THE PLANTS
IN ALPHABETICAL ORDER

Abbreviations used in species treatments

Clinical studies+ = evidence of efficacy provided by one or more clinical study

Comm.E+ = positive monograph by the German Commission E.

ESCOP = treated in the monograph series of the European Scientific Cooperative on Phytotherapy (plus volume number)

HMPC = treated in the monographs of the European Committee on Herbal Medicinal Products

Pharm. = treated in pharmacopoeia(s)

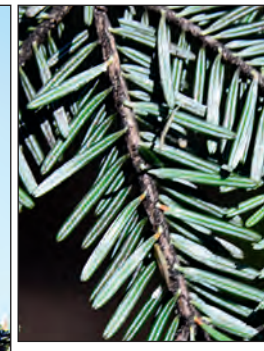
PhEur8 = treated in the 8th edition of the European Pharmacopoeia

WHO = treated in the monograph series of the World Health Organisation (plus volume number)

Abies alba

silver fir • European silver fir

Abies alba tree



Abies alba leaves (upper and lower surfaces)

Abies alba cones

Description Tall, evergreen coniferous tree (up to 60 m in height). The narrowly linear leaves are glossy green above with two lines of whitish stomata below. Cones are typically erect and disintegrates at maturity.

Origin Mountains of central and southern Europe; introduced into North America. Other species such as *A. balsamea, A. cephalonica* and *A. sibirica* are also used medicinally.

Parts used Essential oil (fir needle oil; *Abietis albae aetheroleum*) is steam-distilled from the fresh leaves, while the cones yield fir cone oil (*Oleum templini*). A high-quality turpentine known as Strassburg turpentine or térebénthine d'Alsace (*Terebinthina alsatica*) is obtained from the resin. It contains essential oil, succinic acid, resin acids and bitter compounds.

Therapeutic category Counter-irritant, expectorant.

Uses and properties Fir needle oil is used topically in the form of commercial preparations as liniment on the breast and back. It is also used as balsam and lotion against colds and respiratory ailments. To treat colds, it can be used in a bath, often in combination with eucalyptus oil and menthol. It can be used as a supplement for surgical spirit. Fir cone oil is used as perfume in cosmetics and soaps.

Uses and properties The oil is added to baths or used as inhalant and ointment.

Active ingredients Fir needle oil contains volatile terpenoids such as bornyl acetate, α- and β-pinene, limonene, β-phellandrene and camphene; pine needle oil has limonene and borneol as main compounds. These oils have a refreshing pine-forest fragrance.

Pharmacological effects Topical use: the essential oil is soothing and increases blood circulation in the skin. Internal use: expectorant, secretolytic, antibacterial and anti-inflammatory activities can be expected, which has been shown experimentally for essential oils.

Notes Spruce needle oil (*Piceae aetheroleum*) may contain essential oil from fir (*Abies* species), spruce (*Picea* species) or even larch (*Larix* species). Siberian spruce needle oil, for example, is derived from *Abies sibirica*. Oil from fresh spruce or pine sprouts (*Piceae turiones recentes*) is traditionally used against rheumatism, mild muscle and nerve pains and catarrh.

Warning The product has spasmodic activity and should therefore not be used to treat whooping cough or asthma.

Status Traditional medicine; Pharm.

Abies alba Mill. Family: Pinaceae

sapin argenté (French); *Weißtanne, Edeltanne* (German); *abete nobile* (Italian); *abeto blanco* (Spanish)

Achillea millefolium

yarrow • milfoil • woundwort

Achillea millefolium

Achillea moschata

Achillea millefolium inflorescence

Description A perennial herb with several erect stems arising from multiple rhizomes below the ground. The compound leaves are bright green and feathery. Numerous small, white to pink flower heads are borne in flat-topped clusters. *A. moschata* occurs in the Alps, has similar secondary metabolites as *A. millefolium* and has been traditionally used for similar indications.

Origin Yarrow represents a species complex with many forms and grows naturally in Europe and western Asia but is cultivated as an ornamental and medicinal herb in many parts of the world.

Parts used Whole plant (*Millefolii herba*) or the flowers (*Millefolii flos*); sometimes the essential oil.

Therapeutic category Anti-arthritic, anti-pyretic, anti-inflammatory, diuretic.

Uses and properties The herb is traditionally used to treat arthritis, fever, the common cold and hypertension. It is nowadays mainly recommended for lack of appetite and minor dyspeptic complaints. For external use, it is added to bath water to treat pelvic autonomic dysfunction (painful cramp-like conditions of the lower pelvis in women).

Preparation and dosage Infusions or tinctures are used and the herb (with or without the flowers) may be included in mixtures. For internal use, Commission E recommends a daily dose of 4.5 g of yarrow herb (or 3 g of yarrow flowers and three teaspoons of fresh juice). For external use in a so-called sitz-bath ("Sitzbad"), use 100 g of the herb in 20 litres of water.

Active ingredients Pyrrolidine alkaloids (betonicine and stachydrine), flavonoids and volatiles (including β-pinene, camphor, 1,8-cineole, caryophyllene and azulenic compounds – in the form of sesquiterpene lactones such as achillicin – and numerous others). The bright blue azulenes are not present in the fresh herb, but are formed as artefacts from "pro-azulenes" during steam distillation of the oil.

Pharmacological effects Antibacterial and anti-inflammatory activities have been documented, and are mainly ascribed to the sesquiterpene lactones and azulenic compounds. The flavonoids are thought to be antispasmodic, while the alkaloids are said to have antipyretic and hypotensive effects.

Warning Fresh plants may cause dermatitis in sensitive people.

Status PhEur8; Comm.E+; ESCOP Suppl.; HMPC.

Achillea millefolium L. family: Asteraceae

millefeuille (French); *Schafgarbe* (German); *achillea millefoglio* (Italian); *milenrama* (Spanish)

Aconitum napellus

aconite • monkshood • wolfsbane

Aconitum napellus

Aconitum napellus flowers and fruit

Description A perennial herb with erect flowering stems that grow from a tuberous rootstock. The stems bear deeply dissected, toothed leaves and clusters of purple to blue flowers. Enlarged sepals (calyx lobes) form the conspicuous part of the flower – the upper one is characteristically hood-shaped and gives the flowers their distinctive appearance.

Origin *A. napellus* occurs in mountainous parts of western and central Europe. Several species are commonly cultivated as ornamentals. Tubers are also harvested from wild plants. *A. anthora, A. ferox, A. vulparia* and *A. lycoctonum* have been used in traditional European medicine (today in homoeopathy). Species such as *A. carmichaelii* and *A. kusnezoffii* are important in Chinese medicine (*chuan wu* and *chao wu*).

Parts used Tincture of the tubers (rarely leaves).

Therapeutic category Externally, sometimes as antirheumatic, analgesic and antineuralgic.

Uses and properties Aconite is no longer used in some countries due to the risk of intoxication. Aconite tincture is sometimes still used as one of many ingredients in cough syrups. The main alkaloid, aconitine, can be used in pure form (in 0.1 mg granules) to treat facial neuralgia. In traditional medicine in India and China, the tuber has been used topically as analgesic, antineuralgic, anti-inflammatory and antipyretic.

Preparation and dosage Dilute tinctures are widely used with galenicals and in homoeopathy. The product may also be applied topically in higher concentrations to treat rheumatism and neuralgia.

Active ingredients Aconitum contains numerous diterpenoid alkaloids in concentrations of 0.5 to 1.5% of dry weight. Aconitine is the main compound.

Pharmacological effects At toxic concentration, aconitum causes numbness, abnormal cardiac rhythm and death through respiratory arrest. Aconitine stimulates Na^+-channels; it first activates and then paralyses the peripheral nerve endings. It is highly lipophilic and can be absorbed through the skin.

Warning The tubers are extremely toxic when ingested – the lethal dose in adults is only about 10 g. Several human intoxications due to *Aconitum* (including the two Chinese species) have been reported.

Notes Aconite was formerly used as arrow poison, to kill vermin and enemies.

Status Traditional medicine; TCM; Comm.E+.

Aconitum napellus L. family: Ranunculaceae

aconit napel (French); *Blauer Eisenhut* (German); *aconito* (Italian); *acónito* (Spanish)

Acorus calamus

calamus • sweet flag • flag root

Acorus calamus

Acorus calamus flower spike

Acorus calamus rhizome

Description A reed-like, perennial, aquatic plant with bright green, sword-shaped leaves growing from creeping rhizomes. The leaves are aromatic, relatively broad (more than 15 mm wide), with a distinct midrib. Minute flowers are grouped together in small oblong spikes. Grassy-leaved sweet flag (*A. gramineus*) is well known as *shi chang pu* in Chinese medicine. It is easily recognised by the non-aromatic, narrow leaves (less than 10 mm wide) which are without a distinct midrib.

Origin The plant is indigenous to northern temperate zones (Europe, Asia, North America); in Asian tropics it occurs from India to New Guinea. *A. gramineus* occurs naturally in China, Japan and Southeast Asia.

Parts used Rhizomes (fresh, dried or powdered).

Therapeutic category Bitter tonic (*amarum*), stimulant.

Uses and properties The aromatic, bitter rhizomes are used to treat indigestion and flatulence or to stimulate appetite. Traditional uses are mainly as a digestive and carminative, but sometimes as an emetic, antispasmodic, stimulant and anthelmintic. It appears to relieve stomach cramps, chronic dysentery and asthma. It is believed to have a strengthening effect on the nervous system and has been used in Ayurvedic and Chinese medicine. The plant was found in Tutankhamen's tomb in Egypt, and is mentioned in the Old Testament (Exodus XXX).

Preparation and dosage Tinctures are generally used but dried or candied rhizomes may be directly chewed or taken as an infusion in boiling water.

Active ingredients The essential oil contains monoterpenoids (farnesene, geranylacetate, camphene, *p*-cymene, linalool) and sesquiterpenoids (acorenone), especially phenylpropanoids (β-asarone =*cis*-isoasarone) in the Indian variety.

Pharmacological effects The spasmolytic properties of the essential oil and the sedative effects of the main component of the Indian variety, β-asarone, have been demonstrated. Asarone and the monoterpenes show antimicrobial properties.

Warning The use of *Acorus* in digestive medicines has been discontinued in most countries due to possible harmful effects (mutagenic and embryotoxic properties). The European variety contains only trace amounts of β-asarone and is sometimes allowed in food products.

Status Traditional medicine; TCM; Pharm.

Acorus calamus L. family: Acoraceae

acore vrai (French); *bacc* (Hindi); *Kalmus* (German); *calamo aromatico* (Italian); *cálamo aromático* (Spanish)

Actaea racemosa

black cohosh • black snakeroot

Actaea racemosa plant

Actaea racemosa flowers

Description An erect, perennial herb (up to 2 m in height) with large, compound leaves and long, slender clusters of small white flowers. It is an attractive garden subject but is often confused with the more common *A. simplex* from East Asia. This species and three others (*A. dahurica*, *A. heracleifolia*, *A. foetida*) are also used medicinally.

Origin Canada and the northeastern parts of the USA. The plant is easily cultivated but most of the raw material comes from wild-harvesting.

Parts used Dried rhizome and roots (*Cimicifugae racemosae rhizoma*).

Therapeutic category Treatment of menstrual disorders; sedative.

Uses and properties Treatment of premenstrual and menopause problems associated with neurovegetative complaints. Also included in tonics and cough mixtures, and used to treat rheumatism, chorea (Saint Vitus's dance) – a nervous disorder characterised by lack of coordination), dizziness, and tinnitus.

Preparation and dosage 0.5–1 g of the drug is taken up to three times per day, but in several studies only 40 mg of the crude drug was used per day.

Active ingredients The drug contains several tetracyclic triterpenoid glycosides (actaein and cimicifugoside) and their aglycones (cimigenol, acetylacteol). Also present is an isoflavonoid, formononetin. Other compounds are isoferulic acid, salicylic acid, gallotannins and possibly cytisine and other quinolizidine alkaloids.

Pharmacological effects Black cohosh has an oestrogen-like action, usually ascribed to the isoflavonoids and triterpenoids. It appears to act as a selective oestrogen-receptor modulator and is said to suppress the activity of the luteinizing hormone. Extracts containing actaein are known to be spasmolytic, vasodilatory and hypotensive. Controlled studies (but without a double-blind design) have indicated efficacy in the treament of menopausal symptoms in women. A later study failed to show efficacy in treating "hot flushes".

Warning Black cohosh should be avoided by patients suffering from hormone-dependent cancer. It should not be used continuously for more than three months. More than 5 g can cause toxic symptoms.

Status Traditional medicine; Pharm.; Comm.E+; PhEur8; WHO 2; HMPC; clinical studies+.

Actaea racemosa L. [=*Cimicifuga racemosa* (L.) Nutt.] family: Ranunculaceae

actée à grappet (French); *Traubensilberkerze*, *Amerikanisches Wanzenkraut* (German); *cimicifuga* (Italian); *cimicifuga* (Spanish)

Adonis vernalis

yellow pheasant's eye • spring adonis

Adonis vernalis

Description A small perennial herb with divided, feathery leaves and large, bright yellow flowers produced in early spring.

Origin Europe (excluding the British Isles), West and East Siberia.

Parts used Aerial flowering parts (*Adonidis herba*). Raw material comes mainly from eastern Europe and Russia.

Therapeutic category Heart stimulant.

Uses and properties The product is sometimes used as a heart stimulant, in the same way as more familiar sources of cardiac glycosides such as digitalis. It is considered particularly useful when cardiac conditions are accompanied by nervous symptoms. Several traditional uses are known, including the treatment of bladder and kidney stones.

Preparation and dosage Standardised powder is used (more rarely weak tinctures), but the dosage has to be carefully controlled to avoid negative side-effects. The powdered drug contains about 0.25% cardiac glycosides, standardised to have the same activity as 0.2% cymarin (see below). The average daily dose of adonis powder is 0.6 g. According to the Commission E, the maximum single dose and maximum daily dose should not exceed 1 g and 3 g respectively.

Active ingredients Several cardiac glycosides (cardenolides) are present, in concentrations of 0.2 to 0.5% of dry weight. Cymarin is the main active compound (after hydrolysis it gives *k*-strophantidin and *D*-cymarose), with smaller amounts of adonitoxin (hydrolysis gives adonitoxigenin and *L*-rhamnose) and 26 additional cardenolides. Also present are various flavonoids (flavone-*C*-glycosides).

Pharmacological effects The drug shows positive inotropic and venotonic effects. Cardenolides inhibit Na^+/K^+-ATPase and indirectly increase the concentrations of cellular Ca^{++}-ions that trigger muscle contraction. Cardenolides are known to increase the strength of contraction of the heart muscle without increasing the pulse.

Warning The plant or pure chemical compounds and other products derived thereof are potentially dangerous and should not be used without the supervision of a qualified health care professional.

Notes *Adonis vernalis* is not used in its pure form in OTC herbal medicine (except in mixtures with other cardenolide-containing plants and in some highly diluted homoeopathic remedies).

Status Traditional medicine; Pharm.; Comm.E+.

Adonis vernalis L. family: Ranunculaceae

adonide de printemps (French); *Frühlings-Adonisröschen* (German); *adonide* (Italian); *botón de oro* (Spanish)

Aesculus hippocastanum

horse chestnut

Aesculus hippocastanum tree with fruit

Aesculus hippocastanum flowers

Horse chestnut seeds

Description Horse chestnut is a deciduous tree of up to 30 m high with large, compound leaves and attractive white flowers spotted with pink. The large, brown, nut-like seeds have a shiny surface and are borne in spiny capsules. Other *Aesculus* species are used in homoeopathy.

Origin Horse chestnut occurs naturally from eastern Europe (the Balkans) to central Asia (the Himalayas). The original species is widely cultivated but several hybrids are also found in gardens and parks.

Parts used Mostly the seeds (*Hippocastani semen*); less often leaves (*Hippocastani folium*) or bark (*Hippocastani cortex*).

Therapeutic category Antioxidant; anti-inflammatory, venotonic and anti-oedema.

Uses and properties Clinical studies support the oral use of extracts to treat chronic venous and lymphatic vessel insufficiency with pain, heaviness in the legs, leg cramps, itching and oedema. Externally it is applied to relieve the symptoms of varicose veins, ulcerations and piles. It is sometimes employed to treat rheumatism and fever.

Preparation and dosage Special extracts of dried seeds are mainly used in modern phytotherapy. The daily oral dose is 250 to 750 mg dry extract (equivalent to 50 to 150 mg aescin); taken twice per day. Tinctures (of the seeds, leaves or bark) are also used both internally (to be drunk, or gargled in the case of mouth ulcers) and as components of lotions and skin creams.

Active ingredients Seeds contain a mixture of triterpene saponins (collectively known as aescin) in concentrations of up to 5% of the dry weight. Extracts are used to adjust the level of aescin to the required level (16–21%). The main saponins are glycosides of two triterpenoids, protoaescigenin and barringtogenol C. The seed coat contains antioxidant proanthocyanidins (oligomers of epicatechol and catechol) of which procyanidin B2 is a main component.

Pharmacological effects Aescin, as well as the dry seed extract, have proven antioxidant, anti-exudate and venotonic (vascular-tightening) activity. The saponins and possibly the tannins of horse chestnut have anti-inflammatory and anti-oedema activities. They increase vascular tone and increase the stability of capillary veins.

Status Pharm.; Comm.E+; clinical studies+ (seed extract); ESCOP; WHO 2; HMPC.

Aesculus hippocastanum L. family: Sapindaceae (formerly Hippocastanaceae)

châtaignier de cheval, *marronnier d'Inde* (French); *Rosskastanie* (German); *castagna amare* (Italian); *castaño de Indias* (Spanish)

Agathosma betulina

buchu • round leaf buchu

Agathosma crenulata

Agathosma betulina

Description Buchu is a gland-dotted shrub of up to 2 m in height, with small, characteristically rounded leaves of which the tips curve backwards. The white or pale purple flowers are small and star-shaped. This species is sometimes confused with oval leaf buchu, *A. crenulata* (synon. *Barosma crenulata*), but in the latter the leaves are more than twice as long as they are broad. Several other species have rarely been used as a source of "buchu".

Origin *A. betulina* occurs only in South Africa and has a restricted natural distribution area in the mountains of the Western Cape Province. It is cultivated on a small but increasing scale.

Parts used Dry or fresh leaves (*Barosmae folium;* synon. *Folia Bucco*).

Therapeutic category Diuretic, diaphoretic and stimulant tonic.

Uses and properties Buchu is widely used and has a great reputation for treating kidney and urinary tract diseases, for the symptomatic relief of rheumatism, and also for external application on wounds and bruises (in folk medicine as "buchu vinegar"). Buchu is an excellent tonic and is used to treat minor digestive disturbances. Buchu leaf and buchu oil are important flavour components in herbal teas and food products.

Preparation and dosage A dose of 1–2 g of dry leaf (or equivalent quantities in the form of tinctures) are taken three times per day.

Active ingredients Buchu contains essential oil (2.5%) with limonene, isomenthone, diosphenol (buchu camphor) and terpinen-4-ol as the main compounds. Sulfur-containing minor compounds (such as 8-mercapto-p-methane-3-one) are partly responsible for the characteristic blackcurrant smell and flavour. Oil from oval leaf buchu (*A. crenulata*) is less desirable because it contains little or no diosphenol and high levels of pulegone, a potentially toxic compound. Mucilage, resins and flavonoids (mainly diosmin) are present.

Pharmacological effects Buchu and buchu oil are considered to have urinary antiseptic, diuretic and anti-inflammatory properties. However, there is as yet no published scientific evidence to justify any of the traditional indications, including the use as urinary tract disinfectant.

Status Traditional medicine; Pharm.; Comm.E+.

Agathosma betulina (Berg.) Pillans [=*Barosma betulina* (Berg.) Bartl. & H.L.Wendl.] family: Rutaceae

buchu (French); *Bucco* (German); *buchu* (Italian)

Agrimonia eupatoria

common agrimony

Agrimonia eupatoria

Agrimonia procera

Description An erect, perennial herb (up to 1 m high), with compound, toothed, hairy leaves and small yellow flowers borne in slender spikes. A closely related species, the fragrant agrimony, *A. procera,* is sometimes also used and is considered an acceptable alternative source of raw material. It is similar to *A. eupatoria* but can easily be distinguished by its fragrant smell. In traditional Chinese medicine, *A. pilosa* is used.

Origin Europe and Near East (*A. eupatoria*); Asia Minor (*A. procera,* often cultivated) and Asia (*A. pilosa*). The herb is gathered while flowering – commercial sources originate mainly from eastern Europe.

Parts used Dried, aboveground parts of *A. eupatoria* (*Agrimoniae herba*).

Therapeutic category Antidiarrhoeal, astringent, mild diuretic, antioxidant.

Uses and properties The plant is historically important as an astringent in the treatment of external wounds, especially to stop bleeding. Nowadays it is mostly used to treat mucosal inflammations of the throat and acute diarrhoea, but also for piles, cystitis and urinary incontinence. It is claimed (without scientific evidence) to have benefits in rheumatism, arthritis and gall bladder disorders.

Preparation and dosage The herb is used in tablets and tinctures. It is an ingredient of numerous commercial preparations, mainly liver, bile and stomach remedies. A tea can be prepared from 1.5 g of the herb (taken two or three times a day).

Active ingredients *Agrimonia eupatoria* (like other herbs from the Rosaceae) is rich in tannins, particularly catechol tannins and gallotannins. One of the main compounds is agrimoniin. The herb also contains 20% polysaccharides, triterpenoids and flavonoids (glucosides of luteolin and apigenin). Small amounts of essential oil may be present if *A. procera* was included in the material. *A. pilosa*, rich in agrimophol (a polymer of gallic acid), also shows anthelmintic properties.

Pharmacological effects Gallotannins are astringent; they have the ability to form hydrogen and ionic bonds with macromolecules such as proteins. Extracts show antiviral and marked antibacterial activities. Agrimony is considered to have diuretic effects but there is limited scientific evidence to support the traditional use in ailments of the urinary tract.

Status Traditional medicine; TCM, PhEur8; Comm.E+; ESCOP; HMPC (planned).

Agrimonia eupatoria L. family: Rosaceae

aigremoine gariot (French); *Kleiner Odermennig* (German); *agrimonia* (Italian); *agrimonia* (Spanish)

Alchemilla xanthochlora

lady's mantle

Alchemilla xanthochlora

Alchemilla xanthochlora leaf

Alchemilla alpina

Description A perennial herb with rosettes of lobed leaves and sparse clusters of small yellow flowers. The leaves are somewhat funnel-shaped and shallowly lobed, with conspicuous teeth along the margins. *A. xanthochlora* is a species complex (formerly named as *A. vulgaris)*. The Alpine lady's mantle (*A. alpina* and *A. conjuncta*) is sometimes also used for medicine. It has palmately compound leaves with oblong, free lobes. These plants should not be confused with parsley piert (*Aphanes arvensis*, previously known as *Alchemilla arvensis*), a related, tannin-rich plant used in traditional medicine.

Origin Europe, North America and Asia (*A. xanthochlora*) or central, western and northern Europe (*A. alpina*). *A. xanthochlora* is mainly used, and raw material is imported from eastern Europe.

Parts used Dried aerial parts, collected while the plants are in flower (*Alchemillae herba*).

Therapeutic category Astringent, antihaemorrhagic.

Uses and properties The plant is considered useful in treating minor cases of diarrhoea, sore throat and externally for sores and septic wounds. Traditional uses include gynaecological ailments, especially dysmenorrhoea.

Preparation and dosage For the main indication (diarrhoea), a daily dose of 5–10 g is used. The dried herb and extracts thereof is included in mixtures, ointments, mouthwashes and throat lozenges.

Active ingredients High concentrations of antioxidant ellagitannins (6–8%) are present, including agrimoniin, laevigatin F and pedunculagin. Flavonoids (including a quercetin glucuronide) have also been found.

Pharmacological effects In common with several other tannin-containing herbs of the Rosaceae, lady's mantle is highly astringent and thus useful to treat mild diarrhoea and sore throat. It may also be of some value as a venotonic to treat vascular disorders. Antioxidant effects are ascribed to the polyphenolic compounds.

Warning Severe or persistent diarrhoea is potentially dangerous (especially in infants and children) and should receive medical attention.

Notes *Alchemilla alpina* has been used to treat menstrual disorders, and as diuretic and antispasmodic medicine, while *Aphanes arvensis* is used mainly to dissolve kidney stones. These uses have not been substantiated by scientific studies.

Status Trad. Medicine, PhEur8; Comm.E+.

Alchemilla xanthochlora Rothm. [=*A. vulgaris* auct. non L.] family: Rosaceae

alchimille, *manteau de Notre-Dame* (French); *Gewöhnlicher Frauenmantel* (German); *alchemilla* (Italian); *pie de leon* (Spanish)

Allium cepa

onion

Allium cepa

Allium cepa flowers and fruits

Onions

Description A bulbous perennial with hollow green leaves arising from a bulb formed by dense layers of fleshy leaf bases. The hollow flowering stem bears a rounded cluster of white or purple flowers. Related plants such as scallion (*A. ascalonium*), Chinese shallot (*A. chinense*), chive (*A. schoenoprasum*) and leek (*A. porrum*) are used as culinary herbs.

Origin *Allium cepa* is a cultigen of uncertain origin, probably originating from wild plants in the eastern Mediterranean region or the Middle East. Known from ancient archaeological sites, it is nowadays widely cultivated on a large scale as an important culinary herb and vegetable.

Parts used Fresh or dried bulb (*Allii cepae bulbus*).

Therapeutic category Antibiotic; blood lipid-lowering.

Uses and properties Treatment of appetite loss and prevention of age-related changes in blood vessels (arteriosclerosis). Onion and its juice may be used to treat minor digestive disturbances and is used to overcome the immediate effects of insect stings. Juice mixed with honey or sugar is a traditional treatment for colds and cough. The treatment of dysentery, wounds, scars, keloids, asthma and diabetes are amongst the many traditional uses.

Preparation and dosage An effective daily dose is considered to be 50 g of fresh onion or 20 g of dried product (or equivalent amounts in preparations). The raw bulb may be applied externally or fresh juice is taken on its own or mixed with honey or sugar.

Active ingredients The activity (and pungent smell) is due to several sulfur-containing compounds – mainly sulfoxides, but also cepaenes (α-sulfinyl-disulfides). Sulfoxides (such as *trans*-S-(1-propenyl)-L-(+)-cysteinesulfoxide, an isomer of alliin) are present in the intact bulb, but they are converted by enzymatic action (i.e. by alliinase) into various sulfides that spontaneously form disulfides. These compounds can easily form disulfide bonds with SH-groups of proteins and thus alter their biological activities.

Pharmacological effects Onions are known to have antimicrobial, hypoglycaemic, anti-platelet aggregation, anti-asthmatic, anti-allergic, lipid- and blood pressure-lowering effects. Clinical trials hitherto focused mainly on garlic (see *Allium sativum*) but there is good clinical evidence of efficacy of onions in treating appetite loss and preventing arteriosclerosis.

Status Traditional medicine; Pharm.; Comm.E+; clinical trials+; WHO 1; HMPC.

Allium cepa L. family: Amaryllidaceae (formerly Alliaceae)

oignon (French); *Küchenzwiebel* (German); *cipolla* (Italian); *cebolla* (Spanish)

Allium sativum

garlic

Allium sativum

Allium sativum bulbs

Description Garlic is a perennial herb with fleshy and slightly greyish leaves, rounded flower heads and numerous small bulbs (bulbules, cloves) borne in a group and surrounded by a white papery sheath.

Origin Middle East or central Asia. The exact origin is uncertain – garlic is known only in its cultivated form. It has been used as a food, spice and medicinal crop since antiquity.

Parts used The fresh bulbs or cloves (*Allii sativi bulbus*), garlic powder (*Allii sativi pulvis*) and garlic oil.

Therapeutic category Lipid-lowering activities; antibacterial, antiviral.

Uses and properties The main medicinal uses are supportive dietary treatment of high blood lipids and the prevention of age-related vascular changes (e.g. triglyceride and cholesterol-lowering activities). Garlic has become a popular remedy against the common cold, with claimed diaphoretic, expectorant, antiviral, antispasmodic and antiseptic properties.

Preparation and dosage The average daily dose is 4 g fresh garlic (or equivalent amounts in preparations). Garlic is best used fresh, but carefully dried garlic (as powder) and the essential oil are included in tinctures and syrups.

Active ingredients Various sulfur-containing compounds in garlic or garlic oil are known to have biological effects. The main compound in intact garlic is alliin, which is degraded by an enzyme, alliinase, first to an unstable intermediate and then to allicin (last-mentioned is often the main component in processed material). Another metabolite, known as ajoene (Z and E forms), also inhibits the aggregation of platelets. These sulfides can form disulfides with SH-groups of proteins which will change their three-dimensional structures (conformation). As a consequence of conformation change, the sulfides modulate a wide range of proteins and enzymes.

Pharmacological effects Numerous studies in animals and humans have demonstrated antimicrobial, antiviral and lipid lowering effects. Allicin and ajoene are thought to act as platelet aggregation inhibitors, leading to prolonged bleeding and clotting time. Antimycotic activity is ascribed to inhibition of lipid synthesis in yeasts.

Warning Garlic may interact with standard anticoagulant agents such as warfarin.

Status Pharm.; Comm.E+; ESCOP; WHO 1; clinical trials+; PhEur8; HMPC.

Allium sativum L. family: Amaryllidaceae (formerly Alliaceae)

ail blanc (French); *Knoblauch* (German); *aglio* (Italian); *ajo* (Spanish)

Allium ursinum

wild garlic • bear's garlic • ramsons

Allium ursinum

Colchicum autumnale

Convallaria majalis

Description A typical early spring flower in broad-leaved forests in Europe. It is a perennial bulbous plant with oval-elliptic bright green leaves and white flowers on long stalks that emerge from numerous small bulbs. When the trees become leafy in summer and sunlight is reduced, the leaves of wild garlic plants start to senesce and the aboveground parts die back.

Origin Northern, western and central Europe.

Parts used Freshly harvested leaves (*Allii ursini herba*), sometimes the bulbs (*Allii ursini bulbus*). Most of the sulfur compounds are lost during drying.

Therapeutic category Lipid-lowering, prevention of arteriosclerosis, antibacterial, antiviral.

Uses and properties Wild garlic leaves are a popular spring vegetable and culinary herb in Europe. Some commercial products (especially dietary supplements) contain wild garlic as an ingredient. The plant is used in traditional medicine against digestive ailments, high blood pressure and arteriosclerosis, as well as skin rashes.

Preparation and dosage Intact, freshly harvested leaves are used because alliin is converted to biologically active allicin only in fresh leaves.

Active ingredients Several sulfur-containing compounds (up to 12% in the bulbs) are responsible for the typical smell. Fresh leaves (that are not wilted) and bulbs contain methyl-*L*-cysteinesulphate, alliin, dithiine, γ-glutamylpeptide and flavonoids as main compounds. Alliin is enzymatically converted by alliinase, first to an unstable intermediate product and then to allicin (which is often the main compound in processed material. Minor compounds that are produced include methyl- and dimethylajone.

Pharmacological effects Same as for onion and garlic.

Warning Wild garlic leaves may be confused with those of poisonous plants such as autumn crocus (*Colchicum autumnale*) and lily-of-the-valley (*Convallaria majalis*) which also grow in open broad-leaved forests in spring. Wild garlic can easily be distinguised by the typical taste and smell from similar-looking poisonous plants because the latter have no smell but an extremely bitter taste or they cause a burning sensation in the mouth and throat. These plants can cause serious or even fatal poisoning.

Status Traditional medicine; dietary supplement.

Allium ursinum L. family: Amaryllidaceae (formerly Alliaceae)

ail des ours (French); *Bärlauch* (German); *aglio orsino* (Italian); *ajo de oso* (Spanish)

Aloe ferox

bitter aloe • Cape aloe

Aloe ferox

Tapping of *Aloe ferox*

Leaf in transverse section and aloe lump (Cape aloes)

Description The bitter aloe or Cape aloe is a robust, single-stemmed succulent with broad, spiny leaves and usually bright red or orange flowers in erect, candle-shaped clusters.

Origin Southeastern parts of South Africa. The products are wild-crafted on a sustainable basis.

Parts used The bitter, yellow leaf juice is dried to form a dark brown resinous solid, known commercially as aloe lump or Cape aloes (=*Aloe capensis*). The gel (non-bitter, inner fleshy part of the leaf) is used in tonics and cosmetics.

Therapeutic category Bitters: laxative, tonic; Gel: tonic, wound-healing.

Uses and properties Cape aloes is an important laxative and is included in bitter tonics. The gel has become popular as a health drink. Minor uses include the treatment of arthritis, eczema and conjunctivitis. Extracted and spray-dried leaf gel is used in skin care products.

Preparation and dosage A commercial preparation or a small crystal of the drug (0.05–0.2 g) can be taken orally as a laxative. Half the laxative dose is taken for arthritis. Fresh bitter sap is instilled directly against conjunctivitis and sinusitis.

Active ingredients The main purgative principle (15–30% of aloe lump) is the anthrone C-glucoside aloin (=barbaloin). Aloin occurs as an equal mixture of two stereoisomers, aloin A and aloin B. The wound-healing properties of the gel are ascribed to polysaccharides and glycoproteins and to hydrating, insulating and protective effects.

Pharmacological effects Aloin is converted in the colon by bacteria into aloe-emodin anthrone. Anthrones are responsible for a stimulant laxative action. Molecular targets include a chloride channel and less importantly the Na^+/K^+-ATPase. Anthranoids enhance peristalsis and the secretion of water and inhibit its resorption in the colon. Aloe extracts have antimicrobial, antiviral and cytotoxic properties.

Warning The product has a griping and abortifacient effect and should therefore not be used during pregnancy. Laboratory studies indicate that anthraquinones may be carcinogenic. Anthraquinone-containing laxatives should not be taken for prolonged periods, since K^+ homoeostasis will be changed.

Status Traditional medicine; PhEur8; Comm.E+; ESCOP; WHO 1; HMPC.

Aloe ferox Mill. family: Xanthorrhoeaceae (formerly Asphodelaceae)

aloès féroce (French); *Kap-Aloe, Gefährliche Aloe* (German); *aloe del Capo* (Italian)

Aloe vera

aloe vera • Curaçao aloe

Aloe vera

Aloe vera plantation in Texas

Aloe vera leaves

Description This aloe is a stemless plant with one to several rosettes of thick, fleshy, non-thorny leaves and erect, yellow or red flower clusters.

Origin North Africa. *Aloe vera* is an ancient cultigen and forms the basis of a very large industry, mainly in Central America and the southern USA.

Parts used The gel is the non-bitter, slimy inner leaf pulp, nowadays the main product. This should not be confused with the extremely bitter, yellow leaf exudate, which is dried to a crystalline substance known as Curaçao aloes or Barbados aloes. Pure gel is obtained by cutting away the outer aloin-containing layers of the leaf. Known as "filleting", the process can be done by hand (the best quality) or mechanically. Alternatively the whole leaf is pulped and the aloin removed by filtration (so-called "whole leaf extract").

Therapeutic category Gel: wound-healing, skin care, tonic drink; Bitters: stimulant laxative, bitter tonic (*amarum*).

Uses and properties Curaçao aloes is still used to some extent to treat constipation and as a bitter tonic. Millions of litres of gel are used annually for health drinks and dietary supplements (DS). It is assumed to be beneficial in treating burns and other skin disorders, infections and inflammations, the immune system, diabetes, high cholesterol, and even cancer.

Preparation and dosage The minimum dose to maintain a soft stool is used (20–30 mg aloin per day), while 50–100 ml of the gel may be taken three times a day as a tonic.

Active ingredients Curaçao aloes has aloin (an anthrone C-glucoside) as main laxative compound (up to 38%). The gel contains 0.5–2% solids, including complex polysaccharides (glucomannans), glycoproteins, amino acids, minerals, salicylic acid and enzymes. An acetylated mannan (acemannan, Carrisyn™) is used in wound therapy. Gel used for health drinks is often bitter and mildly laxative (10 ppm or more aloin).

Pharmacological effects Apart from the laxative bitters (see *A. ferox*), the gel has anti-inflammatory, wound-healing and immune-stimulating properties (though not scientifically established in detail).

Warning Chronic laxative use is potentially dangerous (see *A. ferox*).

Status Traditional medicine; DS; Pharm.; PhEur8; Comm.E+; WHO 1 (gel).

Aloe vera (L.) Burm.f. [=*Aloe barbadensis* Mill.] family: Xanthorrhoeaceae (formerly Asphodelaceae)

aloès vrai, *laloi* (French); *Echte Aloe, Aloe vera* (German); *aloe vera* (Italian); *sábila*, *zábila* (Spanish)

Aloysia citrodora

lemon verbena • vervain

Aloysia citrodora

Aloysia citrodora flowers

Lippia javanica

Description Lemon verbena is a perennial shrub of up to 1 m high. The unifoliolate leaves are oblong, more or less hairless and have a strong lemony smell when crushed. They characteristically occur in whorls of three at each node. Tiny white or pale purple flowers are borne in slender clusters, and can be quite attractive when they are present in large numbers.

Origin South America (Argentine and Chile); a popular garden plant in warm and temperate regions.

Parts used Fresh or dried leaves (*Lippiae triphyllae folium*) and essential oil (*Lippiae triphyllae aetheroleum*).

Therapeutic category Digestive, sedative (aromatherapy).

Uses and properties Dried leaves are sold for use as a relaxing health tea (especially in France) and are included in commercial herbal teas. It is considered to be antispasmodic, antipyretic, sedative and stomachic, so that it is used to treat nervous disturbances, colds, fever, asthma, as well as for minor digestive disorders, such as indigestion, colic, flatulence and diarrhoea. The essential oil is used in cosmetic products.

Preparation and dosage A tea can be prepared from 1–2 g of dried herb and taken three times per day.

Active ingredients The plant contains an essential oil, with neral and geranial (the mixture is known as citral) and photocitral A (an artefact formed from citral in the presence of sunlight) as characteristic compounds. Also present are other monoterpenes (borneol, limonene, geraniol, nerol and terpineol) as well as some sesquiterpenoids (caryophyllene, curcumene, myrcenene and isovalerianic acid). Flavonoids include apigenin, luteolin and 6-hydroxylated flavones, together with their methyl esters (eupafolin, hispidulin, eupatorin, and salvigenin).

Pharmacological effects The traditional uses of lemon verbena may be partly explained by the presence of essential oil and flavonoids. The claimed sedative and anxiolytic effects of the tea need to be demonstrated in clinical trials.

Notes Lemon verbena was previously included in *Lippia*. Species of this closely related genus are used as herbal teas in Africa, including *L. javanica* and *L. scaberrima* and in South and Central America *L. dulcis*, *L. graveolens* and *L. lycioides*.

Status Traditional medicine; PhEur8.

Aloysia citrodora Paláu [=*Aloysia triphylla* (L'Hérit.) Britton; =*Lippia citriodora* H.B.K.] family: Verbenaceae

verveine odorante (French); *Zitronenstrauch* (German); *limoncina*, *erba luigia*, *cedrina* (Italian); *verbena olorosa*, *hierba luisa* (Spanish)

Alpinia officinarum

galangal • Siamese ginger • lesser galangal

Alpinia officinarum flowers

Alpinia officinarum rhizome

Alpinia officinarum dried rhizomes

Description A robust, leafy perennial herb of more than 1 m high that grows from thick, fleshy rhizomes below the ground. Clusters of attractive white and purplish flowers are infrequently borne on the stem tips. The plant resembles ginger (*Zingiber officinale*).

Origin Galangal is indigenous to eastern and south-eastern Asia and is widely cultivated, mainly in China, Malaysia, Thailand and India.

Parts used Fresh or dried rhizomes (*Galangae rhizoma*).

Therapeutic category Carminative, digestive tonic, anti-emetic.

Uses and properties The main medicinal use of galangal is as a stomachic to treat dyspepsia and appetite loss. Galangal is a popular ingredient in Chinese cooking and is traditionally used in China as a medicine (TCM) against indigestion, stomach pain, nausea and hiccups. It is also used in traditional Indian and European medicine.

Preparation and dosage Tea made from about 0.5–1 g of dried rhizome is taken half an hour before meals. A daily dose of 2–4 g of the dry product (or its equivalent in fresh form) can be taken. It is also used as a tincture, decoction or in powder form.

Active ingredients Galangal is highly aromatic and contains essential oil (0.5–1%). The main ingredients are monoterpenoids (α-pinene, cineole, linalool), methyl cinnamate and eugenol. The pungent principles are various non-volatile diarylheptanoids (formerly known as galangol), together with phenyl alkyl ketones (known as gingerols). Flavonoids (mainly quercetin and kaempferol glycosides) are also present.

Pharmacological effects Galangal has proven antispasmodic, anti-inflammatory, antibacterial and antimycotic properties. The diarylheptanoids (and also the phenyl alkyl ketones) are known to inhibit prostaglandin biosynthesis.

Notes Other *Alpinia* species that are used in traditional medicine include greater galangal (*A. galanga*) in Southeast Asia, *A. oxyphylla* (fruit; *yi zhi ren*) and *A. katsumadai* (*cao dou cou*) in China, and *A. calcarata* (*rasna*) in India. Seeds of the West African *Aframomum melegueta* (Zingiberaceae) are known as "grains of paradise" and are used medicinally for the same indications as galangal rhizome.

Status Traditional medicine; Pharm.; Comm.E+.

Alpinia officinarum Hance — family: Zingiberaceae

gao liang jiang (Chinese); *galanga* (French); *Echter Galgant* (German); *galanga* (Italian); *galanga* (Spanish)

Althaea officinalis

marshmallow • white mallow

Althaea officinalis

Althaea officinalis flowers

Alcea rosea flowers

Description An erect perennial herb of about 2 m in height, with hairy leaves and attractive pink flowers.

Origin The plant is indigenous to Asia, but has been distributed from Europe to China and became naturalised in America. It is cultivated for medicinal purposes and as ornamental in Europe.

Parts used Mainly the roots (*Althaeae radix*); also the leaves (*Althaeae folium*) and flowers (*Althaeae flos*).

Therapeutic category Anti-irritant, emmolient; expectorant.

Uses and properties Marshmallow root infusions or extracts are traditionally taken orally as a soothing medicine for cough, peptic ulcers and inflammation of the mucosa of mouth, throat and stomach. Leaf infusions or marshmallow syrup (*Sirupus Althaeae*) are used specifically for dry cough associated with irritation and inflammation of the respiratory tract. Externally, preparations are applied to burns, sores and ulcers. Commercially, only the roots are used, while leaves and flowers are popular for self-medication.

Preparation and dosage A daily dose of 6 g of the dried root, 5 g of the leaf (or 10 g marshmallow syrup, in a single dose) is recommended. The herb is extracted in cold or lukewarm water, or in alcohol (but not in hot water). It may be sipped or gargled. For external application, powdered leaves are mixed into ointments.

Active ingredients All parts of the plant contain mucilages (polysaccharides), mainly composed of galacturonic acid, glucuronic acid, galactose, arabinose, and rhamnose, located in special mucilage cells. Roots harvested late in the autumn give the highest yield of mucilage (about 15%), while leaves and flowers usually have less than 10%.

Pharmacological effects The polysaccharides form a protective film over inflamed mucosal tissues and thus reduce irritation. The presence of mucilage leaves no doubt that the herb has anti-irritant properties, but there is some evidence for anti-inflammatory or other beneficial effects. A hypoglycaemic activity has been observed in mice after injection of *A. officinalis* polysaccharides.

Notes The well-known marshmallow sweets were once made from root extracts of this plant. Hollyhock flowers, from *Alcea rosea* (=*Althaea rosea*), seem to be useful for respiratory and inflammatory ailments and as colourant and brightener in herbal teas.

Status Pharm.; PhEur8; Comm.E+; ESCOP; WHO 2, 5; HMPC.

Althaea officinalis L. family: Malvaceae

guimauve (French); *Eibisch* (German); *bismalva*, *altea* (Italian); *malvavisco* (Spanish)

Ammi visnaga

visnaga • khella • bishop's weed

Ammi visnaga umbel

Ammi visnaga leaves

Ammi majus

DESCRIPTION The plant is an erect annual herb with divided, feathery leaves and large, compound umbels of tiny white flowers. The small, dry fruits, often referred to as seeds, are about 2 mm long and have a very bitter taste.

ORIGIN Mediterranean region, from the Canary Islands and Morocco, eastwards to Egypt and Iran. It has become naturalised in South and North America. Commercial cultivation is centred mainly in Egypt, Morocco and Tunisia.

PARTS USED Ripe fruits (*Ammi visnagae fructus*) are used, or more usually standardised extracts thereof.

THERAPEUTIC CATEGORY Antispasmodic, vasodilator, anti-asthmatic.

USES AND PROPERTIES Compounds from the plant, or synthetic derivatives are used as muscle relaxants in the symptomatic treatment of asthma, spastic bronchitis and angina pectoris (sudden chest pain resulting from a lack of oxygen to the heart muscle). Fruits are traditionally used to clean teeth and to treat numerous other ailments, including intestinal colic, the pain of kidney stones (symptomatic relief) and as diuretic.

PREPARATION AND DOSAGE Visnaga fruits are rarely used in the form of tea (0.5 g in a cup of boiling water). Preparations standardised to the level of active compounds in the fruits (khellin or visnadin) are included as ingredients of various commercial formulations (spasmolytics, as well as cardiac, coronary and urological remedies).

ACTIVE INGREDIENTS The main active ingredients are furanocoumarins (khellin, visnagin, khellol) and angular pyranocoumarins (visnadin, samidin, dihydrosamidin).

PHARMACOLOGICAL EFFECTS Visnadin is a powerful vasodilator that acts by blocking calcium channels. Both visnagin and khellin (and synthetic derivatives) have antispasmodic effects.

WARNING Visnaga extracts are no longer considered safe for the treatment of mild angina pectoris. New evidence of negative side-effects (including pseudo-allergic reactions, insomnia, and reversible liver ailments) prompted the German Commission E to withdraw their positive monograph.

NOTES Fruits of a related species, *Ammi majus*, are a commercial source of phototoxic furanocoumarins that are used in photochemotherapy (so-called PUVA) to treat skin disorders (psoriasis, vitiligo). However, long-term treatment may increase the risk of skin and lung cancer.

STATUS Pharm.; WHO 3.

Ammi visnaga (L.) Lam. or ***Visnaga daucoides*** Gaertn. family: Apiaceae

khella (Arabian); *herbe aux cure-dents* (French); *Khellakraut*, *Bischofskraut* (German); *visnaga, kella* (Italian); *viznaga* (Spanish)

Anamirta cocculus

fishberry • Indian berry

Anamirta cocculus leaves

Anamirta cocculus unripe fruits

Anamirta cocculus ripe fruits

Description Perennial climber with heart-shaped, glabrous and shiny leaves. The large pendulous inflorescences bear numerous flowers, each with 9–12 sepals (calyx lobes) but no petals (corolla absent). There are three carpels and more than 10 bracts.

Origin Southeast Asia (Thailand, Indonesia, Papua New Guinea, Philippines), Sri Lanka and India.

Parts used Ripe fruits (*Cocculi fructus*).

Therapeutic category Vertigo (dizziness), Ménière's disease (a disorder of the inner ear that causes sporadic episodes of vertigo, tinnitus and hearing loss), motion sickness.

Uses and properties Severe peripheral vertigo is treated with 1–5 mg picrotoxin (i.v.); for light vertigo a suppository is administered 1–3 times per week.

Preparation and dosage Fruits are used in dilute homoeopathic preparations (mostly D4) in various combination products. To treat travel sickness, fishberries are used at D4 to D6.

Active ingredients The fruits contain 1–1.5% picrotoxin (also called cocculin), a mixture of the sesquiterpenes picrotoxinin and picrotin. The stems and roots accumulate benzylisoquinoline alkaloids such as berberine, palmatine, columbamine and magnoflorine.

Pharmacological effects Picrotin has limited activity but picrotoxinin can cause severe intoxication (in people, a lethal dose of 20–25 mg = 2–3 g of ripe fruits). Picrotoxinin is a non-competative inhibitor of the $GABA_A$ receptor. While γ-amino buturic acid (GABA) is an inhibitory neurotransmitter, picrotoxinin (in low doses) is a stimulant antagonist. In higher doses it causes spasms, similar to those caused by strychnine. Picrotoxin is also used as respiratory stimulant in cases of barbiturate poisoning (barbiturate overdose). Small amounts of picrotoxin can reduce the severity of attacks of vertigo and peripheral nystagmus (involuntary eye movements). Hence the drug can also be used against peripherally related forms of vertigo, including the symptoms of Ménière's disease.

Notes Crushed seeds were formerly used to catch fish (hence the name "fishberry"). They were also used as pesticide against lice and as bitter substance in brewing (to add more "kick" to the beer).

Warning Picrotoxin can lead to severe convulsions and can, even in small doses, increase the severity of seizures in epileptics. Picrotoxin in doses of 1–5 mg has no side-effects in healthy people.

Status Traditional medicine, homoeopathy.

Anamirta cocculus (L.) Wight & Arn. [=*A. paniculata* Colebr.] family: Menispermaceae

Scheinmyrte, *Kokkelspflanze* (German); *coca de Levante* (Spanish)

Ananas comosus

pineapple

Plants of *Ananas comosus*

Description Pineapple is a distinctive perennial herb with rosettes of firm-textured leaves, each of which are sharply toothed along the edges. The purplish flower cluster, including the axis and the bracts, all become fleshy to form the well-known pineapple fruit.

Origin Central America. The plant is now widely cultivated in tropical regions of Africa and Asia.

Parts used Ripe fruit and stems. They are used commercially to extract a mixture of proteolytic enzymes known as bromelain (*Bromelainum crudum*).

Therapeutic category Digestive, anti-inflammatory, anti-oedema.

Uses and properties Bromelain is used to treat post-traumatic and post-operative oedemas (particularly of the nasal passages and sinuses), as well as inflammation. It may be taken for digestive complaints. Pineapple juice is traditionally used as a digestive tonic and diuretic. Plant proteases such as bromelain and papain (obtained from the latex of the unripe fruit of papaya – see *Carica papaya*) are sometimes added to products made from animal pancreatic tissue, aimed at relieving the symptoms of pancreatic insufficiency through replacement therapy. However, there appears to be no strong rationale for the inclusion of proteases in such preparations.

Preparation and dosage Bromelain is administered in the form of tablets. The daily amount of 80–240 mg is taken in two or three doses. The maximum duration of treatment is generally limited to eight or 10 days.

Active ingredients Pineapple contains at least five enzymes collectively known as bromelains. The main compounds are two proteolytic enzymes known as bromelin A and B. Ripe fruits also contain 20 mg per 100 g vitamin C and up to 15% sucrose; esters of caffeic and *p*-coumaric acid with glycerol have been described.

Pharmacological effects Available studies show that bromelain has anti-inflammatory, anti-oedemic, anti-platelet aggregation and fibrinolytic activities. There is evidence that a small percentage of orally administered bromelain may be absorbed into the bloodstream and lymph system. There appears to be sufficient clinical evidence that bromelain is effective in the treatment of post-operative and post-traumatic swelling.

Warning Side-effects of bromelain use include an upset stomach, diarrhoea and allergic reactions.

Status Comm.E+ (bromelain).

Ananas comosus (L.) Merr. [=*A. sativa*] family: Bromeliaceae

ananas (French); *Ananas* (German); *ananasso* (Italian); *piña* (Spanish)

Andrographis paniculata

king of bitters • kalmegh • Indian echinacea

Andrographis paniculata plant

Andrographis paniculata flowers

Description A sparse, erect annual herb (0.3–1.1 m high) with square stems. The leaves are narrowly lanceolate (25 × 80 mm) with scalloped margins and pale lower surfaces. The pinkish white flowers are two-lipped (2-dentate upper- and 2-lobed lower lips) and occur in racemose or paniculate inflorescences. Numerous seeds are borne in oblong-cylindrical fruit capsules.

Origin Mainly India and Sri Lanka; introduced to (and cultivated in) tropical and subtropcial parts of Asia (Malaysia, Indonesia, Java) as well as the Caribbean and tropical America.

Parts used Leaves and stems (*Andrographidis paniculatae folium*).

Therapeutic category Anti-inflammatory, antibiotic.

Uses and properties The plant is an ancient adaptogen of Ayurvedic and Traditional Chinese Medicine; in India it is often referred to as "Indian echinacea". It is used as stomachic and tonic, and in traditional Indian medicine also against diarrhoea, colitis, rheumatic ailments and fever. In Traditional Chinese Medicine, the dry herb (*chuan xin lian*) is used against feverish colds, pharyngitis, ulcers in the mouth and throat, whooping cough and exhaustion. Clinical data support the use of the drug as prophylaxis and as treatment for infections of the upper respiratory tract (including colds, sinusitis, bronchitis, tonsillitis) and urinary tract, as well as acute diarrhoea.

Preparation and dosage Against fever: a decoction of 3 g of dry herb per day; to treat colds: 1.5–3.0 g of dried and powdered herb three times per day; to treat diarrhoea: 3–9 g of the crude drug.

Active ingredients The main active compounds are bitter diterpene lactones (6%), including andrographolide, desoxyandrographolide, andrographiside, andropanoside and paniculin.

Pharmacological effects The drug has an anti-inflammatory action that has been demonstrated *in vitro* (in cell models). It inhibits the synthesis of inflammatory mediators such as prostaglandin E2, leukotriene B2, interleukin-1β. Studies have shown positive effects on coughs, nasal symptoms, headaches, fever, sore throat, earache, fatigue, sleep disturbances and bacterial diarrhoea. Andrographolide shows a pronounced anti-inflammatory action and has antiviral activity against HIV-1.

Status Traditional medicine (TCM, Ayurveda, Siddha); WHO 2, HMPC.

Andrographis paniculata (Burm.f.) Nees. [=*Justicia paniculata* Burm.f.] Family: Acanthaceae

kalmegh (Bengali); *chuan xin lian* (Chinese); *Andrographiskraut, Kalmegh* (German); *kiratyat* (Hindi); *kalamegha, bhunimba* (Sanskrit)

Anethum graveolens

dill

Anethum graveolens flowering plant

Anethum graveolens fruits

Anethum graveolens flowers

Description Dill is a slender annual herb with bright green leaves that are pinnately divided into numerous thin segments, giving them a feathery appearance. The typical flower heads are borne at the tips of hollow stems and the small, dry fruits (mericarps) are flattened, with pale brown, narrow marginal wings.

Origin Unclear (perhaps southwestern Asia); the plant has been cultivated since ancient times in Egypt, Asia and Europe.

Parts used Mainly the small, dry fruits (*Anethi fructus*) – usually referred to as seeds, also the aerial parts (*Anethi herba*) and volatile oil (*Anethi aetheroleum*).

Therapeutic category Stomachic, carminative, diuretic.

Uses and properties Dill fruits are traditionally used to treat dyspepsia, flatulence, other digestive disorders and as a diuretic. Dill "seeds" are particularly well known as an ingredient of baby's gripe water, used to treat colic and flatulence. The plant has a very long history of medicinal use (mentioned already in Ebers Papyrus, about 1500 BC) and was usually considered to be soothing and calming (hence the name dill, derived from the Norse word *dylla* – to soothe). Dill is also well known as a culinary herb and the fresh leaves are traditionally used to flavour fish.

Preparation and dosage A daily dose of about 3 g of the whole fruits ("seeds"), taken as an infusion or tincture, is recommended for dyspeptic complaints. In the case of the essential oil, 0.1–0.3 g is considered an appropriate daily dose.

Active ingredients Dill contains volatile oil in the fruit, of which carvone is the main constituent. Flavonoids, furanocoumarins and coumarins may also contribute to the beneficial effects of the herb.

Pharmacological effects Dill fruits are known to have antispasmodic and bacteriostatic effects. Volatile oils in general are well known for their carminative and diuretic properties.

Note Several other well-known culinary herbs of the Apiaceae, such as *Apium graveolens* (celery), *Carum carvi* (caraway), *Coriandrum sativum* (coriander), *Foeniculum vulgare* (fennel) and *Petroselinum crispum* (parsley) also have volatile oils and furanocoumarins. They are typically used as stomachics, carminatives, diuretics and emmenagogues.

Status Pharm.; Comm.E+ (fruits only).

Anethum graveolens L. family: Apiaceae

shiluo, huixiang (Chinese); *aneth* (French); *Dill* (German); *savaa* (Hindi); *aneto* (Italian); *eneldo* (Spanish)

Angelica archangelica

garden angelica • archangel

Angelica archangelica plants

Angelica archangelica flowers

Angelica archangelica fruits

Description Angelica is a robust biennial herb with large, compound leaves, sheathing leaf bases and thick, ridged, hollow flowering stems. Small, greenish white flowers are borne in rounded clusters and the fruits (mericarps) are relatively large, flattened and winged.

Origin Eurasia. It is commonly cultivated.

Parts used Mainly the roots (*Angelicae radix*), sometimes the whole herb (*Angelicae herba*), fruits or essential oil (*Oleum angelicae*).

Therapeutic category Appetite stimulant, stomachic, spasmolytic.

Uses and properties Angelica root is nowadays specifically recommended for the treatment of appetite loss, stomach cramps and flatulence. Dried roots and root extracts are of commercial importance in alcoholic beverages (e.g. benedictine) and in the flavour industry.

Preparation and dosage Infusions or tinctures of the dried root are taken. The daily dose is 4.5 g of dry root (or an equivalent dose), or 10–20 drops of the essential oil. Root extracts are used as ingredients of various commercial preparations to treat digestive ailments.

Active ingredients The plant is rich in furanocoumarins, including xanthotoxin, imperatorin, angelicin, archangelin and coumarins such as umbelliferone, osthol, osthenol, and others. Osthol is the major compound in roots, imperatorin in fruit. The essential oil of the roots and fruits have α-phellandrene, β-phellandrene and α-pinene as main ingredients.

Pharmacological effects The pharmacology appears to be poorly known but the plant stimulates the flow of gastric juices and has definite antispasmodic and cholagogue activities.

Warning Furanocoumarins are phototoxic (they form DNA adducts) and may cause skin irritation and allergic reactions when taken in large amounts. As a result, the levels of these compounds in skin tanning lotions are controlled.

Notes The roots of *Angelica polymorpha* var. *sinensis* (=*A. sinensis*) (*dang gui*; Chinese angelica), *A. pubescens* and *A. dahurica* (*bai zhi*) are very important in traditional Chinese medicine. Chinese angelica is considered to be second only to ginseng in terms of its value as a tonic. It is used for some types of anaemia, constipation, irregular menstruation, pain and numerous other ailments.

Status TCM; PhEur8; Comm.E+ (root only); ESCOP Suppl.; Chinese angelica: WHO 2; HMPC.

Angelica archangelica L. family: Apiaceae

archangélique (French); *Engelwurz* (German); *archangelica* (Italian); *angélica* (Spanish)

Apium graveolens

celery

Apium graveolens stems and leaves

Apium graveolens field

Apium graveolens tubers (celeriac)

Description Annual or short-lived perennial herb (0.4–1.0 m high). The root is spindle-shaped, branched and woody. The erect stems are hollow, with edged grooves on the outer surface. The leaves are glossy dark green and pinnate (or sometimes bipinnate in modern cultivars). Flowers occur in short umbels with about 12 rays. The small petals are pure white or rarely yellowish or greenish. The small, dry fruits (often referred to as "seeds") are ovoid, 1.5–2 mm in diameter and have corky ribs.

Origin Cosmopolitan distribution. Probably domesticated in the Mediterranean region. The wild form (swamp celery) occurs in central Europe.

Parts used Stems and leaves (*Apii herba*), celery fruits (*Apii fructus*), essential oil distilled from the fruits (*Oleum Apii aetheroleum e fructibus*) as well as the tuberous roots (*Apii radix*). It is nowadays rarely used as a drug. Three types of celery are popular vegetables: Chinese celery, stalk celery (often blanched) and celeriac (turnip-rooted celery).

Therapeutic category Diuretic.

Uses and properties The herb, fruits and roots are traditionally used as mild diuretics to treat bladder and kidney problems, as adjuvant in rheumatic conditions and as carminative for stomach ailments. Celery was known to the ancient Greeks and Romans as diuretic and stimulant digestive (described by Dioscorides and Theophrastus).

Preparation and dosage There is no recent clinical evidence to guide the dosage. A typical dose of fruits (for carminative use) is 1–4 g.

Active ingredients All plant parts contain essential oil, rich in monoterpenes (limonene, ca. 60%) and butylphthalides (with their characteristic odour), as well as coumarins, furanocoumarins (bergapten, isoimperatorin, xanthotoxin), flavonoids (gravaeobioside A and B, luteolin-7-apiosylglucoside, chrysoeryol-7-apiosylglucoside, apiin, isoquercitrin), phenol-carboxylic acids (ferulic and chlorogenic acids) and polyenes (falcarinone). Fruits yield 1.9–3% and roots 0.01–0.15% essential oil.

Pharmacological effects Furanocoumarins intercalate/alkylate DNA, resulting in photodermatosis.

Notes Do not use in case of existing kidney inflammation. Allergies and photodermatoses are possible because of the presence of furanocoumarins. Celeriac has a traditional reputation of being an aphrodisiac (hence the German common name "Geilwurz").

Status Traditional medicine.

Apium graveolens L. family: Apiaceae

fan qin cai, qin cai (Chinese); *céleri* (French); *Sellerie* (German); *sedano* (Italian); *apio* (Spanish)