *E. altaicum* C.A.Mey., *Hesperis flava* Georgi [1].

Description: Bi- or perennial with tap root. Stem 10–60 cm tall, solitary or several, erect, branched to the tip. Leaves linear-oblong, or linear, tapering to the base, entire, basal and lower leaves sometimes dentate, apex mostly curved down. Calyx 7–9 mm long, outer pair of sepals broad, swollen at the base. Petals light yellow, 12–18 mm long, blades broad obovate, or almost round, claws narrow and long. Peduncle thick, 5–17 mm long, erect or ascending, prostrate. Style 1–2 mm long. Seeds 1.5–2 mm long, light brown, oblong.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong-Alt., Dund. Khalkh, Dor. Mong., Ikh n., Gobi-Alt.

Habitat: Debris and stony steppe slopes, steppes, waterside rocks [2–5].

Part used: Herb

Traditional Uses: The taste is bitter and astringent and the potency is cool. It is used for the following: treatment of poisoning, strengthen cardiac contractions, beneficial for urination and edema, and also used to treat toxicity from food, fever, lung disease and blood disorders. It is an ingredient of the following traditional prescriptions: Bavo-11, 14, Banjan hand, Gavur-18, Gontog-7, Goui-13, Khach gurgum-25, Sorogzon-35, and Yajima-13 [5–8]

Chemical constituents: 0.29% cardenolides: erysimine, erymoside, desglucocheirotoxin, and erydiffuside [9–11].

Qualitative and quantitative assays: Cardenolides in the plant are identified by Balie and Legal reactions. Biological activity of cardenolides is determined by comparision with biological activity of reference erysimine [12].

Qualitative and quantitative standards: Loss on drying, not more than 14%. Ash, not more than 13.0%. Organic matter, not more than 2.0% and mineral matter, not more than 1.0%. Biological activity of cardenolides is 350 FAU (frog action unit) in 1 g herb [12].

Bioactivity: Cardiotonic [13].

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Euphorbia discolor Ledeb.

WHO

WHO

Mongolian name
Alag suut ovs

Tibetan name
Durjid

English name
Discolor Euphorbia

Synonym: *Tithymalus discolour* Klotzsch & Garke [1]

Description: Herbs with narrow rhizome, growing obliquely or prostrate. Stem 15–40 cm tall, 1–2 mm thick, rod shaped, shoots with few leaves in axils of upper leaves. Leaves 1.5–4 cm long, 4–8 mm wide, lanceolate-spatulate, or oblong obovate, obtuse, tapering to the base. Terminal umbel with 3–8 equal pedicels. Axillary pedicels less. Bracts 7–15 mm wide, 4–10 mm long, half spherical or reniform, obtuse, truncate, opposite blades together look circular in outline. Cyathium ciliate, with obtuse lobes. Nectary crescent moon shaped.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Gobi-Alt (Ikh Bogd)., Dor. Mong., Dund. Khalkh, Ikh n.

Habitat: Steppe and meadow slopes, larch, cedar and birch forests, forest meadows [2–5].

Parts used: Herb and root

Traditional Uses: The taste is bitter and astringent and the potency is warm, sharp, and heavy. It is used for the following: treating the echinococcus, tumors, phlegm, and reducing inflammation; also used to treat and purge all hot and cold diseases. It is an ingredient of the following traditional prescriptions: Arur-5, Bavo-12, Braivu-5, 8, Garbo-18, Gugul-11, Gurgum-3, 4 tuulga, Khach gurgum-12, Dongh-3, Durjid-3, 5, 7, 10, Dedbon-14, and Jilz-27 [5–8].

Chemical constituents: Coumarin: ellagic acid, 2.6% flavonoids: quercetin, rutin, hyperin, and quercimetrin [9,10].

Bioactivities: Emetic and laxative activity [11].

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Gentiana algida Pall.

WHO

WHO

Mongolian name
Olchir Degd

Tibetan name
Banjan garvo

English name
Alpine Gentian

Synonyms: *G. algida* var. *sibirica* Turcz., *G. frigida* var. *algida* (Pall.) Froel. [1].

Description: Perennials, with short rhizome. Stem 10–20 cm tall, erect, solitary or several. Most leaves basal, oblong or lanceolate. Short terminal raceme. Calyx tube membranous, with 5 equal teeth. Corolla two to three times longer than calyx, 4–5 cm long, light yellow, with blue or violet lines and patterns. Ovary has stipe.

Distribution: Khovs., Khent., Khang., Mong-Alt., Gobi-Alt. (Ikh Bogd mountain)

Habitat: Boggy meadows in alpine belt [2–5].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treating throat illness caused by fever, lung disorders, liver disorders, and bile disorder. It is an ingredient of the following traditional prescriptions: Tsulhir-4, Bontag-25, Zovu-25, Lish-6, Banjingarav-15, Arur-12, Banjin-12, Braivu-6, Garbo-6, Lish-6, Santal-25, and Yajima-18 [5–9].

Microscopic characteristics: Leaf is gomogen. Mesophyll 5–6 layers of cells with many intercellular spaces. Epidermis large, with thickened outer walls. Anomocytic stomata occur on the lower and upper surface of the leaf. Vascular bundle is collateral [10].

Chemical constituents: Acids: anofinic, fomannoxin, and oleanolic acid [11], steroids: sitosterol, daucosterol, stigmasterol, flavonoids: isoorientin, 5,7,3′-trihydroxyflavone-6-*O*-β-D-glucopyranoside [12,13], 6-*O*-β-D-glucopyranosyl-5,7,3′,4′-tetrahydroxyflavone, 6-*O*-β-D-glucopyranosyl-5,7,4′-trihydroxyflavone, secoiridoids: amaropanin,6′-(2,3-dihydroxybenzoyl)sweroside,6′-(2,3-dihydroxybenzoyl)swertiamarin[14],[2′-(2,3-dihydroxybenzyl) sweroside [13], xanthones: isobellidifolin, swerchirin, 3,4-dimethoxy-1,5,8-trihydroxyxanthone [15].

Qualitative and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction. Total flavonoid content is deternimed by spectrophotometry at 349 nm and calculated as isoorientin [10].

Qualitative and quantitative standards: Loss on drying, not more than 8.0%. Ash, not more than 2.0%. Organic matter, not more than 2.0% and mineral matter, not more than 0.5%. Total flavonoid content, not less than 2.0% [10].

Bioactivities: Antithrichomonasis, hemostatic [16]. Anofinic and fomannoxin acids have antifungal activity [11].

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Gentiana barbata Froel.

WHO

WHO

Mongolian name
Sormuust degd, Sakhlai degd

Tibetan name
Jagdig

English name
Gentiana Barbed

Synonyms: *G. barbata* var. *genuina* Kryl. et *simplex* Kryl., *Gentianopsis barbata* (Froel.) Ma [1]

Description: Annual or biennial herbs. Stem erect, 20–40 cm tall, simple or somehow branched at the tip. Radical leaves little wider than cauline ones, which are linear-lanceolate or linear. Flowers 3.5–6 cm long, quadrimerous, at the tip of stem and branches. Sepals acute. Corolla dark-blue, incised down to half, ciliate in the sinus.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong. Alt., Dund. Khalkh, Dor. Mong., Gobi-Alt.

Habitat: meadows along river and brook banks, forest fringes [2–5].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool and blunt. It is used for the following: treating inflamed wounds, eliminating and treating disorders of bile, and chronic liver disease. It is an ingredient of the following traditional prescriptions: Agar-35, Banlag-3, Gavurdogva-23, Gurgumchun, and Durjid-10 [5–8].

Microscopic characteristics:

Leaf: In the cross section, the epidermal cells appear long, quadriangular. The outer walls of the epidermal cells are covered by a layer of cuticle. Phloem are visible outer side of vascular bundle. Phloem narrow.

Stem: In the cross section epidermal cells appear single-layered, rounded. The outer walls of the epidermal cells are covered cuticle. Lower epidermis is present, seven to nine layers parenchymatous cells. Vascular bundle is bicollateral. Phloem narrow, xylem and rays not clear [9].

Chemical constituents: Herb contains 0.2% alkaloids, 2.3–5.91% xanthone [10]: swerciaperenin, gentiacochianin [11,12], 1-hydroxy-3,7,8-trimethoxyxanthone (decussatin), 1,7-dihydroxy-3,8-dimethoxyxanthone (gentiacaulein) [11,13,14], 1-*O*-β-D-glucopyranosyl-1,7-dihydroxy-3,8-dimethoxyxanthone, 1-*O*-β-D-glucopyranosyl-1-hydroxy-3,7,8-trimethoxyxanthone [15], 1-*O*-primverosyl-7-hydroxy-3,8-dimethoxy-xanthone (gentiabavaroside) [10,13,14], 1-*O*-β-D-glucopyranosyl-7-hydroxy-3,8-dimethoxy-xanthone, flavonoids: 5,7,3′,4′-tetrahydroxyflavone, 5,7,3′-trihydroxy-4′-methoxyflavone (diosmetin) [13,14], apigenin, luteolin, chrysoeriol, tilianin [16], 5,4′-dihydroxy-7-methoxyflavone, cosmoosin, 7-*O*-β-D-glucopyranosyl-5,3′-dihydroxy-4′-methoxy-flavone [17], 1-*O*-β-D-glucopyranosyl-7-hydroxy-3,8-dimethoxyflavone, 7-*O*-β-D-glucopyranosyl-5,7,3′-trihydroxy-4′-methoxyflavone [15], secoridoids: gentiopicroside, swertiamarin [13].

Bioactivities: Bile-expelling, hepatoprotective [10,18], antioxidant, anti-inflammatory, antihistamine [10], and immunomodulant [10,19].

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Gentiana decumbens L.f.

WHO

WHO

Mongolian name
Khevtee degd, Ukher Degd, Tomor Degd

Tibetan name
Jagdiga

English name
Prostrate Gentian

Synonyms: *G. adscendens* Pall., *G. gebleri* Ledeb. ex Bunge, *G. decumbens* var. *pallasii* et var. *gebleri* Kryl. [1]

Description: Thick repent rhizome. Stem 5–30 cm tall, radical leaves linear-lanceolate, with five veins. Cauline leaves in 2–4 pairs. Flowers at the tip of stem and in axils of cauline leaves. Sepals acute. Corolla 30–35 mm long, dark-blue. Ovary with stipe.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong. Alt., Dund. Khalkh, Dor. Mong., Ikh n., Olon n., Gobi-Alt. Zyyngar

Habitat: Steppes, slopes of mountains and hills, waterside meadows [2–5].

Part used: Herb

Traditional Uses: The taste is bitter and sour, and the potency is cool and blunt. It is used for the following: treating fever and cough. It is an ingredient of the following traditional prescriptions: Bongar-12, Bragshun-7, Gogal-18, Dudziseljor, and Jabur-8 [5–9].

Microscopic characteristics: Leaf is isolateral. Inner side of lower and upper epidermis are present 2–3 layers of palisade parenchyma. Centre of the leaf shows 2–4 layers of spongy parenchyma. Upper epidermal cells are relatively large than lower epidermis. Outer epidermal wall very thick, lignified. Anomocytic stomata occur on lower and upper epidermis. Intercellular spaces large. Phloem and xylem well-developed. Collateral vascular bundle is surrounded by parenchyma containing chlorophyll [10].

Chemical constituents: 6.1% flavonoids [5], sugars, 0.096% alkaloids, and tannins [11].

Qualitative and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction. Total flavonoid content is determined by spectrophotometry at 420 nm and calculated based on rutin [10].

Qualitative and quantitative standards: Loss on drying, 8.0–9.0%. Ash, not more than 2.0%. Organic matter, not more than 2.0% and mineral matter, not more than 0.5%. Total flavonoid content, not less than 0.5% [10].

Bioactivities: Bile-expelling, stimulates secretion of gastric acid [11].

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Geranium pratense L.

WHO

WHO

Mongolian name
Nugiin shimteglee

Tibetan name
Migman sanjai

English name
Meadow Cranesbill

Synonym: *G. coeruleum* Patrin. [1]

Description: Rhizome large, covered with brown scale, emerging rope like fibrous roots. Stem 30–80 cm tall, with long and short, adpressed and outspread, or directed downward hairs, sometimes mixed with glands. Radical leaves 8–20 cm wide, with deep, but not reaching the base, 5–7 segments, which are oblong-ovate, deeply dissected or largely dentate. Flowers paired on short pedicel, with glandular hairs. Terminal corymbose inflorescence. Pedicels 1.2–2 times longer than calyx, drooping before blossoms, erect in time of flowering, drooping again at fructification. Petals 15–20 mm long, bluish-violet, round at the apex.

Distribution: Khovs., Khent., Khang., Mong-Dag., Mong. Alt., Gobi-Alt.

Habitat: Mountain and waterside meadows in forest-steppe belt [2–5].

Parts used: Herb, root and flowers

Traditional Uses: The taste is sweet and bitter, and the potency is cool. It is used for the following: treatment of conjunctivitis, eye diseases, diarrhea, dysentery, rheumatism, podagra, nephrolithiasis, stomatitis, and throat diseases. It is an ingredient of the following traditional prescriptions: extract of Geranium, Gavar-3, Rashinamjil, Jur ur-6, and Lider-3 [5–7].

Chemical constituents: Sugars: glucose, saccharose, fructose, and raffinose [8], saponins, alkaloids, vitamins [9], tannins [10], polyphenolic compounds: myricetin 3-*O*-(2″-*O*-galloyl)-*β*-D-glucopyranoside and (-)-6-chloroepicatechin, quercetin 3-*O*-(2″-*O*-galloyl)-β-D-glucopyranoside, quercetin 3-*O*-(2″-*O*-galloyl)-*β*-D-galactopyranoside [11].

Bioactivity: Sedative [9].

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FABACEAE

Glycyrrhiza uralensis Fisch. ex DC.

WHO

WHO

Mongolian name
Ural chikher ovs

Tibetan name
Shin ar

English name
Ural Licorice

Synonyms: *G. viscida* Turcz. ex Besser, *G. glandulifera* var. *grandiflora* Ledeb., *G. asperrima* var. *uralensis* Regel [1].

Description: Perennial herb with a rhizome. Stem simple, erect, 40–70 cm tall, scabrous. Leaves odd pinnate, with 4–6 pairs of leaflets, oblong or oblong-ovate, 2–5 cm long, 1.5–3 cm wide, glandular hairs on both surfaces, simple hairs along the midrib and margins. Ca. 20 mm long, whitish-violet flowers shorter than bracts, in sparse short raceme. Legumes 2–4 cm long, 5–8 mm wide, oblong-linear, flat but transversely undulate, on surface glandular spines and pubescent, when curved in autumn and interwoven with each other, look like clenched fist.

Distribution: Khang., Mong-Dag., Khyang., Dor. Mong., Dund. Khalkh, Olon n., Ikh n., Dor. Gobi, Gobi-Alt., Alt. ovor., Zyyngar, Alash.

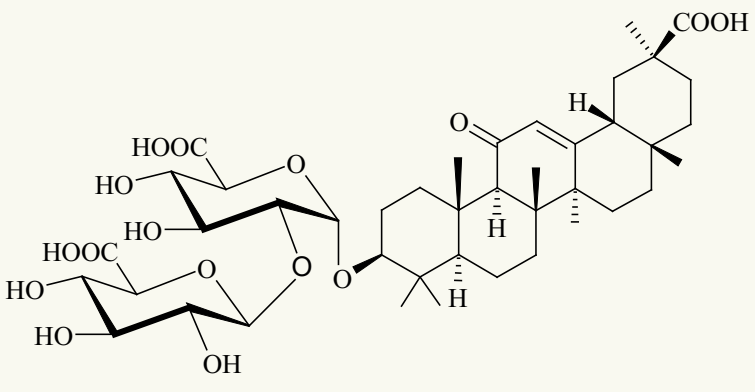
Habitat: Damp alkaline meadows, alkaline sands, sandy steppe, forb-grassy steppe, valleys of rivers and lakes, hummock fields [2–5].

Parts used: Root and rhizome

Traditional Uses: The taste is sweet and the potency is cool and liquid. It is used for the following: treating lung disease and throat illnesses caused by fever and thirst. Decrease fever, induces expectoration and fortifies the body. It is an ingredient of the following traditional prescriptions: Sorool-4, Aglig-4, Lish-6, Zandan-8, Uzem-7, Zachun-13, Banjingarvo-15, Dali-16, Lotsadgunsel, and Samfilnorov [5–9].

Microscopic characteristics: In transverse section of the root the cork is thick, brown, or purplish brown, formed of several layers of flattened polygonal thin-walled cells. Phloem are visible on the inner side of cortex and between medullary rays. Phloem fibres, very long, with very narrow lumen and strongly thickened stratified walls, which are cellulosic in the inner part of the phloem and slightly lignified in the outer. Fibres of parenchyma cells contain prisms of calcium oxalate. Pith, only rhizome dark yellow, parenchymatous; root no pith [10].

Chemical constituents: Root and rhizome contain polysaccharides [11–13], organic acids [13], triterpenoids: 4.9–22.2% glycyrrhizic acid [11,13,14], glyuranolide [3β,22α-dihydroxy-11-oxo-Δ12-oleanene-27α-methoxycarbonyl-29-oic acid (29,22α-)lactone] [15], 18α-glycyrrhizin, apioglycyrrhizin, araboglycyrrhizin, licorice-saponins A3, E2, G2, and H2 [16], coumarin [13,17], 7–9.46% tannins, 1.95–4% flavonoids [13]: quercetin [18], liquiritigenin, isoliquiritigenin [19], neoliquiritin, liquiritin, neoisoliquiritigenin, isoliquiritin [20], saxifragin [21], licoricone [22], vicenin-2 (apigenin-6,8-di-*C*-β-D-glucopyranoside), narcissin (isorhamnetin-3-*O*-rutinoside), nicotiflorin (kaempferol-3-*O*-rutinoside), astragalin (kaempferol-3-*O*-β-D-glucopyranoside), rutin (quercetin-3-*O*-rutinoside), isoquercitrin (quercetin-3-*O*-β-D-glucopyranoside) [23], uralene (6′-isoprenyl-3-methoxy-5,6,3′,4′-tetrahydroxy-flavone), uralenol-3-methyl ether (5′-isoprenyl-3-methoxy-5,7,3′,4′-tetrahydroxy-flavone) [18], gancaonin G, 5-*O*-methylglycryol, isoglycyrol, 6,8-diisoprenyl-5,7,4′-trihydroxyisoflavone [24], uralenol (5′-isoprenyl-3,5,7,3′,4′-pentahydroxy-flavone), neouralenol (2′-isoprenyl-3,6,7,3′,4′-pentahydroxy-flavone), uralenin (5′-isoprenyl-5,7,3′,4′-tetrahydroxy-flavonone), 6′-isoprenyl-3-methoxy-5,6,3′,4′-tetrahydroxy-flavone [25], licobichalcone [26], pterocarpenes: glycyrrhizol A and glycyrrhizol B [24].



Glycyrrhizic acid

Qualitive and quantitative assays: Pink colour is produced with 80% sulfuric acid due to glycyrrhizic acid in the root. Glycyrrhizic acid content is determined by chromato-spectrophotometry [27].

Qualitive and quantitative standards: Loss on drying, not more than 15.0%. Ash, not more than 8.0%. HCl-Insoluble ash, not more than 2.5%. Organic matter, not more than 1.0% and mineral matter, not more than 1.0%. glycyrrhizic acid, not less than 2.6% [27].

Bioactivities: Anticoagulant [13] and mucolitic [28].

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Haplophyllum dahuricum (L.) G.Don f.

WHO

WHO

Mongolian name
Khuj ovs

English name
Dahurian Haplophyllum

Synonyms: *Peganum dauricum* L., *Ruta daurica* (L.) DC. [1]

Description: Small dwarf semi-shrub, with numerous thin, 10–20 cm tall, erect stems, woody at the base, densely leaved. Leaves and seeds with numerous glands. Pentapetalous yellow flowers in umbel-like corymb. Capsule 4–5 mm long, 3–4 locular, obtusely five lobate, glabrous.

Distribution: Khent., Khang., Mong-Dag., Khyang., Khovd, Dund. Khalkh, Dor. Mong., Olon n., Dor. Gobi, Gobi-Alt.

Habitat: Forb meadows in steppe and mountain steppe [2–5].

Traditional Uses: no use

Chemical constituents: 0.05% alkaloids [6], coumarins [7]: umbelliferone [8], dauroside A, B [9], 5,7-dihydroxycoumarin, dauroside D [10], lignans: daurinol, usticidine A [8], difilline, flavonoids: haploside Â, haploside D [11,12].

Bioactivity: Antitumor [7].

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Heteropappus altaicus (Willd.) Novopokr.

WHO

WHO

Mongolian name
Altain Sogsoolj

Tibetan name
Lygchyn

English name
Altai Heteropappus

Synonyms: *Aster altaicus* Willd., *A. gmelinii* Tausch, *Calmeris altaica* Nees, *C. exilis* DC.

Description: Stem 5–40 cm tall, branched from the base or at the tip, several, leafy, densely covered with short adpressed or rigid hairs. Leaves 1–6 cm long, 1–6 mm wide, linear or oblong-linear, obtuse, changing in size up to stem tip. Heads 1.5–3.5 cm in diameter, with short peduncles, in corymbose panicle. Involucres in 2–3 rows, outer blades linear, inner blades short lanceolate or linear-lanceolate, white scarious at margin, 1–2 mm wide, completely covered with glandular hairs and sometimes with short simple

hairs. Ligulate flowers pale blue or lilac, flowers in the middle of the head yellow, petals dentate, glandular hairs on the outer surface. Pappus of all achenes equal.

Distribution: Khent., Khang., Mong-Dag., Khovd, Mong. Alt., Gobi-Alt., Dund. Khalkh, Dor. Gobi

Habitat: Debris and stony slopes, steppes, steppy meadows, rocks, sides of riverbeds, rocky areas [1–5]

Parts used: Herb

Traditional Uses: The taste is bitter and the potency is cool, light. It is used for the following: treating typhoid fever and poisoning, and vessel disorder. Used for spasm of tendon. It is an ingredient of the following traditional prescriptions: Lugchin-7, and Mana-7 [5–8].

Chemical constituents: Terpenoids: 12α-(2-methylbutyryloxy)-chardvikiec acid, farnesol, caryophyllin-1β,10α-epoxide, (-)-chardvikeic acid [9], heteroappusaponin [10], alkaloids, coumarin [11], flavonoids: isorhamnetin 3-*O*-rutinoside, rutin, nicotiflorin [12].

Bioactivity: Antibacterial [11].

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Hippophae rhamnoides (Willd.) L.

WHO

WHO

Mongolian name
Yagshilduu
Chatsargana

Tibetan name
Darbu

English name
Seabuckthorn, sallow thorn

Synonyms: *H. littoralis* Salisb., *H. rhamnoides* var. *sibirica* Regel, *H. rhamnoides* subsp. *eurhamnoides* Servet., *H. rhamnoides* var. *angustifolia* Dipp., *Hippophae rhamnoidea* St.-Lag. [1]

Description: Strongly branched, reddish shrub or small tree, 1–2.5 m tall, with brown-green or yellow-brown bark and numerous thorns. Dioecious plant with unisexual flowers. Leaves sessile, 2–8 cm long, 2–8 mm wide, upper surface pale green, lower surface silver whitish, with scale and round or slightly cordate base. Male flowers

form short, roundish spike in axils of young branches, with dissected tepals and 4 stamens. Female flowers solitary in axils, gamotepalous, with 2 short lobes. Pistil with style and long stigma, protruding from perianth tube.

Distribution: Khang., Mong-Dag., Khovd, Mong. Alt., Gobi-Alt. (Ikh Bogd), Olon n., Ikh n.

Habitat: River banks and lake shores, uremas, waterside rocks, forest fringes, canyon slopes [2–5].

Parts used: Fruit

Traditional Uses: The taste is sweet and sour, and the potency is blunt, oily, and dry. It is used for the following: to expectorate and dilute blood, treating lung and throat phlegm, liver, stomach and spleen disorders. Stops cough, and fortifies the body. An ointment can be used for burn wounds. It is an ingredient of the following traditional prescriptions: Darbu-4, Dejin-7, Jumz-5, Jugan-5, Shimshin-6, Yavuukhai-6, Jonsh-21, Yumedeujin-25, Zobu-25, Rashinamjil, Usu-7, Bayagava-10, Braina-17, Gantig-92, and Adon-8 [5–9].

Microscopic characteristics: **Fruit.** Epicarp thick-walled, quadrangular, covering trichomes, which are thin-walled, multicellular, peltate shaped. Parenchyma containing oil globules yellowish in color. Seed divided into three layers; outer layer narrow, slightly thick-walled, no pores; middle layer: parenchymatous cells thin-walled; inner layer: sclerid relatively thin-walled [10].

Chemical constituents: Fruit contains sugars: glucose, fructose, pectin [11,12], galactose, arabinose, rhamnose [13], polysaccharides [14], organic acids: [12], triterpenoids: ursolic acid [15], 2-*O*-*trans*-coumaroyl maslinic acid, 2-*O*-caffeoyl maslinic acid, oleanolic acid, 3-*O*-*trans*-*p*-coumaroyl oleanolic acid, 3-*O*-caffeoyl oleanolic acid [16], carotenoids: phytophluin, β-carotene, γ-carotene, licopene [12], violoaxanthin, neoxanthin and others [12,17], ascorbic acid [12,18], tocopherols [19], thiamine, riboflavin [12], flavonoids: quercetin, isorhamnetin, and kaempferol [20], myricetin, rutin [12], pentamethylquercetin, syringetin [21] and others, tannins [22], fat with higher fatty acids: oleanolic, linolic, palmitic and others [12]. Seed contains sugars, organic acids [23], ascorbic acid, tocopherols, triterpenoid [15], carotenoids [24,25], steroids [25], higher fatty acids [12,26].

Qualitive and quantitative assays: Carotenoids in the fruit are identified by reacton with $SbCl_3$. Total acid and ascorbic acid contents are determined by titration method. Total carotenoid content is deternimed by spectrophotometry at 541 nm and calculated as β-carotene [27].

Qualitive and quantitative standards: Loss on drying, not more than 75.0%. Ash, not more than 1.0%. Organic matter, not more than 0.5%. Juice yield, not less than 70%. and total acid content, not more than 3.0%. Carotenoid content calculated as β-carotene, not less than 7.9%. Oil content, not less than 7.0% and vitamin C content, not less than 50 mg [27].

Bioactivities: Anti-atherosclerosis, antioxidant [28], antibacterial [12], angioprotective [29]. Healing ulcer [12], leukemia HL-60 cells were inhibited [21].

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Hyoscyamus niger L.

WHO

WHO

Mongolian name
Khar Lantanz, Lantans, Landan, Teneg ovs, Sogtuu ovs

Tibetan name
Lantanza

English name
Black Henbane, Stinking Henbane

Description: Large biennials, covered soft curly hairs. Stem 15–70 cm tall, sometimes taller. Leaves elliptic, lower leaves with stalks, upper leaves sessile, clasping, coarsely dentate or pinnately lobed or parted, lobes acute, entire. Sessile flowers in terminal dense raceme. Bracts sessile, oblong, with a few teeth. Flowering calyx campanulate, fruiting calyx enveloping and longer than capsule. Corolla funnelform, 25–40 mm long, dingy-yellowish, with a reticle of violet veins.

Distribution: Khent., Khang., Mong-Dag. (west), Mong. Alt. (Khar azarga edge), Khyang., Dor. Mong., Dund. Khalkh, Dor. Gobi, Gobi-Alt.

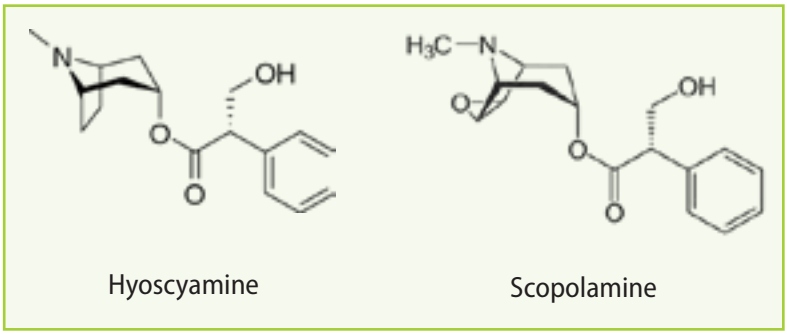
Habitat: Abandoned fields, wastelands in inhabited areas, banks of irrigation ditches, along roads, river banks, agricultural lands, dry rocky areas [1–5].

Parts used: Herb, fruit, and seed

Traditional Uses: The taste is bitter and the potency is oily. It is used for the following: treating diseases of the womb, alleviating pain, and neutralizing poisoning. It is an ingredient of the following traditional prescriptions: Agar-8, Jidanga-10, Zellon-17, Crinman-17, Chugtuv-18, Lantanza-8, and Garid-5 [5–9].

Microscopic characteristics: The leaf is dorsoventral. Epidermis is covered with smooth cuticle and numerous glandular trichomes. In epidermal layer are present anisocytic stomata and prismatic or cluster crystals of calcium oxalate. Near the veins are visible idioblasts. Vascular bundle bicollateral [10].

Chemical constituents: 0.06–0.13% alkaloids: hyoscyamine, apohyoscine, apohyoscine, scopolamine, skimmianine, apoatropine, α-belladonnine, β-belladonnine, tropine [11], coumarinolignans: hyosgerin, venkatasin, cleomiscosin A and cleomiscosin B [12], and other compounds: hyoscyamide, 1,24-tetracosanediol diferulate, 1-*O*-(9*Z*,12*Z*-octadecadienoyl)-3-*O*-nonadecanoyl glycerol, grossamide, cannabisin D, cannabisin G, *N*-*trans*-feruloyl tyramine, 1-*O*-octadecanoyl glycerol, 1-*O*-(9*Z*,12*Z*-octadecadienoyl) glycerol, 1-*O*-(9*Z*,12*Z*-octadecadienoyl)-2-*O*-(9*Z*,12*Z*-octadecadienoyl) glycerol, 1-*O*-(9*Z*,12*Z*-octadecadienoyl)-3-*O*-(9*Z*-octadecenoyl) glycerol, rutin, vanillic acid, β-sitosterol, and daucosterol [13].



Hyoscyamine Scopolamine

Qualitative and quantitative assays: Alkaloids in the plant are identified by the Bitali-Moren reaction, and total alkaloid content is determined gravimetrically [14].

Qualitative and quantitative standards: Loss on drying, not more than 14.0%. Ash, not more than 15.0%. Organic matter, not more than 0.5% and mineral matter. Total alkaloid content, not less than 0.045% [14].

Bioactivities: Sedative, spasmolytic, anticonvulsant, cytostatic, antibacterial, analgesic, anaesthetic [15].

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Inula britannica L.

WHO

WHO

Mongolian name
Britanii Zoosontsetseg

Tibetan name
Menjanserbo

English name
British Inula, British Yellowhead

Synonyms: *I. dysenterica* Georgi, *I. comosa* Lam., *I. serrata* Gilib., *I. repanda* Turcz., *I. tymiensis* Kudo., *I. britannica* var. *tymiensis* Kudo, *Aster orientalis* S.G.Gmel., *Conyza britannica* Rupr. [1]

Description: Perennials with very short rhizomes. Stem 20–60 cm tall, with divaricate hairs mostly near the tip. Leaves 4–10 cm long, 0.5–2.5 cm wide, lanceolate or broad lanceolate, entire, or slightly dentate, upper surface almost smooth, lower surface with long soft hairs and glands. Basal leaves with stalks, upper leaves sessile and clasping. Heads 4–5 cm in diameter, solitary or by 2–5 in terminal yellow corymb.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong-Alt., Dund. Khalkh, Ikh n., Gobi-Alt., Zyyngar.

Habitat: River and brook banks, waterside meadow plots [2–5].

Parts used: Root and rhizome

Traditional Uses: The taste is bitter and salty, and the potency is light and severe. It is used for the following: treatment of anthrax and other bacterial diseases, tumors and fever from anthrax. Also for treating water edema, lymph disease, and increasing appetite. It is an ingredient of the following traditional prescriptions: Gurgum-13, Brunal-14, and Zadjor-25 [5–9].

Microscopic characteristics: Cortex and parenchymatous cells contain oil granules and inulin [10].

Chemical constituents: Essential oil [11], sesquiterpene: britannine, 3-β-hydroxyeupatolide, isotelekine, 3-epi-isotelekine, 3β-hydroxy-2α-senecioloxyalantolactone, 15-dehydroxy-*cis,cis*-artemisiifoline [12–14], inulanolides A-D, 1,6-α-dihydroxyeriolanolide, 1-acetoxy-6-α-hydroxyeriolanolide, eupatolide [15], 4α,6α-dihydroxyeudesman-8β,12-olide, ergolide, 8-epi-helenalin and bigelovin [16], flavonoids: patuletin 7-*O*-(6″-isobutyryl) glucoside, patuletin 7-*O*-[6″-(2-methylbutyryl)] glucoside, patuletin 7-*O*-(6″-isovaleryl) glucoside, patulitrin, nepitrin, axillarin, patuletin, and luteolin [17], saponins, alkaloids [18].

Bioactivities: Antibacterial, antifungal [18], cytotoxic, and antioxidant [11,17].

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Iris potaninii Maxim.

WHO

WHO

Mongolian name
Potaninii Tsakhildag

Tibetan name
Dema

English name
Potanin Iris

Synonyms: *I. flavissima* Besser, *I. pumila* L., *I. tigridia* Bunge [1].

Description: Acaulis perennials with needle-like pale roots. Leaves up to 5 mm wide, narrow-ensiform. Solitary flower sessile, light yellow, with long narrow perianth tube tube twice exceeding limb. Spathe two leaved, with one flower.

Distribution: Khovs. (Eg river), Khent., Khang., Mong-Dag., Khovd, Mong-Alt., Dund. Khalkh, Dor. Mong. (north), Ikh n., Olon n., Dor. Gobi (Delgerkhangai), Gobi-Alt., Alt. ovor., Alash.

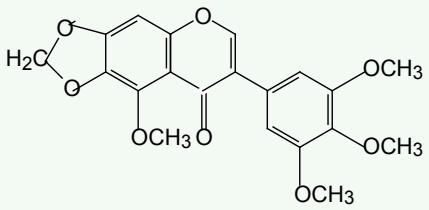
Habitat: Slopes and forest fringes in mountain steppe and forest-steppe belts [2–5].

Part used: Root

Traditional Uses: The taste is warm and the potency is cool. It is used for the following: beneficial for worm and poisoning diseases, wound healing, and when eyes become yellow, dries lymph disease, and treats stomach and large intestine fever. It is an ingredient of the following traditional prescriptions: Jidag-7, Ruda-11, Pagaril-4, and Namjildorj [5–7].

Microscopic characteristics: Under cork with underlying cortex, which are four-layered, angular. Many layers of parenchymatous cells are visible under the cortex. Endodermal layer thick-walled, lignified. Vascular bundle arranged in ring [8].

Chemical constituents: Root contains 5′,7,8-trihydroxy-3′,4′,6-trimethoxy-isoflavone, 6-*O*-β-D-glucopyranosyl-4′,7-dimethoxy-3′,5′,8–trihydroxyisoflavone, 4′,7-dimethoxy-3′,3,5-trihydroxyflavanone, 6,7-methylenedioxy-3′,4′,5′,5-tetramethoxy-isoflavone, 4′,5-dihydroxy-3′-methoxy-6,7-methylenedioxyisoflavone, 5′,5-dihydroxy-3′,4′-dimethoxy-6,7-methylendioxyisoflavone, 4′,5-dimethoxy-3′-hydroxy-6,7-methylenedioxyisoflavone, 4′-hydroxy-5-methoxy-6,7-methylenedioxyisoflavone, iriflophenone [8].



6,7-methylenedioxy-3′,4′,5′,5-tetra-methoxyisoflavone

Qualitative and quantitative assays: Flavonoids in the plant are identified by the reaction with ammonium hydroxide. Total flavonoid content is determined by spectrophotometry at 256 nm and calculated as quercetin [9].

Qualitative and quantitative standards: Loss on drying, not more than 6.0%. Ash, not more than 8.0%. Mineral matter, not more than 0.5%. Total flavonoid content, not less than 0.95% [9].

Bioactivity: Total flavonoids have kidney protective activity [8].

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Juniperus sabina L.

WHO

WHO

Mongolian name
Khasag Arts (Khonin Arts)

Tibetan name
Shugba

English name
Savin Juniper

Synonyms: *J. lycia* Pall., *Sabina officinalis* Garcke [1].

Description: Ascending evergreen shrub with grayish bark. Scale-like leaves or needles densely cover young shoots and branches, closely adpressed to each other. Branches quadrate, ca. 1.5 mm in diameter. Needles 1–3 mm long, rhombic or elliptic, sometimes almost triangle, if in the shade narrow-lanceolate or needle-like, 3–4 mm long. Pollen cones globose, 2 mm in diameter. Seed cones 5–8 mm, oval, dark blue, with many fertile scales, which are 4–5 mm long, 3–4 mm wide, oval and glabrous. Galberries one seeded.

Distribution: Khent., Khang., Mong-Dag., Khovd, Mong. Alt., Dund. Khalkh, Olon n., Gobi-Alt., Zyyngar.

Habitat: Rocky mountain slopes in high mountains [2–4].

Parts used: Fruit, leaf, and shoot

Traditional Uses: The taste is bitter and the potency is coarse, cool, and light. It is used for the following: treating anthrax, as a diuretic, decreases fever, and dries lymph disorder. Also used for arthritis and respiratory tract disorders, to cough up phlegm, heal inflammation and kidney fever and for urinary tract disorders. It is an ingredient of the following traditional prescriptions: Ar ur-10, Boigar-18, Ganma-47, Dargan-20, and Five mineral spring [4–8].

Chemical constituents: Leaves contain 3–4.4% essential oil: sabinyl acetate (11.5–30%), sabinene (10–17.2%), sabinol (17.6%), myrcene, myrcene, α-pinene, limonene, camphene, borneol, phenchene, and thujene [4].

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Lagotis integrifolia (Willd.) Schischk.

WHO

WHO

Mongolian name
Bukhel navchit khonlin

Tibetan name
Khonlen

English name
Entireleaf

Synonym: *L. glauca* var. *pallasii* Trautv., *L. pallasii* Rupr., *L. glauca* subsp. *borealis* var. *pallasii* Maxim., *L. glauca* auct. non Gaertn., *L. altaica* (Willd.) P.A.Smirn., *Gymnandra integrifolia* Willd., *G. altaica* Willd., *G. elongata* Willd., *G. pallasii* Cham. et Schltdl. [1].

Description: Glabrous perennial herbs. Stem 10–30 cm tall, simple, erect or ascending at the base. Radical leaves leather-like thick, with stalks as long as blade, oval, slightly dentate, cauline leaves smaller, sessile, lanceolate or ovate, entire, or somehow dentate. Flowers in terminal spike. Bracts 7–9 mm long, bluish,

but not differ from cauline leaves. Calyx tube-like, with two ciliate obtuse teeth. Corolla 10–13 mm long, with curved tube, dingy-white, turns black when dry.

Distribution: Khovs., Khent., Khang. (central), Khovd, Mong. Alt., Gobi-Alt. (Gurvan saikhan).

Habitat: Damp meadows in high mountains [2–5].

Parts used: Herb, leaves

Traditional Uses: The taste is bitter and the potency is cool and severe. It is used for the following: treatment of fever, blood disorder, vitals disorder,diphtheria, anthrax, and pneumonia. It is an ingredient of the following traditional prescriptions: Agar-19, 35, Jur ur-4, Bavo-13, Balega-4, Banjan-10, 12, 15, 25, Banzido-11, 12, Bashaga-4, Balo-25, Braivu-5, 6, 7, 17, Gavur-7, Givan-8, 10, 11, Gurgum-7, dontal-10, Domti-13, Doshun-11, Dudzi-3, Durjid-11, Jugan-8, Jonsh-16, Jugan-25, Judjal-40, and Manchen-25 [5–10].

Microscopic characteristics:

Leaf: Leaf is dorsoventral. Palisade cells differentiated into 3–5 layers of cells; spongy parenchyma of about 7–10 layers of cells with many intercellular spaces. Middle of the spongy parenchyma appear small and large collateral vascular bundle. Upper side of vascular bundle within aeronchymatous zone, lower side of vascular bundle within parenchymatous zone. Upper and lower epidermal cells slightly small, thickened, straight-walled. On both sides anomocytic stomata present; glandular trichomes visible. Anomocytic stomata occur on both surfaces of epidermis.

Stem: The transverse section is round. Epidermis thick-walled. Under the epidermis are 15 to 20 rows of aeronchyma layer. Parenchymatous cells near the vascular bundle contain oil granules [11].

Chemical constituents: Polyphenol compounds [11].

Qualitative and quantitative assays: Polyphenol compounds are identified by the reaction with lead acetate and titrated with potassium permanganate [11].

Qualitative and quantitative standards: Loss on drying, not more than 9.0%. Ash, not more than 4.6%. Organic matter, not more than 0.5% and mineral matter, not more than 1.0%. Water-soluble extractive, not less than 10.0%. Total polyphenol content, not less than 5.0% [11].

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Ledum palustre L.

WHO

WHO

Mongolian name
Namgiin surgar

Tibetan name
Surgar

English name
Crystalea Ledum, Labrador Tea

Synonym: *Rhododendron palustre* Harmaja

Description: 20–70 cm tall evergreen shrub with, strong fragrant. Leaves entire, turned down margins, leather-like thick, alternate, linear-oblong, 1–5 cm long, upper surface glossy dark green, on the lower surface rust-colored hairs. Petals free, snow flakes shaped, white, in corymb at branch apex. Capsule oval, with five locules and glands on the surface.

Distribution: Khovs., Khent., Khang., Mong-Dag. (Noyon mountain).

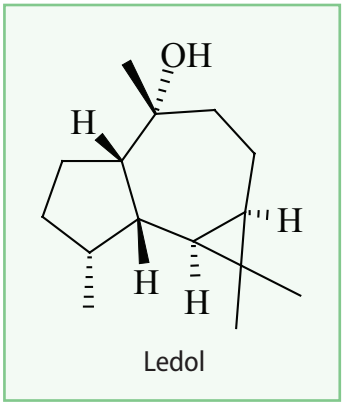
Habitat: Cedar and cedar-pine forests in high mountains [1–5].

Parts used: Herb

Traditional Uses: The taste is bitter and astringent, and the potency is warm and light. It is used for the following: treatment of inflammation, bring up phlegm, heal white worm and candidiasis. It is an ingredient of the following traditional prescription: Dydzi-5 [5–8].

Microscopic characteristics: Leaf is dorsoventral. Palisade and spongy parenchyma are visible. Parenchyma thick-walled and contains chloroplastids. Vascular bundle collateral. Epidermis covering unicellular, glandular and non-glandular trichome [9].

Chemical constituents: The aerial part contains essential oil: paracilline, α-pinene, *trans*-thujone, dihydroaromadendrene, tricyclene, pinene hydrate, β-phellandrene, *cis*-cinocarveol, sabine hydrate, terpinen-4-ol, *cis*-acraridol, campholenol, carvacrol, *trans*-acraridol [9], ledol, palustrol, myrtenal [10], phenolic compounds: 2.6% tannins [11]. The main compounds are ledol, palustrol, and myrtenal [10]. The leaves contain essential oil [11–15], 3.8% arbutin [11], phenolcarboxylc acids [16], 1.1–10.1% tannins, flavonoids: hyperin, 7,4′-dimethoxy-5-hydroxy-6-methylflavone, 5,4′-dihydroxy-3,7,3′,5′-tetramethoxyflavone, quercetin, avicularin, 6″-acetylhyperin and others [11].



Ledol

Qualitive and quantitative assay: Essential oil is determined by distillation method [17].

Qualitive and quantitative standards: Loss on drying, not more than 14%. Organic matter, not more than 1.0% and mineral matter, not more than 0.5%. Old branch 10.0%. Essential oil content, 0.25–2.0% [17].

Bioactivities: Antitussive, antibacteial, antihypertensive, decrease cardiac rate [11].

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Leontopodium leontopodioides (Willd.) Beauverd

OHO

OHO

Mongolian name
Egel Tsagaanturuu, Uul ovs

Tibetan name
Bratogba

English name
Common Edelweiss

Synonyms: *L. sibiricum* Cass., *L. alpinum* fo. *sibiricum* Korsh., *L. alpinum* var. *campestre* Beauverd, *Filago leontopodioides* Willd., *Gnaphalium leontopodioides* (Willd.) Willd., *G. Leontopodioides* var. *sibiricum*, Franch. *Antennaria steetzeana* Turcz. [1].

Description: Ash grey perennial herb with short rhizome. Stem 10–35 cm tall, numerous, many leaved, but without basal leaves. Leaves 1.5–4.5 cm long, 2–3 mm wide, linear, linear-lanceolate, acute, ash grey floccose hairs gradually get together. Bract number same as heads, linear, or narrow-lanceolate, with grey tomentose pubescence. Inflorescence consists of 2–5 heads, which are 7–10 mm wide.

Distribution: Khovs. (Eg river), Khent., Khang., Khyang., Mong-Dag., Dor. Mong.

Habitat: Dry meadows, dry pine and larch forests [2–5]

Part used: Herb

Traditional Uses: The taste is astringent, and the potency is cool and blunt. It is used for the following: treatment of diarrhea, alleviation of pain and sores, and healing glandular tuberculosis. It is a main raw material for cauterization. It is an ingredient of the following traditional prescription: Lonagden manag domba [5–7].

Chemical constituents: Coumarin: obliqine, 5-methoxy-obliqine, 5-hydroxy-obliqine, sesquiterpene lactones: [(1*S*,2*Z*,3a*S*,5aS,6*R*,8a*R*)-1,3a,4,5,5a,6,7,8-octahydro-1,3a,6-trimethylcyclopenta[c]pentalen-2-yl]methyl acetate, 1-[(2*R**,3*S**)-3-(*β*-D-glucopyranosyloxy)-2,3-dihydro-2-[1-(hydroxymethyl)vinyl]-1-benzofuran-5-yl]ethanone [8,9].

Bioactivities: Antidiarrheal, Anticonvulsant [10].

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Leonurus deminutus (Willd.) V.I.Krecz.

WHO

Mongolian name
Baga Khotoi

Tibetan name
Gangachun

English name
Little Motherwort

Synonyms: *G. algida* var. *sibirica* Turcz., *G. frigida* var. *algida* (Pall.) Froel. [1].

Description: Perennials, with short rhizome. Stem 10–20 cm tall, erect, solitary or several. Most leaves basal, oblong or lanceolate. Short terminal raceme. Calyx tube membranous, with 5 equal teeth. Corolla two to three times longer than calyx, 4–5 cm long, light yellow, with blue or violet lines and patterns. Ovary has stipe.

Distribution: Khovs., Khent., Khang., Mong-Alt., Gobi-Alt. (Ikh Bogd mountain)

Habitat: Boggy meadows in alpine belt [2–5].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treatment of diarrhea, reducing fever, poisoning, and blood and bile disorders. It is an ingredient of the following traditional prescriptions: Ikh tan-25, Banjan-25, Donroiselba-16, Doshun-23, and Yutigdum-4 [5–9].

Microscopic characteristics: Lower epidermis of leaf slightly wavy, scattered hairs, with numerous stomata which are surrounded by 3–4 cells. Upper epidermal cells slightly wavy, hairy. Trichoma two- and three-celled, numerous [10].

Chemical constituents: Herb contains 0.04–0.06% cardenolides, 2.56–2.85% flavonoids, 5.43–6.47% alkaloids, 6.02–8.9% tannins [11]. Epirutin and quercetin are the main flavonoids [12].

Qualitive and quantitative assays: Alkaloids are identified by the precipitation reaction. Total alkaloid content is determined by photometric method and calculated using the comparision curve of stachydrin hydrochloride [10].

Qualitive and quantitative standards: Loss on drying, not more than 14.0%. Ash, not more than 12.0%. Organic matter, not more than 2.5%. Total alkaloid content, not less than 2.0% [10].

Bioactivities: Sedative, anticonvulsant, and antihypertensive [12].

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Leonurus sibiricus L.

WHO

WHO

Mongolian name
Sibiri Khotoi

Tibetan name
Ninba

English name
Siberian Motherwort

Synonyms: *L. sibiricus* var. *grandiflorus* Benth., *L. multifidus* Raf., *L. occidentalis* Colla, *L. manshuricus* Yabe, *L. manshuricus* fo. *albiflorus* Nakai et Kitag., *L. sibiricus* fo. albiflorus (Nakai et Kitag.) Wu & Li, *Panzeria tripartita* Moench, *P. multifida* Moench [1].

Description: Perennials. Stem 15–80 cm tall, solitary or several, branched, with short adpressed hairs like leaves. Leaves broad-ovate, trifid, three segments divided into linear lobes. Flower whorls distant. Calyx 6–8 mm long, hairy. Corolla large, 15–20 mm long, bluish-purple. Upper lip with long entangled hairs on the outer surface.

Distribution: Khovs. (Arig river), Khent., Khang. (central), Mong-Dag., Khyang., Dund. Khalkh., Dor. Mong., Dor. Gobi

Habitat: Agricultural fields, stony and rocky slopes, nomad camps, ruderal places [2–5].

Part used: Herb

Traditional Uses: The taste is bitter, and the potency is cool and coarse. It is used for the following: treatment of poisoning, diarrhea, reducing fever, eliminating bile and blood, and calming. It is an ingredient of the following traditional prescriptions: Ikh tan-25, Banjin-25, Donroiselba-16, Doshun-23, and Yutigdum-4 [5–9].

Chemical constituents: 1.99% alkaloids: leonurine [10–12], 12.58% tannins, 3.86% flavonoids, 0.1–0.32% cardenolides [13], diterpenes: leosibirine, isoleosibirine, leosibiricine [14], sibiricinones A-E, and 15-*epi*-sibiricinones D and E [15], lactones [14].

Bioactivities: Sedative, antihypertensive [13], stimulant effect on the uterus, antiarrhythmic [12], antibacterial [16]. Diterpene lactones in the plant have cytotoxic activity [17].

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Lilium pumilum Delile

WHO

WHO

Mongolian name
Odoi saraana

Tibetan name
Aviha

English name
Low Lily

Synonym: L. tenuifolium Fisch. ex Schrank [1]

Description: Perennial herbs. Bulbs 3–4 cm long, white, ovate, covered by grey scales. Stem thin, smooth, 18–80 cm tall. Leaves sessile, narrow, linear, 3–10 cm long, 1–3 mm wide, a clear vein on lower surface, margins slightly curved down. Flowers drooping, tepals oblong lanceolate, their tips curved out, bright red. Raceme 1.5–3 cm long, consisting of 2–6 flowers.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Dund. Khalkh, Dor. Mong.

Habitat: Mountain slopes, meadow slopes, stony slopes, pine forests [2–5].

Parts used: Flower

Use in Mongolian Traditional Medicine: The taste is sweet and potency is cool. It is used for the following: to increase urination, to decrease edema and to promote phlegm. The flowers are used for hemostatis, to dry out lymph, to treat wounds and and for menorrhagia. It is an ingredient of the following traditional prescriptions: Davsen-6, Bushelz-7, Luded-18 [5–9].

Chemical constituents: Alkaloids [10,11], carotinoids [12], flavonoids: rutoside, kaempferol-3-*O*-rutinoside, and isorhamnetin-3-*O*-rutinoside [13].

Bioactivities: anti-inflammatory, spasmolytic, liver protective [14].

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Lomatogonium carinthiacum (Wulfen) Rchb.

WHO

WHO

Mongolian name
Karintiniin degdgene

Tibetan name
Uldig

English name
Carinthiac Felwort

Synonyms: *Swertia carinthiaca* Wulfen, *S. sulcata* Rottb., *Gentiana rotata* Willd., *G. stelleriana* Cham. et Schtdl., *Pleurogyne carinthiaca* (Wulfen) Griseb. [1].

Description: Annual herb with 5–25 cm tall, branched, erect or ascending stems. Leaves oblong-ovate. Blue flower on the scape. Sepals oblong-ovate, acute. Corolla 10–12 mm long, 1.5–2 times longer than calyx, 20–25 mm in diameter, rotate shaped, with dark veins. Nectary not mealy, lobed at the margin. Ovary orange but bluish at the tip. Stigma barely visible. Capsule unilocular, biseptate.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khovd, Mong. Alt.

Habitat: Waterside damp meadows, willow and dwarf birch thickets in mountain forest-steppe belt [2–5].Part used: Herb

Traditional Uses: The taste is bitter and hot, and the potency is cold and blunt. It is used for the following: treating fever, eliminating bile, and healing wounds. It is an ingredient of the following traditional prescriptions: Valo-25, Givan-8, Dasimarbo-21, and Dudzitigva-2 [5–8].

Chemical constituents: Iridoids: erythrocentaurin, swertiamarin, alkaloids, 5.25% flavonoids (myagmar): orientin, luteolin, isovetexin, 6-hydroxyluteolin-7-*O*-gentiobioside, 6- hydroxyluteolin-7-*O*-glucoside [9], xanthones: 1-hydroxy-4,6,8-trimethoxyxanthone, 1,8-dihydroxy-3,5-dimethoxyxanthone, 1-hydroxy-3,7-dimethoxyxanthone, 1-hydroxy-3,7,8- trimethoxyxanthone, 1,8-dihydroxy-3,7-dimethoxyxanthone [9–13].

Qualitive and quantitative assays: The following is a suitable TLC procedure to identify flavonoid: silica gel, ethyl acetate-formic acid-water (10:1:1) solvent system, detection reagent: 2% ethanolic solution of aluminum chloride. Flavonoid spots are observed under UV lamp. Total flavonoid content is determined by spectrophotometry at 420 nm and calculated using the comparison curve of rutin [14].

Qualitive and quantitative standards: Loss on drying, not more than 12%. Ash, not more than 5%. Organic matter, not more than 2.0% and mineral matter, not more than 2.0%. Total flavonoid content, not less than 3.5% [14].

Bioactivities: Bile-expelling, diuretic, and antihypertensive [15].

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Lomatogonium rotatum (L.) Fr. ex Fernald

WHM

WHM

Mongolian name
Dugui Degdgene

Tibetan name
Yldig

English name
Marsh Felwort

Synonyms: *L. stellerianum* Kostel., *L. sulcatum* Rchb. ex Kostel., *Swertia rotata* L., *Pleurogyne rotata* (L.) Griseb., *P. stelleriana* G. Don, *P. sulcatum* G. Don, *Gentiana rotata* Willd., *G. stelleriana* Cham. & Schltdl. [1]

Description: Annuals, with 5–20 cm tall, erect stem, branched from the base. Leaves linear, basal ones fall off early. Flowers on leafless long peduncles, 20–25 mm in diameter. Sepals narrow, as long as corolla. Petals 12–15 mm long, blue, with dark veins, spatulate, but with acute lobes. Nectary whitish with divided margin. Ovary orange coloured.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong. Alt., Ikh n.

Habitat: Damp meadows in river banks, dwarf birch willow thickets in forest-steppe belt [2–5].

Part used: Herb

Traditional Uses: The taste is bitter, and the potency is cool and blunt. It is used for the following: treating fever, healing wounds, and eliminating bile. It is an ingredient of the following traditional prescriptions: Valo-25, Givan-8, Dasimarbo-21, and Dudzitigva-2 [5–8].

Microscopic characteristics:

Leaf: Leaf is dorsoventral. Palisade single-layered; spongy parenchyma four- to seven-layered. Vascular bundle collateral, centre vascular bundle surrounded by sclerenchyma. Upper epidermal cells are wavy, thickened, and inflated. Lower epidermal cells are wavy-walled. Anomocytic and anysocytic stomata occur only on the lower surface of the leaf [9].

Stem: The transverse section is round. Epidermal slightly thick and smooth cuticle. Below epidermis appear four layers of cortex. Sclerenchyma are present between phloem and xylem. Pith parenchyma round, scattered [9].

Chemical constituents: Iridoids: swertiamarin [10], alkaloid: gentianine [11], triterpenes [10], flavonoids: orientin, isoorientin, luteolin, and cinaroside, xanthones: 1-hydroxy-3,7,8-trimethoxyxanthone, 1-hydroxy-3,5,6-trimethoxyxanthone, 1,8-dihydroxy-3,5- dimethoxyxanthone. Herb contains 3.5% γ-pyrone [10].

Qualitive and quantitative assays: Iridoids give a black precipitate with hydrochloric acid. Triterpenoids identified by Lieberman-Burchard reaction. γ-Pyrone in the plant is identified by cyanidin reaction, and total γ-pyrone content is determined by spectrophotometry at 280 nm and calculated as decussatin [9].

Qualitive and quantitative standards: Loss on drying, not more than 4.9%. Ash, not more than 2.0%. Organic matter, not more than 2.0% and mineral matter, not more than 0.2%. Total γ-pyrone content, not less than 2.5% [9].

Bioactivities: Hepatoprotective and bile-expelling [10].

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Malva mohileviensis Downar.

WHO

WHO

Mongolian name
Mogileviin jamba

Tibetan name
Jamba

English name
Mohilev Mallow

Synonyms: *M. pulchella* Bernh., *M. verticillata* L., *M. crispa* L. [1]

Description: Stem 30–100 cm tall, erect. Leaves palmate, crenate, cordate. Flowers sessile or with short peduncles, in capitate inflorescence. Corolla pale purple, twice longer than calyx. Fruits glabrous, mericarp abaxially wrinkled.

Distribution: Khang., Mong-Dag., Mong. Alt., Dund. Khalkh, Olon n.

Habitat: Agricultural fields, nomad camps, ruderal places [2–4]

Parts used: Herb and seed

Traditional Uses: The taste is sweet and astringent, and the potency is sharp and heavy. It is used for the following: improve discharge of urine in cases of anuria, treatment of diarrhea, edema, colds, drying of pus, decrease of thirst, and is beneficial for nephrolithiasis, cystolithiasis, enhancing kidney strength, and lower back and bladder pain. It is an ingredient of the following traditional prescriptions: Jamba-6, Sema-3, Altan els-8, Buurnii arur-18, Jamba-2, Sojid, Sugmel-10, Umodeujin-24, Vanlag-37, Goui-5, Zagtar-7, Sembu-11, Serjijima-13, and Arur-15 [4–8].

Chemical constituents: Total oil yeild of seed is 11% and it contains 16.18% palmitic, 7.7% oleic, 61.6%, linoleic, and 7.9% stearic acids [9]. Polysaccharides are the main compounds of the seed, which also contains flavonoids, terpenoids, and tannins [10].

Qualitative and quantitative assay: Tannins are identified by the reaction with dilute sulfuric acid and titrated with potassium permanganate [10].

Qualitative and quantitative standards: For herb: Loss on drying, 10.54%. Tannins, 2.7%.

For seed: Loss on drying, 12.56%. Tannins, 0.59% [10].

Bioactivities: Anti-inflammatory activity, immunostimulating, and diuretic [10].

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Mentha arvensis L.

WHO

Mongolian name
Kheeriin Batrash

Tibetan name
Jagod bo

English name
Field Mint

Synonyms: *M. austriaca* Jacq., *M. arvensis* subsp. *haplocalyx* (Briq.) Briq. [1].

Description: Stem 8–45 cm tall, simple or more or less branched, sparsely hairy. Leaves oval-lanceolate round, 1.5–5 cm long, 0.8–2.5 cm wide, almost glabrous or sparsely hairy, acute, cuneate, sometimes round, serrate. Flowers whorled in axils of leaves in the middle part of the stem. Bracts lanceolate. Calyx 2–2.5 mm long, sparsely hairy. Pedicels as long as calyx. Corolla 4–5 mm long, more or less hairy.

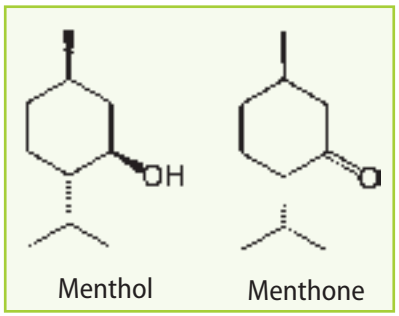
Distribution: Khang., Mong-Dag., Khyang., Khovd, Dund. Khalkh, Dor. Mong., Olon n., Ikh n., Zyyngar.

Habitat: Waterside meadows, damp and swampy river banks and lake shores, undeveloped roads [2,3].

Parts used: Herb, leaf, and flower

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: reduce subfebrile fever, as a sudorific, decreasing pain, including headache and toothache, stops itching, alleviates sore throat, and for persistent fever, including fever caused by any toxin. Also used for treating diphtheria and anthrax poisoning. It is an ingredient of the following traditional prescriptions: Durjid-11, Degd-13, Zandangarvo-15, Manchen-11, Ruda-20, and Senden-25 [4,5].

Chemical constituents: Herb contains 0.84–3% essential oil: α-pinene, β-pinene, limonene, myrcene, menthone, (-)-menthone, isomenthone, (+)-isomenthone, (+)-pulegone, isopulegone, pyperitone, (+)-pyperitone, *n*-cymol, (-)-menthol, menthyl acetate, octanal-3 and other compounds [6–8].



Bioactivities: Antibacterial and antifungal [8].

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Myricaria longifolia Ehrenb.

WHO

Mongolian name
Urt navchit balgana

Tibetan name
Ombu

English name
Longleaved Falsetamarisk

Synonyms: *M. linearifolia* Desv., *M. longifolia* var. typica Maxim., *Tamarix germanica* L., *T. decandra* Pall., *T. longifolia* Willd. [1]

Description: 2–3 m tall shrub. Branches divaricated, quite long, alternately arranged. Leaves 0.8–1.5 cm long, 1–1.5 mm wide, linear-lanceolate, grayish, with abundant glands. Racemes with long petiole. Bracts 10 mm long, wide lanceolate, with narrow scale-like margin. Basal leaves narrow and long. Calyx 3–4 mm long, corolla 5 mm long.

Distribution: Khent., Khang., Mong-Dag., Khovd, Mong-Alt., Ikh n.

Habitat: Rocky areas along river banks [2–4].

Part used: Shoot

Traditional Uses: The taste is sour and sweet, and the potency is blunt and cool. It is used for the following: treating fever and poisoning. It is an ingredient of the following traditional prescriptions: Braivu-3, Gagol-18, Gontog-7, Khach gurgum -25, Degd-13, and Dedbo-10 [4–8].

Chemical constituents: Flavonoids: quercetin, rhamnetin, tamarisksetin, and 3-*O*-beta-D-quercetin glucopyranoside (isoquercitrin) [9].

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Odontites ruber Gilib.

WHO

WHO

Mongolian name
Ulaan Bashga

Tibetan name
Bashiga marbo

English name
Red Bartsia

Synonym: *O. vulgaris* Moench, *O. serotinus* Dumort, *O. rubra* Besser subsp. *litoralis* (Fries) Hartl, *O. litoralis* Fr., *Euphrasia rubra* Vill., *E. serotina* Lam., *Bartsia odontites* Huds. [1].

Description: 10–50 cm tall annuals, simple or branched, completely covered with simple hairs, directed downwards. Leaves tapering to the tip, lanceolate, opposite, with small teeth along the margin. 10 mm long, pink flowers with pedicel, in long unilateral inflorescence. Upper lip of the corolla helmet shaped, with a small notch at the apex, lower lip trilobite. Calyx 5–7 mm long, covered with strict, stiff hairs, its limb almost equals to the tube.

Distribution: Khent., Khang., Mong-Dag., Mong. Alt. (east), Dund. Khalkh (north), Dor. Mong., Ikh n., Olon n., Zyyngar (Bulgan).

Habitat: River banks, waterside meadow [2–4]

Parts used: Herb

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treating blood fever, pneumonia, typhoid fever, and alleviating pain. Usually used for hepatitis, blood and bile disorders. It also stimulates cardiac activity and decreases blood pressure. It is an ingredient of the following traditional prescriptions: Arjutan, Degd-4, Tsarvon-4, Chintan, Vontag-25, Vanjangarav-15, Givan-9,13, Gurgum-7, 10, Zandan-8, Gagol-19, Jonsh-21, Zovu-8, Ruda-6, Tanchen-25, Agar-35, Bavo-6, Balega-4, Banjan-25, Bremog-7, Jalchin-16, and Jonsh-19 [4–8].

Microscopic characteristics:

Leaf: Leaf is dorsoventral. Palisade 2-layered cells, spongy parenchyma 2–4 layered. Numerous glandular and non-glandular trichomes covered by epidermal cells. Anomocytic stomata on lower epidermis only. Epidermal cells wavy walled. Vascular bundle is collateral type.

Stem: The transverse section is quadrangular. Cutinized outer walls; palisade 3–7 layered. Parenchymatous cells are angular [9].

Chemical constituents:1.8% iridoids: aucubin, catalpol, isocatalpol, aucubin 10-acetate, odontoside, odontosid 10-acetate, 8-epi-loganin, mussaenoside, aucubigenin 1-*O*-β-serotinoside, aucubigenin 1-*O*-β-cellobioside, aucubigenin 1-*O*-β-gentiobioside, aucubigenin 1-*O*-β-glucopyranoside [10–12], carotenoid [12], 2.26% saponin, 0.06% alkaloid [12,13], 2.72% phenolcarboxylic acids, 2.34% flavonoids: apigenin, luteolin, apigenin 7-*O*-β-D-glucoside, luteolin 7-*O*-β-D-glucoside [10,12].

Qualitive and quantitative assays: Flavonoids in the plant are identified by reaction with lead tetraacetate. Total flavonoid content is determined by titration using potassium permanganate as the titrant [9].

Qualitive and quantitative standards: Loss on drying, not more than 6.3%. Ash, not more than 6.0%. Organic matter, not more than 0.5% and mineral matter, not more than 0.5%. Water-soluble extractive, not less than 17.0%. Total polyphenolic compound content, not less than 5.0% [9].

Bioactivities: Hepatoprotective [14], membranoprotective, antiallergic, sedative, antihypertensive, bile-expelling, and antioxidant activity [12].

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Oxytropis myriophylla DC.

WHO

WHO

Mongolian name
Tumen navchintsart Ortuuz

Tibetan name
Dagsha

English name
Dense leaf Crazyweed

Synonyms: *Astragalus myriophyllus* (Pall.) Pall., *A. verticillaris* L. [1].

Description: Acaulis perennials, forming dense bush, with grey hairs. Leaves long, but 1.5 times shorter than scape, pinnately compound, fringe-like, 20–30 regularly arranged verticils in a leaf, 6–8 leaflets in a verticil, leaflets longitudinally rolled up, slightly bent, with sparse whitish hairs. Flowers 20 mm long, whitish violet, sometimes white, in oblong sparse raceme. Calyx 8–12 mm long, tube-like, with sparse long hairs, limbs 2–4 mm long, awl-shaped or narrow-lanceolate, two to three times shorter than tube. Beak of the keel 1.5–2 mm long,

legumes 15–18 mm long, oblong-lanceolate, hard, whitish pilose, narrow septa in ventral suture.

Distribution: Khovs. (east), Khent., Khang. (east), Dund. Khalkh (north), Dor. Mong., Khyang.

Habitat: Steppe debris and stony slopes, pine forests on sandy soil, dry forest fringes [2–5].

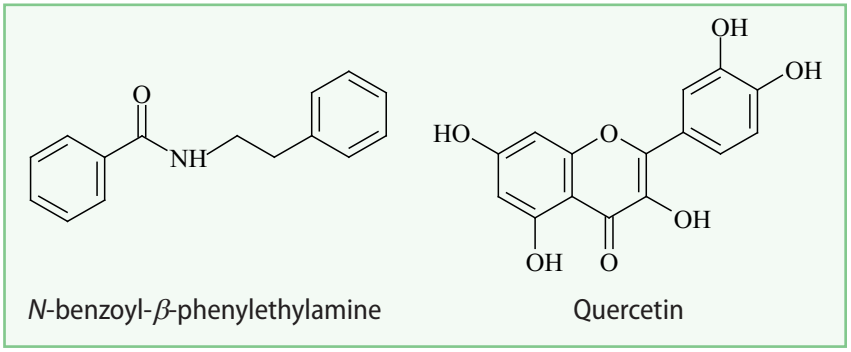
Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool, blunt, and light. It is used for the following: treating bone diseases, broken bones, dermatitis, anthrax, and ulcers. Also used to treat amenorrhea, bleeding and for suppurative wounds. It is an ingredient of the following traditional prescriptions: Bavo-13, 14, 25, Banzdo-11, 12, Boigor-18, Boichun-19, 23, Bonnag-15, Brunag-10, 29, Gavur-13, and Garid-5 [5–9].

Microscopic characteristics:

Petiole: The transverse section is ellipse shaped. Epiderm hairless. 2–3 layer cells of gypoderm are visible lower surface of the epidermis. Single layer chlorenchyma seen below gypoderm. Vascular bundle is surrounded by sclerenchyma that are well-enveloped. Vascular bundle 14, arranged in a ring. Central vascular bundle larger than others [10].

Chemicalconstituents: Theaerialparts contain 0.12–0.3% alkaloids: *N*-benzoyl-*β*-phenylethylamine, *N*-benzoyl-*β*-hydroxy-*β*-phenylethylamine, *N-trans*-cinnamoyl-*β*-phenylethylamine, *N-trans*-cinnamoyl-*β*-hydroxy-*β*-phenylethylamine, *N-cis*-cinnamoyl-*β*-phenylethylamine [11,12], 0.63–2.33% flavonoids [12,13]: kaempferol, quercetin, rhamnasin, astragalin, rhamnetin (3,5,3′,4′-tetrahydroxy-7-methoxyflavone) [13], (2*S*)-7-hydroxyflavanone, pinocembrin, sacuranetin [12], (6*R*,9*R*)-roseoside, (6*R*, 9*S*)-roseoside, adenosine, myriophylloside B, myriophylloside C, myriophylloside D, myriophylloside E, myriophylloside F [14], isorhamnetin-3-*O*-*α*-D-galactopyranoside, isorhamnetin-3-*O*-*α*-D-glucopyranoside, isorhamnetin-3-*O*-*α*-D-rhamnopyranoside [13], oxymyrioside (quercetin-3-*O*-(*β*-D-glucofuranosyl-2→1-*β*-glucofuranosyl)-7-*O*-*α*-L-rhamnofuranoside), acetyloxymyrioside (quercetin-3-*O*-(*β*-D-glucofuranosyl-2→1-*β*-D-glucofuranoside-10″-acetyl-7-*O*-*α*-L-rhamnofuranoside), coumaroyloxymyrioside (quercetin-3-*O*-(*β*-D-glucofuranosyl-2→1-*β*-D-glucofuranoside)-10″-II-coumaroyl-7-*O*-*α*-L-rhamnopyranoside) [15], oxytroside (kaempferol-3-*O*-(*β*-D-glucopyranosyl-6-*β*-L-rhamnopyranoside)-7-*O*-*α*-L-rhamnopyranoside) [16], steroid saponins, coumarin [13], phenolic glucosides: 2-methoxy-4-(3′-hydroxy-*n*-butyl)-phenol-1-*O*-beta-D-glucopyranoside, syringin, 2-methoxy-4-(3′-hydroxy-propenyl)-phenol-1-*O*-beta-D-glucopyranoside [17], and pinitol, benzoic acid, triterpene glycosides [18].



N-benzoyl-*β*-phenylethylamine Quercetin

Qualitative and quantitative assays: The following is a suitable TLC procedure to identify flavonoid: silica gel, chloroform-methanol (9:1) solvent system, detection reagent: 1% ethanol solution of iron (III) chloride. The spot with

the same R_f as reference quercetin is observed under UV lamp and after spraying with detection reagent. Total flavonoid content is determined by spectrophotometry at 256 nm and calculated as quercetin [10].

Qualitative and quantitative standards: Loss on drying, 10.0%. Ash, not more than 6.0%. Organic matter, not more than 1.0% and mineral matter, not more than 1.0%. Total flavonoid content calculated as quercetin, not less than 1.5% [10].

Bioactivity: Antihistamine [13].

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Oxytropis strobilacea Bunge

WHO

WHO

Mongolian name
Borgotsoirkhuu Ortuuz

Tibetan name
Dagsha

English name
Crazyweed Strobilacea

Synonym: *O. halleri* Bunge [1]

Description: Acaulis plant with silky hairs. Leaves shorter than scape, sometimes may be equal. Leaflets in 10–15 pairs, 5–20 mm long, 3–7 mm wide, oblong or lanceolate, acute, with silky hairs on both surfaces, glabrate in late autumn. Scape stiff, erect, completely covered with short adpressed hairs, also black and white hairs mixed. Flowers 17–20 mm long, purple, and turn bluish when dry, in capitate or oblong-ovate dense flowered inflorescence. Calyx 9–12 mm long, tubular-campanulate, with mixed black and white hairs. Calyx limb 3–4 times shorter than the tube. Legumes 10–20 mm long, oblong-ovate or oblong, with long beak.

Distribution: Khovs., Khent., Khang., Mong-Dag., Mong Alt., Khovd, Gobi-Alt.

Habitat: Forests, forest fringes in mountain forest-steppe and alpine belts [2–5].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool, blunt, light, and severe. It is used for the following: Treatment of head, breast, joint, and bone wounds, bacterial fever, and fever from anthrax; also treats anuria. It is an ingredient of the following traditional prescriptions: Banzi-12, Dinman-12, Jonlan-12, Menbo-9, Tsalgar-7, Numadanjug, and extract of Dagsh [5–7].

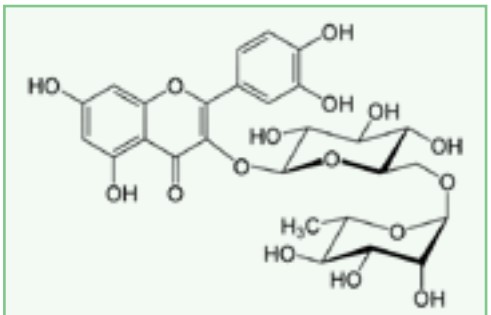
Microscopic characteristics:

Leaf: Palysade parenchyma consists of 4–6 layers of cells containing chlorophyll. Outer epidermal walls slightly thick and wavy. Stomata is the anomocytic type. Glandular trichome long, branched.

Petiole: The transverse section is triangular. Inner side of epidermis consists of layers parenchyma containing chlorophyll. Vascular bundle 7, collateral type with sclerenchyma cells, well-developed. Epidermis has glandular and non-glandular trichomes.

Stem: The transverse section is round. Outer epidermis covered with thick cuticle. Inner side of epidermis consists of 5–11 layers parenchyma. Parenchyma is round and scattered. Vascular bundle collateral type [8].

Chemical constituents: Herb contains flavonoids: quercetin [9], 5.42% rutin [9,10].



Rutin

Qualitive and quantitative assays: Flavonoids in herb are identified by the cyanidin reaction and TLC. The following is a suitable TLC procedure to identify flavonoid: silica gel, butanol-acetic acid-water (4:1:2) solvent system. The spot with the same R_f as reference rutin is observed under UV lamp and after spraying with detection reagent. Total flavonoid content is determined by chromato-spectrophotometry at 363 nm [8].

Qualitive and quantitative standards: Loss on drying, 10.0%. Ash, not more than 8.0%. Organic matter, not more than 1.0% and mineral matter, not more than 1.0%. Rutin content, not less than 2.0% [8].

Bioactivity: Antioxidant [9].

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Paeonia anomala L.

WHO

WHO

Mongolian name
Yagaan Tseene, Yalguuntsetseg

Tibetan name
Bavru

English name
Ural Peony

Synonyms: *P. laciniata* Pall., *P. sibirica* Pall. [1].

Description: 40–80 cm tall, glabrous perennial herbs, with thick tuberous roots. Basal leaves scale-like, cauline leaves ternate with twice palmate segments or pinnately segmented with long lanceolate lobes. Terminal leaves entire, with 2–3 teeth. Lower surface of the leaves glabrous, upper surface slightly hairy along the veins. Corolla red, 8–18 cm in diameter. Follicles 3–4, transversely arranged, with numerous black seeds.

Distribution: Khovs. (Eg river), Khent., Khang., Mong-Dag., Khovd.

Habitat: Larch and mixed forests, their fringes, birch forest in forest-steppe belt [2–5].

Parts used: Roots and rhizome

Traditional Uses: The taste is bitter and astringent and potency is warm, light. It is used for the following: as a diuretic, strengthening the body, as a haemostatic, as a treatment for headache and stomach ache. It is an ingredient of the following traditional prescriptions: Brega-7, 13, Vanlag-35, Braivu-15, 17, Sojid, and Senden-25 [5–9].

Microscopic characteristics:

Roots: Inner epidermis is present 4–6 layers parenchyma. Parenchyma lignified. Phloem and xylem well-developed. Xylem with numerous, strongly lignified wood fibres [10].

Chemical constituents: Roots contain sugars [11]: glucose, galactose, arabinose, rhamnose [12], organic acids, essential oil [13], monoterpenes, triterpenes [11], phenolic acids and derivatives: 0.07–0.2% salicylic acid [5,11], methyl salicylate, 8.8% tannins [5].

Qualitive and quantitative assay: Tannins in the root are identified by the reaction with iron (III) ammonium sulphate and titrated with potassium permanganate [10].

Qualitive and quantitative standards: For rhizome: Loss on drying, not more than 8.5%. Ash, not more than 4.7%. Organic matter, not more than 0.5% and mineral matter, not more than 1.0%. Water-soluble extractive, not less than 37.3%. Tannins, not less than 2.5% [10].

Bioactivities: Sedative and anticonvulsant [13]

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Panzeria lanata Bunge

WHO

WHO

Mongolian name
Uskhii nokhoin khel, Temeen angalzuur, Galuun tavag

Tibetan name
Shimtegle garbo

English name
Woolle Panzeria

Synonyms: *P. alaschanica* Kuprian., *P. albescens* Kuprian., *P. argyracea* Kuprian., *P. kansuensis* C.Y.Wu & H.W.Li, *P. parviflora* C.Y.Wu & H.W.Li, *P. alaschanica* Kuprian. var. *minor* C.Y.Wu & H.W.Li, *Ballota lanata* L., *Leonurus lanatus* Pers. [1].

Description: 30 cm tall perennial herb, with taproot, short woody branched rhizome, white tomentose dense pubescence masking glandules. Leaves pinnatisected, with 3–4 rhomboid lobes. Inflorescence cylindrical or ovate, 5–10 cm long, calyx tubular-campanulate, corolla large, white.

Distribution: In all plant-geographical regions expect Khovgol and Alashaa Gobi.

Habitat: Steppe debris and stony slopes, rock areas, screes, sides and bottoms of dry creeks and valleys, sandy steppes [2–5].

Parts used: Herb, stem, root

Traditional Uses: The taste is sweet and the potency is oily. It is used for the following: as a diuretic, for dysmenorrhia, epilepsy, rheumatism, podagra, and all eye diseases, for treatment of ulcers and inflammation of the uterus, for liver, stomach and intestinal diseases, for heart disease. It is an ingredient of the following traditional prescription: Lider-3 [5–8].

Chemical constituents: Iridiods: garpagide, 8-acetylgarpagide [9], phenol carboxylic acids, their derivatives: neochlorogenic, chlorogenic, and caffeic acids, tannins [10], 5.8% flavonoids: rutin, kaempferol-3-*O*-β-D-galactopyranoside [9].

Bioactivities: Sedative, antihypertensive, antiarrhythmic [9, 11].

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Pentaphylloides fruticosa (L.) O.Schwarz.

WHO

WHO

Mongolian name
Soogon borolzgono, Buriaguul, Borolzgon-on Shuur, Shuur, Dalan khalis, Ugaaguur

Tibetan name
Bema

English name
Bush cinquefoil

Synonyms: *Dasiphora riparia* Raf., *D. floribunda* Raf., *D. fruticosa* (L.) Rydb., *Potentilla fruticosa* L., *Fragaria fruticosa* Crantz., *Potentilla tenuifolia* Willd. ex Schlecht., *P. fruticosa* var. *vulgaris* Willd. ex Schlecht., *P. fruticosa* var. *teniufolis* Lehm., *Dasiphora teniufolia* Rydb. [1]

Description: 20–150 cm tall shrub, with erect or sometimes ascending, branched stems. Young shoots covered with silky hairs, old shoots with red-brown or grey bark, which is easily peeled. Leaves with 5–7 leaflets, each

of them 10–15 mm long, 1.5–8 mm wide, oblong or oblong-ovate, mostly with adpressed hairs, occasionally almost glabrous. Stipules narrow cuneate, acute and hairy. Flowers 1.5–3 cm in diameter, yellow, three to seven at the apex of the branches.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd (Kharkhiraa), Mong. Alt., Gobi-Alt.(Ikh Bogd), Dor. Mong., Dund. Khalkh, Olon n.

Habitat: Big and small rivers and spring banks in forest-steppe and alpine belts [2–4].

Parts used: Herb and flowers

Traditional Uses: The taste is sweet and the potency is soft. It is used for the following: treating fever, healing rhinitis, and erupted papula, and for lung disorders and vomiting. It is an ingredient in the following traditional prescriptions: Santal-6 and Zakhujug-ninbo-17 [4–7].

Chemical constituents: Carotene [8], phenol carboxylic acids, their derivatives: caffeic, sinapic, ferulic, and *p*-coumaric acids, catechins: (±)-catechin, (–)-epicatechin, (–)-epigallocatechin, epigallocatechingallate [9,10], flavonoids: kaempferol, quercetin, and quercimetrin [10].

Bioactivities: Antibacterial [10].

References:

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Physochlaena physoloides G.Don

WHO

WHO

Mongolian name
Yagaan Khyn Khors

Tibetan name
Tampram

English name
Common Physochlaina

Synonyms: *P. dahurica* Miers, *P. lanosa* Pasch., *Hyoscyamus physaloides* L. [1]

Description: 20–50 cm tall perennial herb with thick roots. Upper part of the stem with long entangled many cellular hairs. Leaves in lower part of the stem scale-like, those in middle and upper parts acute, entire, ovate, with stalks covered with long entangled hairs. Terminal few flowered umbel. Calyx 7–8 mm long, wooly hairy, fruiting calyx swollen, almost globose, sparsely hairy, net-veined. Corolla violet, 20 mm long. Capsules 1 cm in diameter.

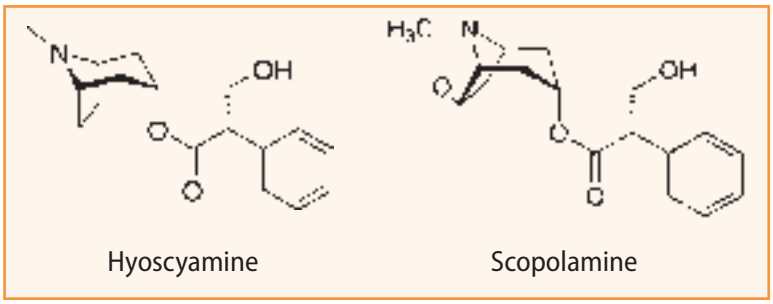
Distribution: Khovs., Khang., Mong-Dag., Khyang., Khovd, Mong. Alt., Dund. Khalkh, Dor. Mong., Gobi-Alt., Dor. Gobi.

Habitat: Mountain slopes, among and below rocks, hills and residual mountains, dry ravines and shrubberies [2–5].

Parts used: Herb and root

Traditional Uses: The taste is bitter and potency is cool, oily. It is used as the following: as an antibacterial, against anthrax, stomach and skin worms, hypothermia, to reduce tumors, as and as an analgesic. Also used for treating encephalitis, glanders, pain of stomach, aspermia, and sexual unresponsiveness. It is an ingredient of the following traditional prescriptions: Brugru-5, Gurgumchun, Gurgum-13, Jidangaa-10, Tamprom-9, Deva-10, Sertun-7, and Tamprom-7 [5–9].

Chemical constituents: The epigeal part contains flavonoids: neoisorutin, glucoepirutin [10], rutin, quercetin-3-*O*-β-D-glucofuranosyl-(6→1)-α-L-rhamnopyranoside-7-α-L-rhamnopyranoside [11,12], alkaloids: hyosciamine, scopolamine [11], 6-hydroxyatropine [13]. Root contains alkaloids: atropine, scopolamine, cuskhygrine [14], flavonoids: liquiritigenin, gvaiaverine, coumarin: scopolin, fabriatrin, scopoletin, umbelliferone, and also β-sitosterol, 3-*O*-β-D-glucopyranoside-β-sitosterol [15].



Hyoscyamine Scopolamine

Qualitive and quantitative assay: Alkaloids of the plant are identified by the pecipitation reaction and paper chromatography using the solvent system: butanol-acetic acid-water (4:1:5), detection reagent: Dragendorf's reagent. Total alkaloid content is titrated with sodium hydroxide after transferring to salt [16].

Qualitive and quantitative standards: Loss on drying, 13–15.0%. Ash, 6–7.0%. Organic matter, not more than 0.5% and mineral matter, not more than 0.5%. Total alkaloid content, 0.3% [16].

Bioactivities: Anticonvulsant, ulcerogenic, antipyretic, antiparasitic [14]. Fabriatrin has a bile-expelling activity [15].

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Plantago major L.

WHO

WHO

Mongolian name
Ikh Tavansalaa, Ukher uurgene, Khongolon

Tibetan name
Taram

English name
Rippleseed Plantain

Synonyms: *P. borysthenica* (Rogov.) O.D.Wissjul., *P. scopulorum* (Fries) Pavlova *P. sorokini* Bunge, *P. vulgaris* (Hayne) Pavlova [1]

Description: Leaves ovate or lanceolate-ovate, cordate or round at the base, with 5–7 veins, glabrous or with sparse short hairs, entire or indistinctly dentate margin and long stalks. Scape 5–65 cm tall, solitary or several, erect, sometimes ascending, sparsely hairy. Spike 3–30 cm long, with sparsely or densely arranged flowers. Sepals with almost round lobes. Petals brown.

Distribution: Khent., Khang., Mong-Dag., Khyang., Dund. Khalk., Dor. Mong., Ikh n., Olon n., Gobi-Alt, Zyyngar.

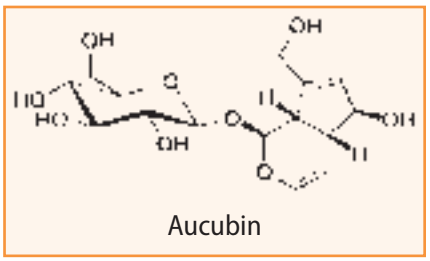
Habitat: Forest and waterside meadows, forest fringes, along roads and ravines [2–5]

Parts used: Herb, leaf

Traditional Uses: The taste is sweet and the potency is warm. It is used for the following: treating diarrhoea, bloody urine, and cough, improving eyesight, and as a diuretic. It is an ingredient of the following traditional prescriptions: Indra-17 and Tarma-6 [5–8].

Microscopic characteristics: Leaf upper epidermis with 5–7 angled cells and straight-walled. Lower epidermis slightly wavy-walled. Upper and lower epidermis covered with wavy cuticle. Epidermis has glandular and non-glandular trichomes [9].

Chemical constituents: The leaves contain sugars: 20% polysaccharide [10,11], pectic acid, mannitol, sorbitol, iridoids: 1% aucubin [11], catalpol [12], phenolcarboxylic acids and their derivatives: vanillic, *n*-hydroxybenzoic [13], chlorogenic and neochlorogenic acids [14,15], flavonoids: baicalein, baicalin, scutellerein, luteolin [11.16] and others, alkaloids, and terpenoids [16].



Aucubin

Bioactivities: Sedative, antihypertensive, anti-inflammatory activity, ulcerogenic, antimicrobial activity [11], mucolitic [17].

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Polygonatum odoratum (Mill.) Druce.

WHO

WHO

Mongolian name
Ankhiluun mukhar tsagaan, Tsagaan khor, Mukhar tsagaan

Tibetan name
Rani

English name
Fragrant Solomonseal

Synonyms: *P. officinale* All., *Convallaria odorata* Mill., *C. polygonatum* L. [1].

Description: Perennial herbs with 30–50 cm tall, slightly recurved stems. Leaves oblong-elliptic or ovate, tapering to the tip and base, semi-clasping, glabrous, 10–12 cm long, 3–5 cm wide, alternate. Flowers paired in axils of mid-stem leaves. Sepals 15 mm long, white with green teeth. Filaments smooth or papillose, adnate to perianth tube.

Distribution: Khovs., Khent., Khang., Mong-Dag., Dund. Khalkh, Dor. Mong.

Habitat: Larch and pine forests, forest fringes, birch forest, shrubberies, rocky areas [2–5].

Parts used: Root and rhizome

Traditional Uses: The taste is sweet and the potency is warm and light. It is used for the following: treating kidney disease, preventing atherosclerosis, improving strength and kidney function, and increasing appetite. It is an ingredient of the following traditional prescriptions: Bawru-3, Briyangu-9, Brega-14, Vanlag-37, Braivu-15, 17, Braisa-15, Dowchen-13, Dosel-22, and Dudzi-5 [5–9].

Microscopic characteristics:

Root: Epidermis single-layered, outer wall thickened, lignified. Below epiderm is seen endoderm, vascular bundle, parenchyma cells.

Rhizome: Vascular bundle is collateral type and numerous [10].

Chemical constituents: sugar: polysaccharides [11], dipeptide: *N*-benzoyl-*S*-phenylalanyl)-*S*-phenylalaninol [12], steroids [13,14], 0.23% alkaloids [15], saponins: polyfuroside [16], 3-*O*-β-D-glucopyranosyl-(1-->2)-[β-D-xylopyranosyl-(1-->3)]-β-D-glucopyranosyl-(1-->4)-galactopyranosyl-25*R*-spirost-5-en-3β,14α-diol [17], furostanol glycoside**:** 22-hydroxy-25(*R* and *S*)-furost-5-en-12-one-3β,22,26-triol 26-*O*-β-D-glucopyranoside [12].

Qualitative and quantitative assay: Saponins in the plant are identified by the reactions to produce a foam and with lead acetate. Total saponin content is determined by gravimetric assay [10].

Qualitative and quantitative standards: Loss on drying, not more than 9%. Ash, not more than 5%. Organic matter, not more than 0.5% and mineral matter, not more than 0.5%. Water-soluble extractive, not less than 3.0%. Total saponin content, not less than 1.4% [10].

Bioactivities: Psychostimulant, hypoglycemic, and antifungal [11].

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Polygonum aviculare L.

WHO

WHO

Mongolian name
Shuvuun tarna, Budneen suul, Gakhain nogoo

Tibetan name
Nyalo

English name
Common Knotweed

Synonyms: *P. aequale* Linadm., *P. agreste* Sumnev., *P. aphyllum* Krock., *P. araraticum* Komarov, *P. arenastrum* Boreau, *P. aviculare* subsp. *aequale* (Lindm.) Asch. & Graebn. [1].

Description: Annuals with less branched roots. 10–30 tall stem branched from the base till the tip. Leaves obtuse, linear to lanceolate, tapering to the base and ending by short stalks. Flowers in leaf axils. Perianth green, with white or red margin, 5-cleft, divided to mid-length. Nutlets black-brown and trigonous.

Distribution: Khovs., Khent., Khang., Mong-Dag., Mong. Alt., Dund. Khalkh, Dor. Mong., Ikh n., Olon n., Gobi-Alt.

Habitat: Ruderal places, along roads, in ploughed fields, river banks, rocky areas and shoals, damp and subsaline meadows [2–5].

Parts used: Herb and root

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treating fevers associated with the stomach and large intestine, and lower back pain after giving birth. It is an ingredient of the following traditional prescriptions: Brunag-13, Beman-9, Gibanyanlag-7, Dagbo-9, Dobaza-4, Donga-3, Durjid-7, 10, 11, and Shimeldeg-3 [5,6].

Chemical constituents: Herb contains sugars: glucose, fructose, and saccharose [7], vitamins: ascorbic acid, vitamin E, K, provitamin A, 9.4% flavonoids [8]: avicularin, quercetin [9], hyperin, quercitrin [7], kaempferol, isorhamnetin [10], myricetin [8], 1.8–4.8% tannins [7,8], essential oil [8], coumarins: scopoletin, umbelliferone [9], naphthoquinone, 6-methoxyplumbagin [11], phenol carboxylic acids and their derivatives: caffeic, gallic, chlorogenic, and *p*-coumaric acids, anthraquinone [8]. Root contains anthocyanin: delifinidin [7], anthraquinone: chrysophanol, emodin and its glycoside [8].

Bioactivities: Diuretic, haemostatic, antihypertensive, and anti-inflammatory [8].

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Polygonum hydropiper Lour.

WHO

Mongolian name
Usan Tarna, Usan chinjuu

Tibetan name
Chumza garbo

English name
Red-knees Marshpepper

Synonym: *Persicaria hydropiper* Opiz [1].

Description: Annuals with 30–60 cm tall, reddish, erect or ascending stem branched from the base. Leaves lanceolate acuminate, ciliate, lower leaves short petiolate, upper leaves sessile. Ochreae membranous, glabrous, reddish brown, apex truncate, shortly ciliate or glabrous. Flowers by 1–3 in axils of ochreae, united in up to 10 cm long narrow spike. Perianth 3.5–4.5 mm long, green at the base, pink above, yellow glandular punctuate. Nutlets small, dull.

Distribution: Khent. (Eree), Mong-Dag., Khang. (Urd Tamir), Ikh n., Zyyngar.

Habitat: Damp watersides of rivers, meadows, shoals and shallow waters [2,3].

Parts used: Herb

Traditional Uses: The taste is bitter and sour, and the potency is warm and light. It is used for the following: treatment of fever from toxin, dyspepsia, constipation, amenorrhea, parasitic worms of the cecum and wounds. It is an ingredient of the following traditional prescriptions: Brunag-13, Bemon-9, Giwanyanlag-7, Dagvo-9, Dovaza-4, Donga-3, Durjid-7,10, 11, and Shimeldeg-3 [3–7].

Microscopic characteristics: Leaf wavy-walled in lower and upper epidermis. Anomocytic stomata appear on each side; glandular trichomes visible. Trichoma 2–4 celled and small [8].

Chemical constituents: Organic acids [9], essential oil: phellandrene, α-pinene, β-pinene, *n*-cymol, 1,4-cineole, bornyl acetate [10], sesquiterpene: isotadeonal [11], polygodial [12], gallic acid [9], 3.4–3.8% tannins [13,14], coumarins [15], flavonoids: 3-*O*-α-L-rhamnopyranosyloxy-3′,4′,5,7-tetrahydroxyflavone, 3-*O*-β-D-glucopyranosyloxy-4′,5,7-trihydroxyflavone, 6-hydroxyapigenin, 6″-*O*-(3,4,5-trihydroxybenzoyl)-3-*O*-β-D-glucopyranosyloxy-3′,4′,5,7-tetrahydroxyflavone, scutellarin, 6-hydroxyluteolin, 3′,4′,5,6,7-pentahydroxyflavone, 6- hydroxyluteolin-7-*O*-β-D-glucopyranoside, quercetin-3-*O*-β-D-glucuronide, 2″-*O*-(3,4,5-trihydroxybenzoyl)-quercetrin, quercetin [16], triterpene: polygodiol [17].

Bioactivities: Analgesic, antibacterial [9], antioxidant [16], hemostatic [18].

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Polygonum viviparum L.

WHO

Mongolian name
Tolluur Tarna, Khurgan mekheer, Tsagaan mekheer

Tibetan name
Rambu godba

English name
Viviparous Bistort

Synonyms: *Bistorta bulbifera* Greene, *Bistorta vivipara* Gray, *Colubrina vivipara* (L.) Montandon, *Polygonum bulbiferum* Royle ex Bab., [1].

Description: 10–50 cm tall perennial herbs, with contorted large rhizome. Basal leaves long petiolate, oblong-elliptic, with rounded or cuneate base, cauline leaves linear. Inflorescence dense, narrow linear-oblong, oblong or linear spike. Flowers white, with yellowish shade. Those in lower and middle part of the spike often turn into deciduous bulbils.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong. Alt., Dund. Khalkh, Ikh n., Gobi-Alt., Zyyngar.

Habitat: Meadows, meadowy slopes, larch forests and their fringes in forest-steppe and alpine belts [2–4].

Part used: Rhizome

Traditional Uses: The taste is sour and the potency is easy and cool. It is used for the following: treatment of wounds, diarrhea, fever from pneumonia, and large and small intestine diseases. It also relieves cough and promotes expectoration. It is an ingredient of the following traditional prescriptions: Bragshun-9, Gunbrum-7, Dali-16, Donshin-4, Zobo-25, Lotsadgunsel, Martan-11, Srol-4, Tiche-7, Jugan-25, and Indra-4 [4–7].

Microscopic characteristics: Rhizome epidermis single-layered. Many layers of parenchyma are present on the lower surface of the epidermis. Centre of the stem are seen spongy parenchyma. Upper spongy parenchyma are seen as a collateral vascular bundle. Vascular bundle eight, arranged in a ring [8].

Chemical constituents: Rhizome contains 8–10% tannins. Herb contains ascorbic acid, carotene [9], phenol carboxylic acids: caffeic and chlorogenic acids [10], flavonoids: kaempferol, quercetin [11].

Qualitive and quantitative standards: Loss on drying, 18.0%. Ash, not more than 5.0%. Matter, not more than 1.5% [12].

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Potentilla anserina L.

WHO

WHO

Mongolian name
Galuun Gichgene

Tibetan name
Doma

English name
Silverweed Cinquefoil

Synonyms: *P. argentina* Huds., *Fragaria anserina* Crantz, *A. anserina* Rydb., *A. argentea* Rydb., *Argentina vulgaris* Lam., *Dactylophyllum anserina* Spenn. [1].

Description: Perennials with thin creeping stems. Interruptedly pinnate elliptic leaves, with 9–20 pairs of acute-dentate leaflets, densely silky-pilose beneath. Bigger leaflets oblong-oblanceolate, 0.5–3 cm long, 3–10 mm wide, between them smaller leaflets, with entire or few dentate margins. Flowers solitary, 1–2 cm in diameter. Corolla bright yellow, 1.2–2 times longer than pilose calyx. Epicalyx segments three or more fid, equal to sepals in inner series. Sepals broad ovate, tapering, entire.

Distribution: Khovs., Khent., Khang., Mong-Dag., Dund. Khalkh, Dor. Mong., Khyang., Khovd, Mong. Alt., Ikh n., Olon n., Gobi-Alt., Zyyngar, Alt. ovor.

Habitat: Damp waterside and alkaline meadows, river and spring banks, lake shores, swampy meadows, ruderal places [2–5].

Part used: Herb

Traditional Uses: The taste is sweet and the potency is cool and blunt. It is used for the following: treating hemorrhages, diarrhea, hemiparesis, headache, and fever. It is an ingredient of the following traditional prescriptions: Erkhem-6 and Donti-13 [5–8].

Chemical constituents: Sugars: glucose, fructose, rhamnose [9], vitamin: carotene, coumarin: ellagic acid [10], 4.18–10.64% tannins [9,10], 1.8% flavonoids: quercetin, quercitrin, quercetin glycoside, kaempferol and myricetin glycoside [10], leucoanthocyanidin [11].

Bioactivities: Antibacterial activity and stimulates digestive tract [10].

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Potentilla tanacetifolia Schur.

WHO

WHO

Mongolian name
Maralzgana navchit gichgene

Tibetan name
Re gonbo

English name
Tansyleaf Cinquefoil

Synonyms: *P. filipendula* Turcz. [1].

Description: Perennial herbs, with 10–55 cm tall stem. Stems with numerous leaves and erect villous hairs. Leaves 1–3.5 cm long, 0.6–1.5 cm wide, oblong or oblanceolate, with big acute teeth, both surfaces rigid-pilose. Yellow flowers 10–15 mm in diameter, in many flowered corymb. Calyx slightly shorter than corolla, glandular hairs mixed, outer row of sepals lanceolate, inner rows of sepals ovate and tapering.

Distribution: Khent., Khang. (east), Mong-Dag., Khyang., Dund. Khalkh, Dor. Mong., Dor. Gobi.

Habitat: Rocky and scree slopes, mountain foothills, ravines, valleys and steppes, filifolium and feather-grass steppes [2–4].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treating blood disorders. It is an ingredient of the following traditional prescriptions: Regonchitan, Utogtanmar, and Olsomei-25 [4–7].

Chemical constituents: 0.3% essential oil, phenol carboxylic acids: caffeic, sinapic, and ferulic acids, coumarin: ellagic acid, catechin: (–)-epicatechin, (–)-epigallocatechin, 4.9% tannins, flavonoids: quercetin, quercimetrin, astragalin, and kaempferol [8].

Bioactivities: Antihypertensive, spasmolytic, angioprotective, anti-inflammatory, and antibacterial [8].

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Pyrola incarnata Fisch. ex DC.

WHO

WHO

Mongolian name
Ulaan Turuudai,
Unagan turuu

Tibetan name
Lushan cha

English name
Redflower Pyrola

Synonyms: *P. rotundifolia* subsp. *incarnata* (DC.) Krylov, *P. rotundifolia* var. *incarnata* DC., *P. asarifolia* Michx. var. *purpurea* (Bunge) Fernald, *P. daurica* Komarov [1].

Description: Perennials with branched rhizome. Scape 15–25 cm tall, with 1–2 brownish scales. Radical leaves 2–6 cm long, roundish, membranous, almost entire and long petiolate. Raceme regular, many flowered. Sepals entire. Corolla widely open, violet-red. Calyx, bracts, pedicels, leaf stalks and stem reddish. Filaments curved to the calyx base. Anthers violet. Style curved, dilated at apex into a ring.

Distribution: Khovs., Khent., Mong-Dag., Khyang., Khovd, Mong. Alt., Dor. Mong.

Habitat: Coniferous and mixed forests, birch stands [2–5].

Parts used: Leaf

Traditional Uses: The taste is bitter and hot, and the potency is cool and blunt. It is used for the following: strengthening bones and sinews, for rheumatism, and bone and joint pain, inflammatory diseases of the eye, and as an antibacterial. It is an ingredient of the following traditional prescriptions: Braib-17, Jamba-6, Marbo-3,4, Marchin-13, Khar baivan-3, Shunkhan-2, Briyaga-13, Buur ar ur-10, Arur-4, Brega-13, Braivy-13, Jitser-8, and Sarichun [5–9].

Microscopic characteristics: Leaf is uniform structure. Spongy parenchyma consists of 4–6 layers cells containing chlorophyll. Upper epidermis thick and wavy-walled. Anomocytic stomata occur only lower epidermis. Vascular bundle is collateral type [10].

Chemical constituents: Triterpenoids: taraxasterol, iridoid: monotropein, polyphenols: homoarbutin [11,12], galloylhomoarbutin, (+)-catechin, (–)-epicatechin gallate, procyanidin B1, B3, B2-3′-*O*-gallate, B2-3,3′-di-*O*-gallate, hyperin and hyperin-2″-*O*-gallate [13].

Qualitative and quantitative assays: Flavonoids are identified by cyanidin reaction and TLC. The following is a suitable TLC procedure to identify flavonoid: silica gel, ethyl acetate-acetic acid-formic acid-water (100:11:11:26) solvent system, detection reagent: 1% ethanol solution of iron (III) chloride. The flavonoid spots with the same R_f as reference quercetin is observed under UV lamp and after spraying with detection reagent. Total flavonoid content is determined by spectrophotometry at 256 nm and calculated as luteolin. Tannins in rhizoma and leaves are identified by the reaction with ammonium iron (III) sulphate and titrated with potassium permanganate [14].

Qualitative and quantitative standards: Loss on drying, 9.5%. Ash, not more than 7.0%. Organic matter, not more than 1.0% and mineral matter, not more than 1.0%. Total flavonoid content calculated as quercetin, not less than 3.0%. Tannin content, not less than 12% [14].

Bioactivities: Haemostatic, spasmolytic, and anti-inflammatory [15].

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Rheum undulatum Pall.

WHO

WHO

Mongolian name
Dolgiotson Gishuune

Tibetan name
Jumza

English name
Bucharian Rhubarb

Synonym: *R. rhabarbarum* L. [1]

Description: Ca. 2 m tall perennials, with dark brown roots and hollow thick stems. Radical leaf blades long triangular, densely villose, with tapered apex, cordate base, pinnate veins, strongly undulate margins, petioles fleshy and juicy. Cauline leaves smaller, a few, with large ochreas. Whorled white flowers with long peduncles form panicle. Nutlets 8–10 mm long, triangular, dark brown, glossy, with narrow light brown wings.

Distribution: Khent., Khang., Mong-Dag., Dund. Khalkh, Dor. Gobi.

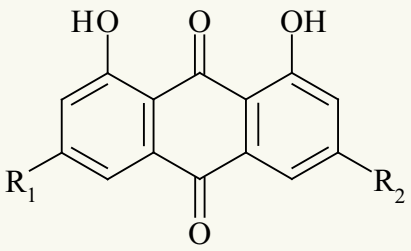
Habitat: Steppes, forest fringes, mountain slopes and foots, ravines, waterside rocky areas, damp meadows [2–5].

Part used: Root

Traditional Uses: The taste is bitter and sour, and the potency is light and severe. It is used for the following: treating poisoning, diarrhea, inflamed uterus, clears phlegm and eliminates bile, also beneficial for upset stomach and intestine and for constipation. It is an ingredient of the following traditional prescriptions: Bavru-7, Baldug-27, Bragshun-10, Braivu-6, Garbo-6, Garbochigtuv, Givan-11, Dangun-4, Darvu-16, 17, Dudzi-3, Jumza-3, 9, 15, and Shijid-6, 8, 10 [5–9].

Microscopic characteristics: The transverse section of the root is round. Periderm many layered on outer side. Cortex many layered. Below the cortex shows many layers spongy parenchyma. Spongy parenchyma round in shape. Collateral vascular bundle arranged in a ring, covered with sclerenchymatous fibers [10].

Chemical constituents: Root and rhizomes contain 2.58% anthraquinones [11] and their derivatives: chrysophanol, emodin, physcion [12,13], aloe-emodin, rhapontin, rhein [13], emodin-1-*O*-*β*-D-glucopyranoside, physcion-8-*O*-*β*-D-glucopyranoside [14], sugars: arabinose, galactose [15], stilbene diglycoside [14,16]: piceatannol-3,4′-*O*-beta-D-diglucopyranoside [14], naphthalene glucoside [16].



	R_1	R_2
Rhein	COOH	H
Aloe-emodin	CH_2OH	H
Chrysophanol	CH_3	H
Physcion	CH_3	OCH_3

Qualitive and quantitative assays: Anthraquinone glycosides in the plant are identified by the reaction with 10% ammonia. Total anthraquinone glycoside content is determined by spectrophotometry at 540 nm, and calculated using the comparison curve of cobalt chloride [17].

Qualitive and quantitative standards: Loss on drying, not more than 10.0%. Mineral matter, not more than 0.5%. Total anthraquinone glycoside content, not less than 0.8% [17].

Bioactivities: Laxative [18] and anti-scurvy [11].

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Rhodiola quadrifida Fisch. & Mey

WHO

WHO

Mongolian name
Dorvolson mugez, Altangagnuur, Zerleg Mugez

Tibetan name
Tsan

English name
Foursplit Rhodiola

Synonyms: *Sedum quadrifidum* Pall., *Kirpicznikovia quadrifida* (Pall.) A. Löve & D. Löve, *Chamaerhodiola quadrifida* (Pallas) Nakai [1]

Description: Dioecious perennials, with thick rhizome. Many remnants of old thin stems. Stems abundant, reddish, juicy, not branched, 3–10 cm tall, forming dense turf with green stems after drying. Leaves narrow, almost linear, 5–10 mm long, 1–3 mm wide, densely arranged. Quadrimerous bright yellow or greenish yellow flowers in 2–5, form few flowered corymb. Follicle yellowish red.

Distribution: Khovs., Khent., Khang., Khovd, Mong. Alt., Gobi-Alt.

Habitat: Between rocks, stony slopes, screes in alpine belt [2–5].

Part used: Root

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treating lung fever, enhancing strength and vigor, and as a mouthwash for bad breath. It is an ingredient of the following traditional prescription: Santal-6 [5–7] .

Chemical constituents: organic acids [8], 0.8% tannins, *β*-sitosterol, 0.49–1.1% salidroside (rodioloside) [8,9], chlorogenic acid, rhodioline, rosiridine, rosavine, rhodiooctanoside, monghroside [9], gallic acid, kaempferol, quercetin, umbelliferone, scopoletin [5]. Cyanoglycosides: rhodiocianoside A and B, octyl α-L-arabinopyranosyl(1–6)-β-D-glucopyranoside, gossypetin 7-*O*-β-D-glucopyranosyl(1–3)-α-L-rhamnopyranoside [10].

Qualitive and quantitative assay: The following is a suitable TLC procedure to identify salidroside and rosavin: silica gel, choloroform-methanol-water (26:14:3) solvent system. Violet spot of rosavin (R_f=0.4) is observed under UV lamp. Red spot of salidroside (R_f=0.42) is observed after spraying detection reagant. Salidroside content is determined by spectrophotometry at 486 nm [11].

Qualitive and quantitative standards: Loss on drying, not more than 10%. Ash, not more than 5%. Organic matter, not more than 0.5% and mineral matter, not more than 3.0%. Heavy metals, not more than 3 mg/kg. Water-soluble extractive, not less than 25%. Salidroside content, not less than 0.3% [11].

Bioactivities: Antibacterial [9].

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Rhodiola rosea L.

WHO

WHO

Mongolian name
Yagaan Mugez (Altangagnuur)

Tibetan name
Tsanser

English name
Rose-boot

Synonyms: *R. elongata* Fisch. et Mey., *R. rosea* (L.) subsp. *elongata* (Led.) Jacobsen, *Sedum altaicum* G.Don., *S. arcticum* (Boriss.) Rodding, *S. elongatum* Ledeb., *S. rosea* (L.) Scop., *S. rosea* subsp. *arcticum* (Boriss.) Kosevn., *S. rhodiola* DC. [1].

Description: 20–40 cm tall perennial herbs. Rhizome branched, golden yellow or grey-brown, with few remnants of old stems, emerging many erect stems. Leaves oblong-ovate or elliptic, thick fleshy. Many small yellow flowers in corymb.

Distribution: Khovs., Khent., Khang., Khovd (Kharkhiraa), Mong. Alt., Dund. Khalkh (east north), Gobi-Alt. (Gurvan Bogd, Gurvan saikhan).

Habitat: Rocky and stony slopes, screes and cliffs, stony and rocky banks of small rivers in alpine and forest belts [2–5].

Parts used: Root and rhizome

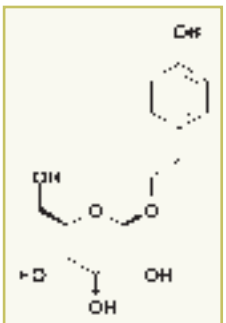
Traditional Uses: The taste is astringent and bitter and the potency is cool. It is used for the following: treatment of inflammation of the lung fever and strengthening the body. Used as a mouthwash for bad breath [5–8].

Microscopic characteristics:

Rhizome: The transverse section is round-shaped. Peridermal cells are dense. Below periderm are visible parenchyma layer. Parenchyma numerous, round in shape. Vascular bundle arranged in a ring.

Root: Periderm four-layered, dense. Below periderm is parenchyma layer. Parenchyma relatively large, thin-walled. Vascular bundle arranged in a ring [9].

Chemical constituents: sugars: glucose, galactose, arabinose, rhamnose [10], organic acids, 15.9–20.25% tannins, 0.8–0.9% essential oil [11]: *n*-decanol, geraniol, geranyl formate, geranyl acetate, benzyl alcohol, phenylethyl alcohol, linalool, nonanal, decanal, nerol, and cinnamyl alcohol [12], phenylpropanoid: rosavin [13], rosin, rosarin [11,14–16]; phenylethanol derivatives: salidroside (rodioloside) [11,13,14,17], tyrosol [11,18]; flavonoids: rodiolin [13], kaempferol, astragalin, rodionin, rodiosin, acetylrodalgin, trycin, kaempferol-7-rahmnoside, trycin-7-glucoside, 8-methylgerbacetin [11,19–21], rhodioflavonoside [18] and others [22]; terpenoids: rosiridol [11], rosiridin [13,14], rhodiolosides A-E [23]; steroids: β-sitosterol [14], daucosterol; phenol carboxylic acids: chlorogenic, 4-hydroxycinnamic [18], gallic [11,18], isochlorogenic, neochlorogenic acids [13] and lotaustralin [14].



Salidroside

Qualitive and quantitative assays: The following is a suitable TLC procedure to identify salidroside and rosavin: silica gel, choloroform-methanol-water (26:14:3) solvent system. Violet spot of rosavin (R_f=0.4) is observed under UV lamp. Red spot of salidroside (R_f=0.42) is observed after spraying detection reagant. Salidroside content is determined by spectrophotometry at 486 nm [24].

Qualitive and quantitative standards: Loss on drying, not more than 13%. Ash, not more than 7%. Organic matter, not more than 0.5% and mineral matter, not more than 3.0%. Heavy metals, not more than 3 mg/kg. Salidroside content, not less than 0.1% [24].

Bioactivities: Cytotoxic [18], antibacterial [13], CNS effects [25].

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Rhododendron adamsii Rehdes

OHM

OHM

Mongolian name
Adamsiin Terelj, Terelj Dali

Tibetan name
Daligarbo

English name
Adams Rhododendron

Synonyms: *R. fragrans* Maxim., *R. pallidum* Dümmer, *R. anthopogon* D.Don, *Azelea fragrans* Adams, *A. pallida* Turcz., *Osmothamnus fragrans* DC., *O. pallidus* DC. [1].

Description: 30–40 cm tall shrub. Leaves acute at the tip, round at the base, ovate-lanceolate, elliptic or oblong, upper surface glabrous, with impressed reticle veins, wrinkled, lower surface with rust-colored glands. Flowers white, by 3–4 in terminal inflorescence.

Distribution: Khovs., Khang. (central).

Habitat: Dense and damp larch and cedar-larch forests, mossy bogs, goltzy and screes [2–5].

Parts used: Flowers, leaves

Traditional Uses: The taste is bitter and sour, and the potency is warm and light. It is used for the following: treating wind, excess bile, phlegm and lung diseases, inflamed throat and coughing, to enhance energy, and increaseing appetite. It is an ingredient of the following traditional prescriptions: Anar-8, Gagol-6, Gogtal-8, Dali-3, 6, 7, 8, 9, 11, 16, 18. Doshun-12, and Terelj-16 [5–9].

Microscopic characteristics:

Petal: Upper epidermis wavy and thick-walled cells. Lower epidermis straight and thick walled cells. Spongy parenchyma three-layered, large intracellular spaces. Vascular bundle is collateral type [10].

Leaf: Leaf is dorsoventral. Palisade 4–6 layered, compactly arranged; spongy parenchyma 5–8 layered with intercellular spaces. Vascular bundle is collateral. Upper epidermis thickened, lignified; lower epidermis thin walled. Upper and lower epidermis covering multicellular trichomes. Anomocytic stomata occur on lower epidermis only [10].

Chemical constituents: The aerial part contains 11.1% essential oil: germacrone, β-elemenone, γ- elemenone, gumulene, pharnesine**,** σ-cadinene, δ-guaiene, bisabolene, nerolidole, unicamphor, cariophylline [11,12]. Leaves contain 4.85–6.9% tannins, 0.02% essential oil, cardenolides [12].

Qualitive and quantitative assay: Strong sulphuric acid is used for revealing triterpenoids in the plant. Total triterpene glycosides content is determined gravimetrically [10].

Qualitive and quantitative standards: Loss on drying, 14.0%. Ash, not more than 3.6%. Organic matter, not more than 0.5% and mineral matter, not more than 0.2%. 70% ethanol-soluble extractive, not less than 24%. Total flavonoid content, calculated as quercetin, not less than 1.5% [10].

Bioactivities: Antihypertensive and antibacterial [12].

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Rosa acicularis Lindl.

WHO

WHO

Mongolian name
Orgost nokhoin khoshuu

Tibetan name
Segod

English name
Prickly Rose

Synonyms: *R. alpina* Pall., *R. baicalensis* Turcz. ex Besser, *R. carelica* Fries, *R. gmelini* Bunge, *R. korsakoviensis* H.Lév. [1]

Description: Stem up to 2 m tall, brownish or red-brown, prickly. Leaves composed of 5–7 oblong-ovate, obtuse leaflets, serrate, 2–5 cm long, 1–3.5 cm wide, upper surface smooth, lower surface hairy, sometimes glandular punctuate. Stipules ovate-lanceolate, glandular ciliate along the margin. Flowers at the tips of branches. Pedicel with glandular prickles, occasionally glabrous. Fruit 2–3 cm long, 1–1.3 cm wide, oval-ovate, tapering to two ends and red in color.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Dund. Khalkh, Dor. Mong., Gobi-Alt.

Habitat: Forests and their fringes [2–5].

Parts used: Fruit and flower.

Traditional Uses: The taste is sweet and sour, and the potency is cool and heavy. It is used for the following: treating fever from liver disease and poisoning, eliminating bile and enhancing vigor. It is an ingredient of the following traditional prescriptions: Braivu-21 and Duntal chu gem ch [5–9].

Chemical constituents: Fruit contains sugar [10], ascorbic acid, B_2, carotene [10–12], 3.5–7.4% tannins [12], flavonoids: rutin, astragalin, hyperoside, quercimetrin [10]. Flowers contain 0.04% essential oil, tannins, flavonoids: astragalin, hyperoside, quercitrin [10].

Qualitative and quantitative assays: Ascorbic acid in fruit and flower is identified by reaction with silver nitrate and titrated with potassium iodate [13,14].

Qualitative and quantitative standards:

For fruit: Loss on drying, not more than 14.0%. Organic matter, not more than 0.5%. Ascorbic acid content, not less than 950 mg/% [13].

For flower: Loss on drying, not more than 12.0%. Ash, not more than 4.7%. Organic matter, not more than 0.5% and mineral matter, not more than 0.5%. Ascorbic acid content, not less than 0.20% [14].

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Rumex acetosa L.

WHO

WHO

Mongolian name
Isgelen khurgan chikh, Daagan chikh

Tibetan name
Joman

English name
Garden Sorrel, Green-sauce Dock, Charp Dock, Sour Leek

Synonyms: *Acetosa pratensis* Mill., *Lapathum acetosa* Scop., *L. pratense* Lam., *Rumex micranthus* Campd. ex Meisn., *R. pratensis* Dulac [1].

Description: Ca. 1 m tall, dioecious perennials, with short rhizome. Leaves soft, oval, with broad and folded down lobes at the base. Ochrea brownish at the base of petiole. Panicle narrow, its branches consist of small red, pink or yellowish flowers, with pedicel. Nutlets glossy brown, triangular.

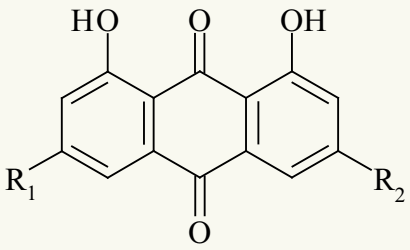
Distribution: Khovs., Khent., Khang., Khovd., Mong-Alt. (west north).

Habitat: Meadows, meadowy steppes, river banks, larch forests and their fringes [2–5].

Part used: Root

Traditional Uses: The taste is bitter, sour and potency is sharp, severe. It is used as the following: healing wounds, skin diseases, edema and glandular disorders, as an antiparasitic and antihelmintic, for decreasing tumors and to improve digestion. It is an ingredient of the following traditional prescriptions: Yajima-13, 25, Yantuv-25, Chuchin-25, and Chu-on-9 [5–8].

Chemical constituents: Root contains tannins [9], anthraquinones: chrysophanol, aloe-emodin, emodin, physcion [9–11], rhein [9], chrysophanol-8-*O*-β-D-glucoside, emodin-8-*O*-β-D-glucoside [11].



	R_1	R_2
Rhein	COOH	H
Aloe-emodin	CH_2OH	H
Chrysophanol	CH_3	H
Physcion	CH_3	OCH_3

Bioactivity: Anti-inflammatory [12].

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Salsola laricifolia Litv. ex. Drobow

OHO

OHO

Mongolian name
Shineserkhuu Budargana

Tibetan name
Nadma sinba

English name
Larchleaf Russian Thistle

Synonyms: *S. arbuscula* Pall., *Halimocnemis laricifolia* Turcz. ex Drobow [1].

Description: 50–60 cm tall dwarf or semi-shrub with curved branches. Stem with reddish grey bark, but old branches dark-grey or light-grey. Leaves short, cylindrical, abruptly tapered to the tip. In time of fruiting, sepals densely arranged over the wings.

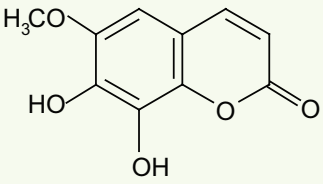
Distribution: Dor. Gobi, Gobi-Alt., Alash.

Habitat: Upper parts of slopes of mountains and hills [2,3].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool and severe. It is used for the following: treatment of broken bones, healing wounds, alleviating itching and swollen joints [4–6].

Chemical constituents: Coumarins: fraxidin, isofraxidin, scopoletin, fraxetin, calicantoside, fraxidin-8-*O*-β-D-glucopyranoside, scopolin, fraxin, cleomiscosin B, cleomiscosin D, and lariside [7].



Fraxetin

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Sambucus manshurica Kitag.

WHO

WHO

Mongolian name
Manj gandigar

Tibetan name
Ganda gari

English name
Manchurian Elder

Description: Shrub 1–4 m tall, branched from the base, with sparse hairs and violet-brown branches, their pith soft, spongy, ligth brown. Leaflets 5–6, in 2–3 pairs, lanceolate or broad lanceolate, 5–9 cm long, with round or sometimes cuneate, sligthly cordate base, acuminate apex, serrate-dentate margins. Inflorescence dense, ovate or broad ovate, corymbose, glabrous or sometimes papillose. Corolla yellowish or green. Stamens widely open. Berries brigth red, 4 mm in diameter, with three narrow oval seeds.

Distribution: Khent., Khang., Mong-Dag., Khyang.

Habitat: Stones, screes, rocks and mountain slopes in forest-steppe and alpine belts [1–5]. Parts used: Shoot and fruit

Traditional Uses: The taste is sweet and the potency is cool. It is used for the following: treatment of fever of wind, light edema, and lung diseases. Also used to alleviate pain, relieve cough, treat tumors, and as a diuretic. It is an ingredient of the following traditional prescriptions: Arjutan, Banzdo-2, Gandigar-3, Dudzi-10, Jonsh-6, Zovu-25, Mana-4, 10, 15, Marchin-13, Norov-7, and Tanchin-25 [5–9].

Microscopic characteristics:

Leaf: Leaf is dorsoventral. Palisade single layered, oblong ovate; spongy parenchyma 4–7 layered. Epidermis relatively thick walled. Anomocytic stomata occur upper and lower surface of epidermis. Vascular bundle is collateral. Sometimes sclereids are appearing in the middle of the mesophyll. Numerous glandular and multicellular trichomes covered by epidermis [10].

Stem: Stem consists of vascular bundle, cortex and pith. Pith containing parenchyma. Parenchyma large, thin-walled [10].

Chemical constituents: 2–3% rutin [5], alkaloids [10].

Qualitative and quantitative assay: Flavonoids in the plant are identified by cyanidin reaction, alkaloids by the reaction with Dragendorf's reagent [10].

Qualitative and quantitative standards: Loss on drying, not more than 10.0%. Organic matter, not more than 1.0% and mineral matter, not more than 0.5%. Water-soluble extractive, not less than 4.3% [10].

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10. Tegshsuren, D., Shiirevdamba, Ts., and Khurelchuluun, B. (1991). Shoot of *Sambucus manshurica* Kitag. Mongolian National Standard 4106–91.

Saussurea amara Less

OHM

OHM

Mongolian name
Gashuun Banzdoo,
Gazriin khokh

Tibetan name
Lugzi dovo

English name
Meadow Saussurea

Synonyms: *S. marginata* Borszca. ex Trautv., *S. glomerata* Poir., *S. amara* (L.) DC. var. *glomerata* (Poir.) Trautv., *S. glomerata* var. *chinensis* F.H. Chen, *S. japonica* var. *alata* (Chen.) Nakai et Kitag., *S. centauroides* Tausch, *S. macrocephala* Less., *S. scabra* Less., *S. gmelini* Hort.Dorp. ex Herder, *S. microcephala* C.A.Mey., *S. microcephala* var. *aptera* Nakai et Kitag. fo. *leucocephala* Nakai et Kitag., *S. japonica* fo. *leucocephala* (Nakai et Kitag.) Nakai et Kitag., *S. amara* Less. var. *microcephala* (Franch.) Lipsh., *S. tenuicaulis* Ling, *Serratula amara* L., *Theodorea amara* Cass., *T. glomerata* (Poir.) Soják [1].

Description: Perennial herb with 7–60 cm tall, erect, strong, glabrous or scabrous stems, branched in upper part, sometimes simple. Radical lower leaves petiolate, 3–15 cm long, 1–4 cm wide, oblong-ovate, oblong-lanceolate, with big teeth or irregular dentate, sometimes almost entire, both surfaces green, scabrous, with small glands. Loose corymbose heads form terminal corymbiform panicle. Involucres 10–15 mm long, 6–10 mm wide, layered on each others, with short tomenta. Flowers pink, with glands.

Distribution: Khovs. (Darkhad), Khang., Mong-Dag., Khyang., Mong. Alt., Dund. Khalkh (west north), Dor. Mong., Ikh n., Olon n., Zyyngar.

Habitat: Alkaline sandy and rocky riverbanks, waterside alkaline waters, nomad camps, agricultural fields, flooded places [2–5].

Part used: Herb

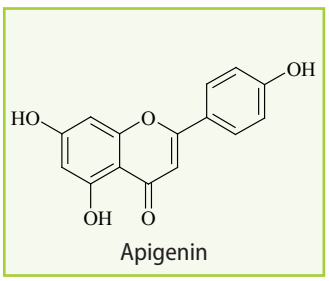
Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treatment of infectious diseases, inflammation, bile disorders, and as an antibacterial. It is an ingredient of the following traditional prescriptions: Bavo-13, 14, Banzido-2, 6, 11, 12, Bontag-25, Bragshun-8, 25, Givan-7, 10, 20, Gurgum-7, 9, Dudzi-10, Seru-15, Tsarvon-4, Tanchin-10, and Tuglogunsel [5–9].

Microscopic characteristics:

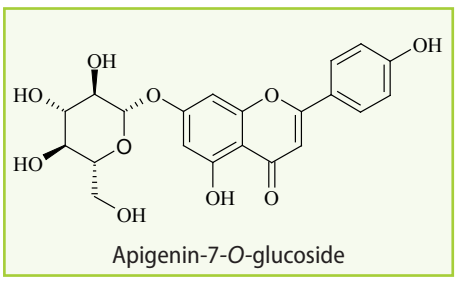
Petiole: The transverse section is triangular. Epiderm is single-layered. Spongy parenchyma of about single layer of round shaped chlorenchyma cells. Collateral vascular bundle occurs in the middle of the spongy parenchyma. Central vascular bundle is bicollateral, others collateral. In the lower part of the central vascular bundle are present sclerenchyma, well-developed [10].

Stem: The transverse section is round shaped. Epidermis is single-layered. Thin-walled, relatively large parenchymatous cells shows inner zone of the epidermis. Collateral vascular bundle is open. Between vascular bundles shows parenchyma, walls lignified. In the upper side of the vascular bundle are present sclerenchyma 10].

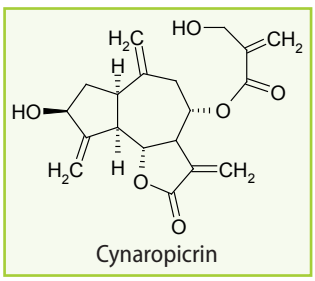
Chemical constituents: Sesquiterpene lactones: cynaropicrin, desacylcynaropicrin, γ-linolenic acid [10–12], sugars, coumarins, cardenolides, anthraquinone glycosides, 0.1% alkaloids, 0.7% tannins [13], sterols: taraxasterol, 3-*O*-acetyltaraxasterol, β-sitosterol, lupeol, flavonoids: apigenin, apigenin-7-*O*-glycoside, genquanine [10].



Apigenin



Apigenin-7-*O*-glucoside



Cynaropicrin

Qualitative and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction and TLC, tannins by the reaction with iron (III) chloride. Total flavonoid content is determined by spectrophotometry at 335 nm and calculated as apigenin. Tannins are titrated with potassium permanganate [10].

Qualitative and quantitative standards: Loss on drying, not more than 8.0%. Ash, not more than 9.0%. Organic matter, not more than 0.5% and mineral matter, not more than 1.0%. Heavy metals, not more than 0.01%. Water-soluble extractive, not less than 32%. Total flavonoid content calculated as apigenin, not less than 3.5%. Tannins, not less than 1.5% [10].

Bioactivities: Hemostatic, antitumor activity, antibacterial [13,14]. Cinaropicrin, apigenin, and apigenin-7-*O*-glycoside have choleretic effect [10].

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Saxifraga hirculus L.

WHO

WHO

Mongolian name
Namgiin Serdeg

Tibetan name
Sumju digda, Serdog

English name
Coat's Rockfoil

Synonyms: *S. nutans* D.Don, *S. lutea* Gilib., *Hirculus ranunculoides* Haw., *H. punctatus* Raf., *Leptasea hirculus* Small [1].

Description: Perennial herb with erect, 20 cm tall, solitary or several stems. Basal part of the stem glabrous, upper part, specially, below the flowers with dense grey hairs. Leaves lanceolate, pale green, Rosette leaves hairy, long petiolate, upper leaves sessile, narrow and small. Flowers by 1–4 at the stem tip. Petals elliptic, bright yellow, sometimes with orange dots.

Distribution: Khovs., Khent., Khang., Khovd, Mong. Alt., Gobi-Alt. (Ikh Bogd).

Habitat: Swamps, meadows, river and spring banks, rocky areas, damp screes, damp forests in forest-steppe and alpine belts [2–5].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is blunt and cool. It is used for the following: relieving inflammation, ulcer, liver and bile disorders, and expels bile. It is an ingredient of the following traditional prescriptions: Degd-3, Yajima-7, Serjmyadag-11, Serdog-3, 5, 7, 8, 11, and Givan yanlag-7 [5–9].

Microscopic characteristics:

Leaf: Leaf is uniform structure. Mesophyll 6–9 layered, ovate. Upper epidermis straight-walled. Lower epidermis wavy-walled. Anomocytic stomata appear on both surfaces of the epidermis.

Stem: Outer epidermal walls thick, lignified. Parenchyma consists of 5–8 layers cells containing chlorophyll. Sclerenchyma well-developed. Three vascular bundles within parenchymatous zone [10].

Chemical constituents: Flavonoids: myricerin, quercetin, isorhamnetin, and their glycosides, malividin glycoside, petunidin glycoside [5].

Qualitative and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction and reaction lead acetate. Total flavonoid content is determined by spectrophotometry at 370 nm and calculated as quercetin [10].

Qualitative and quantitative standards: Loss on drying, not more than 12.0%. Total ash, not more than 17.0%. Organic matter, not more than 2.0% and mineral matter, not more than 0.5%. Total flavonoid content, not less than 0.14% [10].

Bioactivities: Anti-analgesic and diuretic [11], liver protective and bile-expelling [12].

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Scutellaria baicalensis Georgi.

WHO

WHO

Mongolian name
Baigal Guun-khokh

Tibetan name
Khonchin

English name
Baikal Skullcap

Synonym: *S. macrantha* Fisch. ex Rchb. [1].

Description: 50 cm tall perennial herb, with fleshy yellow roots. Stem erect, quadrate, slightly woolly. Leaves narrow lanceolate, up to 4 cm long, 1.3 cm wide, opposite, with short stalk. Flowers bilobate, blue, up to 2.5 cm long, solitary in axils of upper leaves. Fruit consists of four black, ovate nutlets, with small prickles on the surface.

Distribution: Khent., Khang., Mong-Dag., Khyang., Dor. Mong.

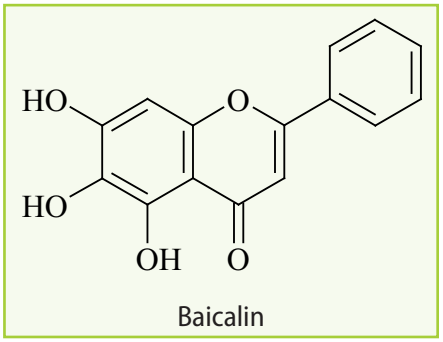
Habitat: Rocky and stony slopes, loose sandy steppes [2–5].

Parts used: Root, rhizome

Traditional Uses: The taste is bitter and the potency is cool, blunt, and light. It is used for the following: treatment of poisoning, as an antibacterial, for decreasing lung fever, blood pressure, and pain, and treating fever. It is an ingredient of the following traditional prescriptions: Serma-25 and Khonchin-5 [5–7].

Microscopic characteristics: Root periderm 5-layered. Parenchyma many-layered. Vascular bundle is collateral [8].

Chemical constituents: Steroids: β-sitosterol, campesterol, stigmasterol [9], coumarins [10], flavonoids: baicalein, wogonin and oroxylin A [11], norvogine, 7-methoxybaicalein, 7-methoxynorvogine [12], wogonoside, baicalin [13,14], dihydroxyoroxylin A, chrysin, baicalin-7-*O*-glucoside, oroxylin A-7-*O*-glucuronide, 7-methoxy-5,8,2′,6′-tetrahydroxyflavanone [15], wogonin-7-*O*-glucuronide, skullcapflavone II [13,15], 7-methoxy-5,8,2′-trihydroxyflavone, 6,7-dimethoxy-5,8,2′-trihydroxyflavone, 6-methoxy-5,7,4′-trihydroxyflavone [16], skullcapflavone I, dihydrobaicalin, 5-hydroxy-6,7,8-trimethoxyflavone [14], 5,8-dihydroxy-6,7-dimethoxyflavone, 8-methoxy-5,7,4′-trihydroxyflavone [17], 8,5′-dimethoxy-5,7,2′-trihydroxyflavone, 8,6′-dimethoxy-5,7,2′,5′-tetrahydroxyflavanone, 5,2′,5′-trihydroxy-6,7,8-trimethoxyflavanone, 5,7,2′-trihydroxyflavone, baicalein-7-*O*-β-D-glucopyranoside [18], 5,7,2′-trihydroxy-8-methoxyflavone, 7,8-dimethoxy-5,2′,6′-trihydroxyflavone, 5,7,2′,3′-tetrahydroxyflavone, (2*S*)-5-methoxy-7,2′,6′-trihydroxyflavone, 6′-methoxy 2,6,2′,4′-tetrahydroxy-chalcone [19], 5,7,2′,6′-tetrahydroxyflavone, 8,6′-dimethoxy-5,7,2′,5′-tetrahydroxy-flavone, 3,5,7,2′,6′-pentahydroxyflavanone [13,20], 6,2′-dihydroxy-5,7,8,6′-tetramethoxyflavone, 6,8-dimethoxy-5,7,2′-trihydroxyflavone [21], wogonin-5-β-D-glucoside [16], 5,6,2′-trihydroxy-6,7,8-trimethoxyflavone-2′-*O*-glucoside, 6,7-dimethoxy-5,2′,6′-trihydroxyflavone-2′-*O*-glucoside [13]. The main components of the roots were baicalin (8.12% of dry root mass) and wogonin glucuronide (2.52%) [22].



Baicalin

Qualitative and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction and reaction with lead acetate. Total flavonoid content is determined by spectrophotometry at 330 nm and calculated as luteolin [8].

Qualitative and quantitative standards: Loss on drying, not more than 7.0%. Ash, not more than 13.0%. Organic matter, not more than 0.1% and mineral matter, not more than 1.0%. 70% ethanol-soluble extractive, not less than 30%. Total flavonoid content, not less than 0.8% [8].

Bioactivities: Anticonvulsant, hepatoprotective [14], antitumor [10], radical scavenging effect [22].

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Senecio vulgaris L.

WHO

WHO

Mongolian name
Egel zokhimon

English name
Groundsel

Synonyms: *S. flosculosus* Gilib., *Jacobaea vulgaris* Gaertn. [1].

Description: Annuals, with 10–35 cm tall, branched stems, glabrous or with barely entangled hairs. Basal or lower leaves petiolate, but fall off early. Leaves in mid stem sessile, 3–10 cm long, 0.5–4 cm wide, oblong or lanceolate, pinnatilobate with broad obtuse dentate lobes. Numerous heads form terminal dense, short, corymbiform panicle. Involucres 6–7 mm long, glabrous, bracts of outer series 2–7, sometimes black tipped, two to four times shorter than bracts of inner series. No ligulate flowers. Achene hairy, 2.5 mm long.

Distribution: Khent., Khang., Mong. Alt., Dund. Khalkh (west north).

Habitat: River banks, ploughed fields, along irrigation ditches [2–4].

Part used: Herb

Traditional Uses: No documented use in traditional medicine

Chemical constituents: Alkaloids: seneciphylline [5], senecionine, retrosine [6,7], spartiodine, intenerrimine, uzaramine [8], riddelline [7,9], flavonoids [10], quinone and its derivatives [11], essential oil: β-caryophylline, α-copaene, myrcene, nonene-1, α-pinene, terpinolene, damascenone, β-cadinene, nerolidol, azarone [12].

Bioactivities: Cholinolytic [5], antibacterial and antifungal [13]. Senecionine shows hemostatic activity [5].

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Sophora alopecuroides L.

WHO

WHO

Mongolian name
Unegen suulkhei lider, Khulan-buyan

Tibetan name
Ledre

English name
Foxtail-like False-sophora

Synonyms: *S. alopecuroides* subsp. *jaubertii* Borza, *S. jaubertii* Spach, *S. prodanii* E. Anderson, *Goebelia prodanii* Grossh., *Sophora alopecuroides* L. subsp. *prodanii* Yakovlev, *S. alopecuroides* L. var. *tomentosa* (Boiss.) Bornm., *Goebelia alopecuroides* Bunge ex Boiss., *G. alopecuroides* (L.) Bunge var. *tomentosa* Boiss., *Vexibia alopecuroides* (L.) Yakovlev [1].

Description: Up to 1 m tall perennial herb, with rhizome. Leaves odd-pinnate, alternate, 13–22 cm long, leaflets oval to oblong-ovate, 3–5 cm long, 10–20 mm wide, entire, upper surface

green, lower surface with grey hairs. 1.5–2 cm long, white-yellow flowers in terminal raceme. Keel acute at apex. Calyx 7–8 mm long, outer surface hairy. Legumes 5–7 cm long, 7–8 mm in diameter, cylindrical. Seeds orbicular

Distribution: Alt. Ovor. (Ekh river, Khovd fountain).

Habitat: Caragana-forb-grass steppe on slopes in river and lake valleys [2,3].Parts used: Root and herb

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treats wind and fever, infections, fortifying the body, and is beneficial for heart disease and rheumatism. It is an ingredient of the following traditional prescriptions: Mana-4, 10, 15, Norov-7, Marchin-13, Lider-5, 7, Arjutan, Buurun shosh-7, Bariav-17, Banlag-3, Jamba-6, Jonlan-5, Tanchin-10, Tsulkhir-4, Agar-15, 35, Ar ur-14, 21, Balchin-23, Boigar-10, 18, Giban-13, and Khiin gurgum-7 [3–7].

Chemical constituents: Root contains alkaloids: sparteine, sophoridine, sophocarpine [8], oxymatrine, oxysophocarpine, sophoridine, matrine, sophocarpine [9,10], cytisine, nicotine [10], flavonoids: quercetin, rutoside [8], isobavachin, glabol, trifolirhizin, ammthamnidin [11], vexibinol, vexibidin [12], flavonostilbenzenes: alopecurones A-F [13]. Herb contains alkaloids: sophoridine, cytisine, 3α-hydroxysophoridine, baptifoline [14], aloperine, neosophoramine [15], 7α-hydroxysophoramine, 12β-hydroxysophocarpine, sophoramine, 14β-hydroxymatrine, matrine, sophocarpine, adenocarpine [16], organic acids, flavonoids, coumarins, triterpene saponins [3].

Qualitative and quantitative assays: Alkaloids in the plant are identified and determined by MNS 2176–75 [17].

Qualitative and quantitative standards: Loss on drying, not more than 15.0%. Ash, 5–6% . Organic matter, not more than 0.8% and mineral matter, not more than 0.7%. Total alkaloid, not less than 0.5% [17].

Bioactivities: Anti-endotoxic [18,19], antitumor, antiviral, and antibacterial [10].

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Stellaria dichotoma L.

WHO

WHO

Mongolian name
Atsan Ajigana, Tumen zangilaa

Tibetan name
Srolo garbo

English name
Dichtomous Starword

Description: Perennial herbs. Root 20–60 cm long, 5–15 mm in diameter. Stems up to 30 cm tall, with dense glands, branched from the base forming globose bush. Leaves ovate or oblong-ovate, lanceolate, acuminate, cordate, those in lower part of the stem broad, upper leaves narrower. Flowers with white and lobed petals in leaf axils and shoot tips. Capsule 2–5 locular, almost orbicular.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Dund. Khalkh, Dor. Mong., Ikh n., Dor. Gobi, Gobi-Alt.

Habitat: Steppe debris and stony slopes, screes, rocks, sometimes on rocky areas and sands [1–5].

Parts used: Herb and root

Traditional Uses: The taste is sweet, bitter and potency is cool. It is used as the following: treating lung and chest fevers, and pneumonia. It is an ingredient of the following traditional prescriptions: Agar-3, 8, 15, 35, Garnag-6, Arur-11, 12, 14, Banzdoo-6, Valo-7, 8, Banjangarvo-15, Gavar-9, Givan-13, Darvu-5, Jugan-25, 11, Lotsadgunsel, Mana-15, Sorogzonnorov, Sorool-4, 7, 11, Senden-25, Tuglogunsel, Santal-43, Uzem-10, and Chun-9 [5–8].

Microscopic characteristics:

Root: Periderm four-layered. Below periderm is seen parenchyma layer. Parenchyma thin-walled, relatively dense. Collateral vascular bundle arranged in a ring [9].

Chemical constituents: Herb contains flavonoids, root contains coumarins [10], alkaloids, triterpene glycosides [11], cyclic peptides: dichotomins J, K [12], dichotomins H, and I [13], phenylpropanoid glycoside: dichotomoside E, neolignan glycosides: dichotomosides A, B, C, and D, β-carboline-type alkaloid glycosides: glucodichotomine B [14], dichotomines A, B, C, D and dichotomides I and II [15].

Qualitive and quantitative assay: Triterpene glycosides are identified by the reaction to produce a foam and TLC. The following is a suitable TLC procedure to identify triterpene glycosides: silica gel, butanol-ethanol-25% ammonia (7:2:5) solvent system, detection reagent: strong sulphuric acid. After complete evaporation of the solvent in air, sprayed with detection reagent and heated at ca. 105°C; a pink spot is observed. Alkaloids are identified by the precipitation reaction. Total alkaloid and triterpene glycoside contents are determined gravimetricallyr [11].

Qualitive and quantitative standards: Loss on drying, not more than 13.0%. Ash, not more than 13.0%. Organic matter, not more than 1.0% and mineral matter, not more than 0.5%. 70% ethanol-soluble extractive, not less than 21.0%. Total alkaloid content, not less than 0.04%. Total triterpene glycosides content, not less than 3.0% [11].

Bioactivity: Immunosuppressive [15].

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Stellera chamaejasme L.

WHO

WHO

Mongolian name
Odoi dalan turuu,
Choniin cholbodos

Tibetan name
Rejag

English name
Chinese Stellera

Synonym: *S. rosea* Nakai, *Passerina stelleri* Wikstr., *Wikstroemia chamaejasme* (L.) Domke [1].

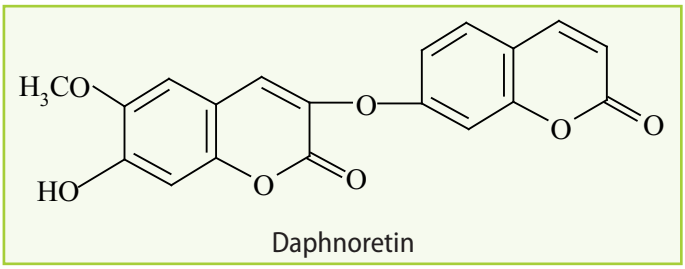
Description: Semi-shrubs, with long, thick woody roots and many simple, leafy, 20–30 cm tall stems. Leaves lanceolate, 1–2 cm long, 3–8 mm wide. Flowers white or grey, 5–6 mm in diameter, in terminal capitate inflorescence. Perianth salver-formed, with ca. 10 mm long reddish tube and five limbs. Stamens 10, half of them fused to the tube, others in sinus. Nutlets orbicular, brown.

Distribution: Khent., Khang. (east), Mong-Dag. (west), Khyang., Dor. Mong. (north).

Habitat: Stony and rocky slopes, forest meadows and fringes in mountain forest-steppe and steppe zone [2–5].**Part used**: Root, herb

Traditional Uses: The taste is bitter and the potency is light. It is used for the following: treating poisoning, inflammation and as an antibacterial. It is an ingredient of the following traditional prescriptions: Bashaga-7, Bemon-9, Dagvo-13, Dotal-18, and Jilz-27 [5–9].

Chemical constituents: Root contains sugars, organic acids, saponins, 1.2% tannins, 0.35% flavonoids [10]: 5,7-dihydroxy-4′,11-dimethoxy-3′,14-dimethylbenzoflavanone [11], ruixianglangdusu A and B, 4′,4‴,5,5″,7,7″-hexahydroxy-3,3″-biflavone [12], 7-methoxyneochamaejasmin A [13], 0.31% coumarins: sfondine, isobergapten, pimpinellin, isopimpinellin [10], umbelliferone, daphniretin, bicoumastechamin [14], daphnetin [11], diterpenes [15], lignans: (+)-kusunokinin, lirioresinol-B, magnolenin C, (-)-pinoresinol monomethyl ether, (-)-pinoresinol, (+)-matairesinol, isohinokinin, and (-)-eudesmin [14], steroids: daucosterol, β-sitosterol [11]. Herba contains coumarins: daphnorin, daphnetin, daphnoretin, daphnetin 8-*O*-β-D-glycopyranoside, chamaejasmoside [16].



Daphnoretin

Qualitative and quantitative assays: The following is a suitable TLC procedure to identify coumarins: silica gel, chloroform-methanol (4:1) solvent system. Not less than two blue spots are observed under UV lamp. Total coumarin content is determined by gravimetric analysis [17].

Qualitative and quantitative standards: Loss on drying, 10.0%. Ash, not more than 8.0%. Organic matter, not more than 1.0% and mineral matter, not more than 0.5%. Total coumarin content, not less than 0.3%. Water-soluble extractive, 23–25% [17].

Bioactivities: Antifungal [18], anti-ulcerative, and laxative [10].

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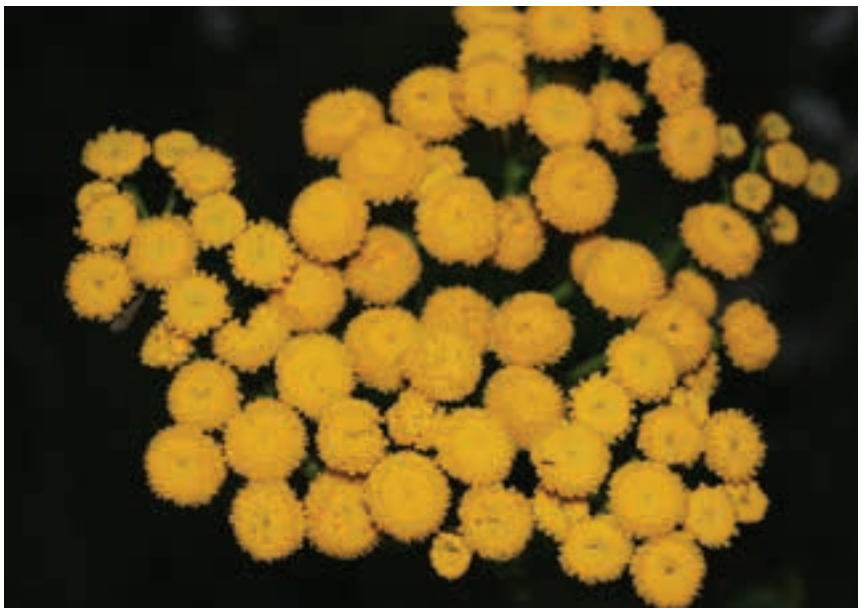
Tanacetum vulgare L.

WHO



WHO

Mongolian name
Egel Maraltsetseg

Tibetan name
Youg chin

English name
Common Tansy

Synonyms: *T. umbellatum* Gilib., *Chrysanthemum vulgare* (Lam.) Gaterau, *C. tanacetum* Vis., *Pyrethrum vulgare* (L.) Boiss. [1].

Description: 30–150 cm tall perennial herb, glabrous or with simple sparse hairs near the tip. Basal leaves petiolate, other leaves sessile, 7–20 cm long, 3–10 cm wide, oblong, pinnately dissected or divided into lanceolate and pinnately notched lobes. Both surfaces hairy, but only upper surface glandular. 10–70 heads in terminal large dense corymb. Receptacles almost flat. Involucres with narrow brown margins, outer series two to three times shorter than inner series.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd (Kharkhiraa), Mong. Alt.

Habitat: Forests, their fringes, birch forest willow thickets, pine forests, forest meadows in forest-steppe belt [2–5].

Part used: Flower

Traditional Uses: The taste is sweet and hot and the potency is severe. It is used for the following: treating dysentery and typhoid. It is an ingredient of the following traditional prescriptions: Dali jujod, Risan-4, and Ulchu-23 [5,6].

Chemical constituents: The epigeal part contains aliphatic compounds [7], 0.09–0.12% essential oil: α-pinene, β-pinene, α-thujone, β-myrcene, limonene, (-)-borneol, bornyl acetate, geraniol, sabinene, phellandrene, 1,8-cineol, γ-terpinene, *n*-cymol, terpinonlene, thymol, β-cariophyllene, β-selinene, γ-cadinene, δ-cadinene, β-cadinene [8], β-thujone [9], sesquiterpenes: tanacetene [10], parthenolide [11], chrisanin, tamyrin, tanahyn, tavulin [12], tatridine A, B [13], tanacetol A, B, santimarin and others [14,15], triterpenes [16], flavonoids [7,17,].

Bioactivities: Bile-expelling, antibacterial, antihypertensive, anti-anginal [18].

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Taraxacum officinale (L.) Weber.

WHO

WHO

Mongolian name
Emiin bagvaakhai

Tibetan name
Khyrmon

English name
Medicinal Dandelion

Synonyms: *T. vulgare* Schrank, *T. dens-leonis* Desf., *Leontodon taraxacum* L. [1].

Description: 10–30 cm tall perennial herb with taproot. Radical leaves repand, sometimes entire or dentate, extending downward along the stalk. Scape aphyllous, glabrous, hollow, erect or sometimes ascending, with terminal head. Yellow ligulate flowers on the flat receptacle.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd, Mong. Alt. (west).

Habitat: Forest and riverbank meadows, forest fringes, birch forests and pine forests, river and brook banks, near roads, inhabited places [2,3].

Parts used: Root

Traditional Uses: The taste is bitter and the potency is cool. It is used for the following: treating diseases of bile, stomach diseases, poisoning, chronic liver, kidney and respiratory system diseases, inflammation, eliminating bile, detoxification, cystolithiasis, and lung tuberculosis. It is an ingredient of the following traditional prescriptions: Yajima-13, Tagjod-25, Oo-tan-13, Rejag-15, and bor-7 [3–6].

Microscopic characteristics:

Root: Periderm thin-walled and 5–7 layered. Cortex is composed of many layers of large, ovate-shaped parenchymatous cells. The parenchyma contains inulin. Laticifers visible in root [7].

Chemical constituents: Root contains sugars: fructose, saccharose, oligosaccharide [8], sesquiterpenes: 4α,15,11β,13-tetrahydroridentin B, 1′-*O*-β-D-glucopyranoside taraxaloside, triterpenoids: taraxasterin, ψ-taraxasterin acetate, steroids: stigmasterol, β-sitosterol [9], phenol carboxylic acids, flavonoids [10], lactones [11].

Bioactivities: Antiatherosclerotic, hypoglycemic [10], bile-expelling [12], hemostatic, antitumor, antifungal, and antibacterial [10,13], and diuretic [14].

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5. Danzanpuntsag., Crystal rosary. XVIIIth century.
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FABACEAE

Thermopsis lanceolata R.Br.

WHO

WHO

Mongolian name
Yulden tarvagan shiir

Tibetan name
Saradgar

English name
Lanceolata Thermopsis

Description: 12–25 cm tall perennial herb, simple or branched. Leaves trisect, segments bent down, alternate, upper surface barely hairy or glabrous, lower surface somehow hairy. Flowers in terminal inflorescence. Legumes abruptly tapering at the tip, straight linear, with 10–14 reniform dark or dark- brown seeds.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Dund. Khalkh, Dor. Mong., Olon n., Dor. Gobi.

Habitat: Debris and stony slopes, river and spring banks, lake coasts, alkaline steppe meadows [1–5].

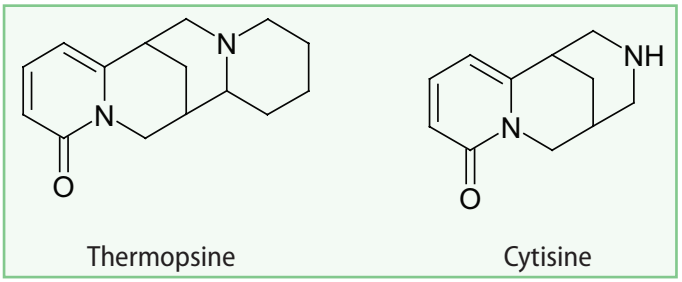
Parts used: Herb and root

Traditional uses: The taste is bitter and potency is cool and heavy. It is used for as the following: treating wounds and fever, and fortifying the body. It is an ingredient of the following traditional prescriptions: Pagril-5, Senden-25, Nymjor-17, Chumaze-25, Chumankhorol, Chavdagshagdol, Aba-6 tan, Abkhia-6 [5–8].

Microscopic characteristics:

Leaf: Upper epidermal cells polyangular, wavy walled; lower epidermis relatively more wavy. Anomocytic stomata occur only lower epidermis. Trichome multicellular, two celled. Sometimes trichome thick-walled [9].

Chemical constituents: Alkaloids: cytisine, anagrine, pachycarpine [10], rhombifoline, *N*-methylcytisine [11], N-formylcytisine, thermopsine, termopsidin, lupanin, spartein, 5, 6-dihydrolupanin, baptifoline, epibaptifoline, 17-oxosparteine, 11,12-dehydroanagyrine, àmmodendrine, isoammodendrine [12].



Thermopsine Cytisine

Bioactivity: Mucolitic [13].

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Thlaspi arvense L.

WHO

WHO

Mongolian name
Khodoogiin biraaga

Tibetan name
Briga

English name
Dish Mustard, Boors Mustard

Synonym: *T. collinum* M.Bieb. [1].

Description: Annuals or perennials, 15–60 cm tall, with few branches near the tip. Leaves often auriculate or entire, oblong oval or lanceolate, cordate, amplexicaul at base. Calyx straight. Petals entire, white or purple. Silicles orbicular, oval, elliptic, cylindrical, obcordate or almost triangle in shape. Seeds grooved, brown, two or many seeded, with a deep notch at the apex and broad wings.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khovd, Mong. Alt., Gobi-Alt.

Habitat: Fields and vegetable gardens, nomad camp sites, inhabited areas [2–5].

Part used: Seed

Traditional Uses: The taste is bitter and the potency is hot, oily, and light. It is used for the following: treating lung and kidney fevers and joint atrophy. It increases appetite, fortifies the body, alleviates arthritis and chronic kidney diseases. It is an ingredient of the following traditional prescriptions: Arur-15, Brega-13, Givan-12, Gagol-18, Gou-9, Dajidsambo-9, Dargan-10, Dosal-22, and Sebru-16 [5–9].

Microscopic characteristics: Envelope of seed made up epiderm, mesoderm and sclerenchyma. Pod long, with flattened wings. Outer epdermis thickened, lignified. Below epidermis are seen 2–3 layers of parenchyma cells. Centre of the seed shows 1–3 layers of sclerenchyma cells [10].

Chemical constituents: Seed contains 20–33% fat [11–13], thioglycosides: 1.4% synigrin [14], glucocapprin [15], isothiocyanate: allylisothiocyanate [14], fatty acids [16].

Qualitive and quantitative assays: The following is a suitable TLC procedure to identify flavonoids: silica gel, butanol-acetic acid-water (4:1:5) solvent system, detection reagent: 1% ethanolic solution of aluminium chloride. 2–3 yellow flavonoid spots are observed under UV lamp. Total flavonoid content is determined by titration using potassium permanganate as the titrant [10].

Qualitive and quantitative standards: Loss on drying, 8–10%. Ash, 11–13%. Organic matter, not more than 1.0%. Water-soluble extractive, 10–12%. Total flavonoid content, 0.6–0.8% [10].

Bioactivities: Antibacterial [15], anti-atherosclerotic [17].

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Tribulus terrestris L.

WHO

WHO

Mongolian name
Zelen zanguu, Nokhoi zanguu, Naangi

Zanguu, Khevtee zanguu, Zerleg zanguu

Tibetan name
Sema

English name
Puncturevine Caltrap

Synonyms: *T. bicornutus* Fisch. et C.A.Mey.

Description: Annuals with 10–60 cm long, tomentose, prostrate branched stems. Leaves opposite, short petiolate. Yellow flowers in leaf axils. Fruit almost orbicular, consisting of 4–5 locules with prickles and spines on the surface.

Distribution: Khang. (south), Dund. Khalkh, Dor. Mong., Ikh n., Olon n., Dor. Gobi, Gobi-Alt., Alt. ovor., Alash., Zyyngar.

Habitat: Alkaline, debris and stony tailings, sands, sandy bottom of dry riverbeds, alkaline river and spring banks, nomad camps, agricultural lands, along irrigation ditches and roads [1–5].

Parts used: Herb

Parts used: Herba

Traditional Uses: The taste is sweet and astringent, and the potency is light and sharp. It is used for the following: treating back and cold kidney diseases, and nervous diseases. It decreases edema, diminishes tumors, heals wounds and enhances body strength, and is also used as a diuretic. It is an ingredient of the following traditional prescriptions: Sema-3, Sojid, Senden-25, Umodeuijin-24, Vanlag-37, Bragshun-7, Zandan-8, and Gamjid-18 [5–9].

Microscopic characteristics:

Leaf: Leaf is isolateral. Inner sides of upper and lower epidermis are present single layers palisade parenchyma. Between lower epidermis and palisade parenchyma are visible gypoderm. Vascular bundle is collateral. Anomocytic stomata appear both surface of epidermis. Epidermal cells thick and straight-walled [10].

Stem: The transverse section is round-shaped. The outer walls of the epidermal cells are covered by cuticle. Chlorenchyma four- to six-layered and thin-walled. Well-developed sclerenchyma occurs between vascular bundle and chlorenchyma. Trichomes occur in concave of ridges [10].

Chemical constituents: Sugars [11], 2.8% steroid saponins [12], steroids [13,14], alkaloids [15], flavonoids [12].

Qualitive and quantitative assays: Flavonoids in the plant are identified by cyanidin reaction and TLC. The following is a suitable TLC procedure to identify flavonoid: silica gel, butanol-acetic acid-water (4:1:5) solvent system, detection reagent: 1% aluminium chloride. 2–3 yellow flavonoid spots are observed after using detection reagent. Total flavonoid content is deternimed by Levantal method using potassium permanganate as the titrant [10].

Qualitive and quantitative standards: Loss on drying, not more than 10.0%. Ash, not more than 25.0%. Organic matter, not more than 1.0%, and mineral matter, not more than 0.5%. Total flavonoid content, not less than 0.4% [10].

Bioactivities: Diuretic, adaptogenic activity [14].

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Trollius asiaticus L.

WHO

WHO

Mongolian name
Aziin Jamiyanmyadag, Shar Udval, Khokhoonii idee

Tibetan name
Jamen medog

English name
Siberian Globeflower

Synonym: *T. kytmanovii* Reverd. [1].

Description: 40–60 cm tall perennial herb, with bunched roots. Basal leaves long petiolate, palmately divided into five broad rhomboid, 3–6 cm long, 2–4 cm wide segments, with acutely dentate lobes. Terminal flowers 3–5 cm in diameter, orange or yellow. Petaloid nectary obtuse, linear, ca. 2 mm wide, 15 mm long, 1.5–2 times longer than stamens, but 1/3 shorter than sepals. Anthers 3–4 mm long. Stigma yellow. Tepals 5–7, widely open. Follicles 7–8 mm long, with 1–1.5 mm long, erect or curved outward beak.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd (Zuslan), Mong. Alt. (Taishir uul), Gobi-Alt. (Ikh Bogd, Baga Bogd).

Habitat: Larch forests, riverbank meadows, forest fringes [2–5].

Parts used: Herb and flowers

Traditional Uses: The taste is sweet and bitter, and the potency is cool. It is used for the following: wound healing, cardiovascular diseases, blood disorders, lymph diseases, and eye diseases. It is an ingredient of the following traditional prescription: Dugseltan [5–7].

Chemical constituents: Herb contains alkaloids, flavonoids; flowers contain alkaloids, vitamin C, flavonoids, coumarins [8].

Bioactivity: Antibacterial [8].

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Urtica cannabina L.

WHO

WHO

Mongolian name
Olslog khalgai

Tibetan name
Sugod

English name
Hempleaf Nettle

Description: 35–120 cm tall, mostly mono- sometimes dioecious perennial herb, with rhizome. Stems erect, quadrilateral, with cystoliths. Inflorescence branched, ca. 7 cm long, male flowers in axils of middle leaves, female flowers in axils of upper leaves. Leaves 4–15 cm long, 5–12 cm wide, palmatisect, with 3–5 dentate or incised lobes, which are 2.5–12 cm long, 1–3.5 cm wide, with simple hairs on both surfaces and cystoliths along the veins on the lower surface. Bracts 0.6–1.3 cm long, scale-like, lanceolate. 1/3 of perianth of female flowers united, back lobes equal to nutlet, which are 2.0–2.5 mm long, ovate, flat.

Distribution: Khent., Khang., Mong-Dag., Khovd, Mong. Alt., Dund. Khalkh, Ikh n., Dor. Mong, Gobi-Alt., Zyyngar.

Habitat: Rocky and stony slopes, among boulders, dry light forests, nomad camps, inhabited areas [1–5].

Parts used: Herb

Traditional Uses: The taste is bitter and the potency is hot and oily. It is used for the following: wound healing, treating lymph disease, edema, diabetes, scurvy, and lupus erythematosus; also beneficial in nervous diseases [5–7].

Chemical constituents: Organic acids, ascorbic acid, carotene, phenol carboxylic acids, flavonoids [8].

Bioactivities: Haemostatic, anti-inflammatory, diuretic, and antipyretic [8].

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Vaccinium vitis-idaea L.

WHO

WHO

Mongolian name
Alirs

Tibetan name
Dagdu

English name
Cowberry

Description: 2.5–25 cm tall, semi-shrub with whitish branches. Leaves stay leather-like in winter, oval or obovate, obtuse or notched, indistinctively dentate, with slightly rolled margins, 5–27 mm long, 3–12 mm wide, with 0.5–3 mm long stalks, upper surface dark green, lower surface pale, with brown glands. Terminal panicle consists of 2–8 hairy flowers. Sepals 0.75–1.25 mm long, 0.75–1 mm wide, with reddish round teeth. Corolla campanulate, white-pink, 4–6.5 mm long, with four lobes. Stamens eight, with hairy filaments. Anthers without spurs. Style emerging out from corolla. Ovary quadrilateral, berry almost orbicular.

Distribution: Khovs., Khent., Mong-Dag., Khyang., Khovd.

Habitat: Larch, cedar and mixed forests, birch forest in forest-steppe and alpine belts [1–5].

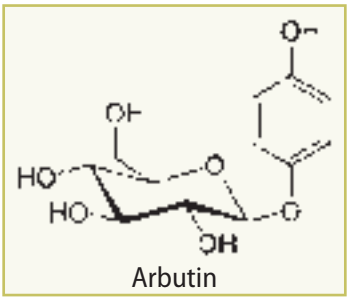
Parts used: Herb and fruits

Traditional Uses: The taste is sweet and sour and the potency is cool. It is used for the following: enhancing longevity, develops body power and heals coughs. It is an ingredient of the following traditional prescription: Oddan-25 [5–8].

Microscopic characteristics:

Leaf: Upper and lower epidermis covered with thick cuticles; both epidermis wavy-walled. Stomata is surrounded by two subsidiary cells and appears only in lower epidermis. Near the upper epidermis and along midrib covered by thick-walled hairs. Hairs with cuticle. Multicellular, glandular trichomes occur in lower surface of epidermis [9].

Chemical constituents: Leaves contain aldehydes, triterpenoids, ascorbic acid [10], phenol glycosides: arbutin [10–13], methylarbutin [10], phenol carboxylic acids, their derivatives: chlorogenic, caffeic, isochlorogenic, neochlorogenic, ferulic acids [14], catechin: (+)-catechin, (–)-epicatechin, (+)-gallocatechin [14–16], tannins, flavonoids: kaempferol, quercitrin [13], isoquercitrin, rutin, quercetin 3-*O*-β-D-glucosyl-L-rhamnoside, kaempferol 3-*O*-L-rhamnoside, avicularin, hyperin [13,17], luteolin 3-*O*-β-D-glucopyranoside, luteolin 3-*O*-β-D-galactopyranoside [12]. Fruit contains sugar, ascorbic acid, organic acids: citric, benzoic, salicylic acids [13], terpenoids: α-pinene, β-pinene, 1,8-cineol, camphor, borneol, myrcene, γ-terpinene, and others, aromatic compounds (benzene, toluene, phenol, anisaldehyde, benzaldehyde, acetophenol, and others) [18].



Arbutin

Qualitive and quantitative assays: Tannins in leaves are identified by the reaction with ammonium iron (III) sulphate. Arbutin is identified by the reaction with iron (II) sulphate. Arbutin is determined by titration using iodine as the titrant and starch as the indicator [19].

Qualitive and quantitative standards: For leaves: Loss on drying, not more than 12.0%. Organic matter, not more than 2.0% and mineral matter, not more than 1.0%. Water-soluble extractive, not more than 20.0%. Tannins, not less than 5.0%. Arbutin, not less than 4.0% [19].

For fruit: Loss on drying, 10–12.0%. Ash, 9–10.0%. Matter, not more than 3.0%. Ascorbic acid, 7–17 mg% [20].

Bioactivities: Sedative, antioxidant [11], and diuretic [21].

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Valeriana alternifolia Ledeb.

WHO

WHO

Mongolian name
Emiin bambai

Tibetan name
Banboi

English name
Alternate-leaved Valeriana

Synonyms: *V. jacutica* Sumnev., *V. transbaicalensis* Sumnev., *V. dahurica* Sumnev., *V. stubendorfi* Kreyer ex Komarov, *V. alternifolia* var. *stubendorfii* (Kreyer ex Kom.) Vorosch., *V. officinalis* auct. non L. [1].

Description: 1–1.5 m tall perennial herb with rhizome. Stem longitudinally grooved, hollow, cylindrical, green, erect sometimes violet-red near the base. Leaves linear-lanceolate, odd-pinnate, with big teeth. White, pink, grey flowers in corymb. Fruit oblong lanceolate, seed with one rib on the flat side, three on the domed side.

Distribution: Khovs., Khent., Khang., Mong-Dag., Khyang., Khovd (Kharkhiraa, Turgen).

Habitat: Larch forests and their fringes, birch forest, forest and waterside meadows, willow thickets [2–5].

Parts used: Root and rhizome

Traditional Uses: The taste is bitter and the potency is cool and light. It is used for the following: treating persistant fever, poisoning, and tumors. Has sedative effects, alleviates the pain, and reduces blood pressure. It is an ingredient of the following traditional prescriptions: Agar-11, Ar ur-7, Gavur-9, 25, Gagol-18, Gurgum-8, Delmanmar, Tsarvon-15, Shinjud-21, and extract of banboi [5–9].

Microscopic characteristics: Epiderm with hairs, hypodermis cells large, sometimes essential oils present. Parenchyma single-layered contain starch grains. Endoderm thick-walled [10].

Chemical constituents: Root and rhizomes contain 0.67–1.1% essential oil [11]: kessan, (-)-bornylacetate, α-kessylacetate, kessanyl acetate, (-)-borneol [12], ledol, (-)-bornyl isovalerate, bornyl acetate [13], valerianic and isovalerianic acids and their ethers [14,15], α-humulene, camphene, valerenal, 15-acetoxyvaleranone [11] and others, iridoids: isovaltrate, valtrate, homovaltrates I and II [16], alkaloids: actinidine [17], hatinine [18], valerine [13], valerianine [19], ethylakinidine [20]. The content of valerenal, valerianic acid, camphene, and 15-acetoxyvaleranone is high in the essential oil [11].

Qualitative and quantitative assays: Valerianic acid is titrated with 0.1 mol/L sodium hydroxide [21].

Qualitative and quantitative standards: Loss on drying, not more than 16.0%. Ash, not more than 14.0%. Organic matter, not more than 1.0% and mineral matter, not more than 3.0%. Valerianic acid content, 0.8–1.4% [21].

Bioactivities: Sedative, spasmolytic, antitumor, antibacterial, and anti-arrhythmic [15].

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Vincetoxicum sibiricum (L.) Decne.

WHO

WHO

Mongolian name
Sibiri Erondgono

Tibetan name
Dugmonun

English name
Siberian Vincetoxicum

Synonyms: *Alexitoxicon* St-Lag., *Antitoxicum* Pobed. [1]

Description: 15–20 cm tall perennial herb, with transversely growing roots. Leaves acute, narrow cuneate, linear or linear-lanceolate, 4–7 cm, 3–4 mm wide, with sparse short hairs on both surfaces. Flowers 3–4 mm long, in short raceme in leaf axils near stem tip. Peduncle and calyx with woolly hairs. Corolla dull yellow. Staminate corona ovate, with lengthened apex. Follicles 4–7 cm long, up to 1.5 cm wide. Seeds with bunch of dense silky hairs.

Distribution: In all plant-geografical regions except Khovs., Khent., Khovd.

Habitat: Steppe debris and stony slopes, bottom of dry riverbeds, sandy places [2–5].

Parts used: Herb and fruit

Traditional Uses: The taste is bitter and the potency is cool and blunt. It is used for the following: bile diseases, dysentery, pneumonia, detoxification, hemostatic, and wound healing. It is an ingredient of the following traditional prescriptions: Agar-13, 11, Bavo-6, 15, Bilva-11, Bongar-5, 13, Bragshun-7, Givan-11, 15, 18, Gurgum-7, 9, Khach gurgum-25, Dashil-36, Dontal-24, Doshin-7, Doshun-23, and Dudzitigva [5–8].

Microscopic characteristics: Leaf is dorsoventral. Palisade single-layered; spongy parenchyma 5–8 layered. Anomocytic stomata occur on the lower and upper surface; covering multicellular trichomes on both epidermis; vascular bundle is collateral [9].

Chemical constituents: Herb contains phenol carboxylic acids, their derivatives: ferulic, isoferulic, sinapic, 3-ferulyolquinic, 3-*O*-sinapyol-B-quinic acids, 1-ferulyolglucose, flavonoid: quercetin glucoside [10].

Bioactivities: Anti-inflammatory and hypotensive [11].

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Zygophyllum potanini Maxim.

OHO

Mongolian name
Potaninii khotir,
Argaliin und

Tibetan name
Khotiro

English name
Bigflower Beancaper

Description: 10–17 cm tall, glabrous perennial herb. Pinnate leaves 10–35 mm long, 7–25 mm wide, with 1–2 pairs of oblique obovate or oval leaflets and winged flat stalks. Stipules herbaceous. Capsules papery, 15–30 mm long, width almost same as length, cylindrical with five broad wings.

Distribution: Gobi-Alt., Alt. Ovor., Alash.

Habitat: Debris tailings of mountains and hills, sandy and rocky bottom of dry riverbed, stony slopes of hills, rocky desert areas [1–4].

Part used: Herb

Traditional Uses: The taste is bitter and the potency is cool and blunt. It is used for the following: as a diuretic, treating inflammation, liver cirrhosis, and ulcers, healing wounds, and for degeneration of liver and bile, ascites tumors [4–6].

Microscopic characteristics:

Leaf: Leaf is isolateral. Palisade 5–7 layered. Near the vascular bundle shows thin walled rounded parenchyma cells. Upper and lower epidermal cells angular walled. Anomocytic stomata occur both surface of epidermis. Vascular bundle is collateral [7].

Stem: The transverse section is round in shape. Epidermis single-layered. Cortex is composed of 5–6 layers parenchyma. Vascular bundle is collateral. Centre of the stem are present large, thin-walled parenchyma containing water [7].

Chemical constituents: Triterpenoid saponins: 3-*O*-*[β*-D-2-sulphonylglucopyranosyl*]*-quinovic acid-28-*O*-*[β*-D-2-glucopyranosyl*]* (zygophyloside G), 3-*O*-*[α*-L-arabinopyranosyl*]*-(1-->2)-*β*-D-inovoglucopyranosyl*]*-quinovic acid-28-*O*-*[β*-D-glucoglucopyranosyl*]* (zygophyloside H), flavonoids: kaempferol-3-*O*-neohesperidoside, kaempferol-3-*O*-rutinoside, kaempferol-3-*O*-glucoside, kaempferol-3-*O*-rutinoside-3-*O*-*β*-D-quinovopyranosyl, quercetin-3-*O*-rutinoside, phenylalanine, steroids: *β*-sitosterol, hendriacktan [8].

Qualitative and quantitative assays: Flavonoids in the plant are identified by TLC. Suitable procedure for TLC: silica gel, ethyl acetate-methanol-water (10:2:1) solvent system. The spot with the same R_f as reference kaempferol is observed under UV lamp. Total flavonoid content is determined by spectrophotometry at 269 nm and calculated as kaempferol [7].

Qualitative and quantitative standards: Loss on drying, 6.9±0.67%. Total ash, 35.2±1.194%. Acid-insoluble ash, 15.5±1.06%. Water-soluble extractive, 60.4±0.47%. Total flavonoid content calculated as kaempferol, 1.38±0.113% [7].

Bioactivities: Antioxidant and immunodepresant [9].

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This volume—one in a series on medicinal plants in Member States of WHO's Western Pacific Region—introduces Mongolian traditional medicine and details the nature and uses of medicinal plants found in the country.

The book focuses on the medicinal plants used most commonly in Mongolia. Each monograph contains colour pictures of the plant and a wide array of information—from the scientific and English names of plants to their microscopic characteristics.

While helping record and document traditional medicine practices, the book contributes to the understanding of the value of medicinal plants in Mongolia and increases the evidence base for the safe and efficacious use of herbs in health care.

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