

Pharmacokinetics

Bethanechol chloride is poorly absorbed from the gastrointestinal tract. It is not hydrolysed by cholinesterases. At standard doses bethanechol does not cross the blood-brain barrier.

Uses and Administration

Bethanechol chloride, a choline ester, is a quaternary ammonium parasympathomimetic that mainly exhibits the muscarinic actions of acetylcholine (p.1877). It is not inactivated by cholinesterases so its actions are more prolonged than those of acetylcholine. Bethanechol chloride has little if any nicotinic activity and is used for its actions on the bladder and gastrointestinal tract. It has been used as an alternative to catheterisation in the treatment of urinary retention and has also been used for gastric atony and retention, abdominal distension following surgery, congenital megacolon, and gastro-oesophageal reflux disease.

Bethanechol chloride is given in usual doses of 5.15 mg subcutaneously or 10 to 50 mg orally, both up to 4 times daily, but dosage must be adjusted individually. Oral doses should be taken on an empty stomach. The effects usually occur within 5 to 15 minutes of a subcutaneous dose, or 30 to 90 minutes of an oral dose, and disappear within about 1 to 2 hours depending on the dose and route. However, large oral doses (300 to 400 mg) may produce effects for up to 6 hours. For a warning to avoid intravenous or intramuscular use, see under Precautions, above.

Decreased gastrointestinal motility. Parasympathomimetics such as bethanechol enhance gastric contractions and increase intestinal motility and form just one of many treatments that have been used in conditions associated with decreased gastrointestinal motility (p.1694).

Gastro-oesophageal reflux disease. Prokinetic drugs such as bethanechol have been tried in gastro-oesophageal reflux disease (p.1696).

References.

1. Thanick KD, *et al.* Reflux esophagitis: effect of oral bethanechol on symptoms and endoscopic findings. *Ann Intern Med* 1980; **93**: 805–8.
2. Saco LS, *et al.* Double-blind controlled trial of bethanechol and antacid versus placebo and antacid in the treatment of erosive esophagitis. *Gastroenterology* 1982; **82**: 1369–73.
3. Thanick K, *et al.* Bethanechol or cimetidine in the treatment of symptomatic reflux esophagitis: a double-blind control study. *Arch Intern Med* 1982; **142**: 1479–81.
4. Strickland AD, Chang JHT. Results of treatment of gastro-oesophageal reflux with bethanechol. *J Pediatr* 1983; **103**: 311–15.

Stuttering. A double-blind placebo-controlled study¹ in 10 patients with stuttering (p.1001) on the whole failed to confirm an earlier report² of benefit using bethanechol although 2 patients who did respond elected to continue treatment after the study.

1. Kampman K, Brady JP. Bethanechol in the treatment of stuttering. *J Clin Psychopharmacol* 1993; **13**: 284–5.
2. Hays P. Bethanechol chloride in treatment of stuttering. *Lancet* 1987; **i**: 271.

Urinary incontinence and retention. Bethanechol is one of the parasympathomimetics that have been given to increase detrusor activity in patients with overflow incontinence, but there have been doubts about the effectiveness of such treatment (see p.2180). Bethanechol was also one of the parasympathomimetics used in the management of postoperative urinary retention but they have generally been superseded by catheterisation.

References.

1. Finkbeiner AE. Is bethanechol chloride clinically effective in promoting bladder emptying: a literature review. *J Urol (Baltimore)* 1985; **134**: 443–9.
2. Kemp B, *et al.* Prophylaxis and treatment of bladder dysfunction after Wertheim-Meigs operation: the positive effect of early postoperative detrusor stimulation using the cholinergic drug bethanecholchloride. *Int Urogynecol J Pelvic Floor Dysfunct* 1997; **8**: 138–41.
3. Riedl CR, *et al.* Electromotive administration of intravesical bethanechol and the clinical impact on acontractile detrusor management: introduction of a new test. *J Urol (Baltimore)* 2000; **164**: 2108–11.

Preparations

USP 31: Bethanechol Chloride Injection; Bethanechol Chloride Oral Solution; Bethanechol Chloride Oral Suspension; Bethanechol Chloride Tablets.

Proprietary Preparations (details are given in Part 3)

Arg.: Miotonachol; **Austral.:** Urocarb; **Austria:** Myocholine; **Belg.:** Myocholine; **Braz.:** Liberan; **Canad.:** Duvoid; Myotonachol; **Ger.:** Myocholine; **India:** Urotone; Urotonine; **Israel:** Urocholine; **Switz.:** Myocholine; **Thai.:** Ucholine; Urocholine; **UK:** Myotonine; **USA:** Myotonachol; Urocholine.

Bibrocathol (INN)

Bibrocathin; Bibrocatholum; Bibrocato; Bibrokatol; Bibrokatoli; Bismuth Tetrabromopyrocatechinate; Tetrabromopyrocatechol Bismuth. 4,5,6,7-Tetrabromo-2-hydroxy-1,3,2-benzodioxabis-mole.

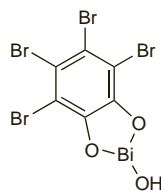
Биброкато́л

$C_6H_5Br_4O_3 = 649.7$.

CAS — 6915-57-7.

ATC — S01AX05.

ATC Vet — QS01AX05.

**Profile**

Bibrocathol is a bismuth-containing compound that has been applied topically in the treatment of eye disorders, wounds, and burns.

Preparations**Proprietary Preparations** (details are given in Part 3)

Ger.: Noviform; Posiformin; **Swed.:** Noviform; **Switz.:** Noviform†.

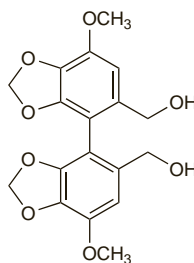
Multi-ingredient. Ger.: Novifort†.

Bicyclol

4,4'-Dimethoxy-5,6,5',6'-bis(methylene-dioxy)-2-hydroxymethyl-2'-methoxycarbonyl biphenyl.

Бицикло́л

$C_{19}H_{18}O_9 = 390.3$.

**Profile**

Bicyclol has been used as a hepatoprotectant in the management of hepatitis. It has been given orally in a dose of 25 or 50 mg three times daily for at least 6 months.

References.

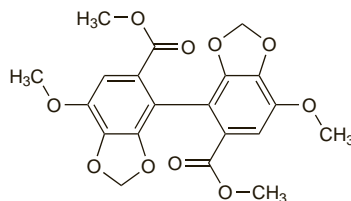
1. Liu Q, *et al.* A useful agent for chemoprevention of hepatocellular carcinoma? *Cancer Biol Ther* 2006; **5**: 1674–6.
2. Wu T, *et al.* Bicyclol for chronic hepatitis B. Available in The Cochrane Database of Systematic Reviews; Issue 4. Chichester: John Wiley; 2006 (accessed 01/05/08).
3. Yang XY, *et al.* Bicyclol for chronic hepatitis C. Available in The Cochrane Database of Systematic Reviews; Issue 1. Chichester: John Wiley; 2007 (accessed 01/05/08).

Bifendate

Dimethyl 7,7'-dimethoxy-(4,4'-bi-1,3-benzodioxole)-5,5'-dicarboxylate.

$C_{20}H_{18}O_{10} = 418.4$.

CAS — 73536-69-3.

**Pharmacopoeias.** In *Chin.***Profile**

Bifendate is derived from schisandra (see p.2384). It is used in Chinese medicine for chronic hepatitis.

Bifendate has been reported to reduce blood concentrations of ciclosporin (see p.1826).

Bile Acids and Salts

Biliares, ácidos y sales.

CAS — 81-25-4 (cholic acid); 11006-55-6 (sodium tauroglycocholate); 361-09-1 (sodium cholate).

Pharmacopoeias. *Jpn* includes bear bile.

Profile

The principal primary bile acids, cholic acid and chenodeoxycholic acid (p.2280), are produced in the liver from cholesterol and are conjugated with glycine or taurine to give glycocholic acid, taurocholic acid, glycochenodeoxycholic acid, and taurochenodeoxycholic acid, before being secreted into the bile where they are present as the sodium or potassium salts (bile salts). Secondary bile acids are formed in the colon by bacterial deconjugation and 7 α -dehydroxylation of cholic acid and chenodeoxycholic acid, producing deoxycholic acid and lithocholic acid, respectively. Ursodeoxycholic acid (p.2408) is a minor bile acid in man although it is the principal bile acid in *bears*. Dehydrocholic acid (p.2292) is a semisynthetic bile acid.

The total body pool of bile salts is about 3 g, and most of the secreted bile salts are reabsorbed in a process of enterohepatic recycling, so that only a small fraction of this amount must be synthesised *de novo* each day.

Bile salts are strongly amphiphilic; with the aid of phospholipids they form micelles and emulsify cholesterol and other lipids in bile. Oral administration of chenodeoxycholic acid also reduces the synthesis of cholesterol in the liver, while ursodeoxycholic acid reduces biliary cholesterol secretion apparently by increasing conversion of cholesterol to other bile acids. The bile acids (but not the bile salts) also have a choleric action, increasing the secretion of bile, when given by mouth.

Chenodeoxycholic acid and ursodeoxycholic acid are given by mouth in the management of cholesterol-rich gallstones (p.2409) in patients unsuited to, or unwilling to undergo, surgery. Ursodeoxycholic acid is also being studied in some liver disorders.

Preparations containing bile salts have been used to assist the emulsification of fats and absorption of fat-soluble vitamins in conditions in which there is a deficiency of bile in the gastrointestinal tract. Ox bile has also been used in the treatment of chronic constipation. Cholic acid is used for the treatment of inborn errors in primary bile synthesis.

Sodium cholate has been used for its spermicidal properties in barrier contraceptives.

Preparations**Proprietary Preparations** (details are given in Part 3)

Chile: Desicol; **Ger.:** Cholecysmon†; **Mex.:** Virulizin; **Rus.:** Festal (Dectra); **S.Afr.:** Bilron†; **Venez.:** Hepa-Desicol.

Multi-ingredient. Arg.: Bibol Leloup; Bil 13; Bilagol; Bilidren; Bilosan Compuesto†; Carbogasol Digestivo; Cascara Sagrada Bouzent†; Digesplen; Gastron Fuerte†; Hepatolagina; Nilflux; Opobyl; Pankreon Compuesto†; Veracolate; Zimerol; **Austral.:** Digestaid; Enzyme; Lexat†; **Austria:** Arca-Enzyme; Buccalin; **Belg.:** Buccaline; Grains de Vals; **Braz.:** B-Vesil; Dasc; Emagrex†; Figatil; Jurubleno†; Nutrizim†; **Canad.:** Bicholate; Herbalax†; Laxative†; Protectaid; **Chile:** Combizym Compositum; Combizym†; Flapex E; Hepabil; K.C.M.C; Katin; Onoton†; **Cz.:** Combizym Compositum; **Fin.:** Combizym Compositum; **Fr.:** Rectopaniline; **Ger.:** Combizym Compositum†; **Hong Kong:** Bilisan; Buccaline†; Enzyme; Hepatofalk; Protectaid; Topaset†; **Hung.:** Combizym Compositum†; **India:** Digelex-T; Dispeptal†; Farizym; Ipeptal†; Merckenzym; Panolaset†; Papytazyme; **Indon.:** Benozym; Berzymplex; Cotazym Forte; Enzymfort; Enzyme; Eviprost†; Pankreon Comp; **Israel:** Encypalmel; **Ital.:** Solvobil; **Malaysia:** Enzyme; **Mex.:** Dirfaben†; Dixifen; Espaven Enzimatico; Ochozoin; Onoton; Zimeton; **NZ:** Buccaline; **Port.:** Byli†; Caroid†; Combizym Compositum†; Fermetone Compoto; **Rus.:** Ipeptal (Ipeptal); **Singapore:** Enzyme; **Spain:** Menabil Complex†; **Swed.:** Combizym Compositum; **Switz.:** Buccaline; Combizym Compositum; **Thai.:** Buccaline†; Combizym Compositum; Enzyme; Papytazyme†; Veracolate; **Turk.:** Flaton; Intestinal; Multanzim; Pankrodigest; **UK:** Protectaid; **USA:** Digepepsin; **Venez.:** Combizym Forte; Nutizym Compositum; Pankreon Compositum; Stamy†.

Birch Leaf

Abedul, hojas de; Beržų lapai; Betulae folium; Birkenblätter; Björkblad; Bouleau; Bouleau, feuille de; Březový list; Koivunlehti; Lišč brzozy; Njyřaleví; Silver Birch Leaf.

Pharmacopoeias. In *Eur.* (see p.vii).

Ph. Eur. 6.2 (Birch Leaf). The whole or fragmented dried leaves of *Betula pendula* and/or *B. pubescens* as well as hybrids of both species. It contains not less than 1.5% of flavonoids, calculated as hyperoside ($C_{21}H_{20}O_{12} = 464.4$), with reference to the dried drug. Protect from light.

Profile

Birch leaf is used in herbal medicine, particularly for urinary tract disorders. Birch leaf oil has also been used.

Preparations**Proprietary Preparations** (details are given in Part 3)

Ger.: Urorenal†.

Multi-ingredient. Arg.: Sequals G; **Austral.:** Guaiacum Complex†; **Austria:** Blasente St Severin; Heumann's Blasen- und Nierentee; Rheuma; Solubrat; **Cz.:** Abführ-Heilkräutertee†; Blasen- und Nierentee†; Cajova Smes pri Redukcni Diete†; Fytokliman Planta; Nephrosal†; Reduktan; Senalac; Species Diureticae Planta†; Species Urologicae Planta; Stoffwechseltee N†; Urologicka Cajova Smes; **Fr.:** B.O.P; Depuratum; Drainactil; Mediflor no 11 Draineur Renal et Digestif; Mediflor Tisane Antirhumatismale No 2; **Ger.:** Anthypertonicum S; BioCyst; Canephron novot†; Cystinol N; Dr Wiemanns Rheumatonikum; Dr Scheffler Bergischer Kräutertee Blasen- und Nierentee; Hamtee 400 N; Hamtee STADA; Hamtee-Steiner; Heumann Blasen- und Nierentee Solubrat S†; Heumann Blasen- und Nierentee Solubrat uro; Hamtee-Blasen-Nieren-Tee N; Hweberberol-Tee; Nephropasc†; Nephronorm med†; Nephropur tri†; Nephroselect M; Nephrobrin-N†; Nierentee 2000†; Nieren-Blasen- und Nieren-Tee V†; Nieren-Tee N†; Presselin Nieren-Blasen K 3†; Renob Blasen- und Nierentee; Urodiol phyto†; **Ital.:** Betulla (Specie Composita)†; Gramigna (Specie Composita)†; Lipaven; Listerine Fresh Citrus; Listerine Tartar Control; **Pol.:** Betasol; Diabetofort; Herbaton; Nefrobonisil; NeoFitolizyn; Urosept; **Rus.:** Herbon Urological

Drops (Гербийон Урологические Капли); Sibectan (Сибектан); **S.Afr.:** Arnica Massage Oil; **Spain:** Diurinat; Genurat; Natusor Artlane†; Natusor High Blood Pressure†; Natusor Renal†; Rensus†; Tensibent†; **Switz.:** Dragées S pour les reins et la vessie; Nephrosolid; Phytomed Nephro†; Tisane Diurétique; Tisane pour le cœur et la circulation; Tisane pour les reins et la vessie; Urinex; **UK:** Massage Balm with Calendula.

Black Catechu

Cutch.
CAS — 8001-76-1.

NOTE. Distinguish from Catechu (p.2278).

Pharmacopoeias. In *Chin*.

Profile

Black catechu is an extract from *Acacia catechu* (Leguminosae) that is used as an astringent.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **India:** Arowash.

Black Currant

Blackcurrant; Cassis; Grosella negra (casis); Rib. Nig.

Pharmacopoeias. *Br.* includes the fruit.

Fr. includes the leaf.

BP 2008 (Black Currant). The fresh ripe fruits of *Ribes nigrum* together with their pedicels and rachides. It has a strong, characteristic odour and a pleasantly acidic taste.

Profile

Black currant fruit is a source of vitamin C (p.1983). It is used to prepare black currant syrup, which is used as a nutritional supplement and as a flavour.

Black currant leaf is included in herbal preparations for urinary, musculoskeletal, and gastrointestinal disorders. Black currant is reported to contain bioflavonoids and is also included in preparations for vascular disorders. It has also been used as a diuretic in folk medicine.

Black currant seed oil (below) is used as a source of gamolenic acid (see p.2308).

Preparations

BP 2008: Black Currant Syrup.

Proprietary Preparations (details are given in Part 3)

Braz.: Tili.

Multi-ingredient: **Austria:** Amersan; **Cz.:** Amersan; **Fr.:** Arkophytum†; Drainactil; Hydracur; IgeE; Maxidrainet†; Mediflor no 11 Draineur Renal et Digestif†; Mediflor Tisane Antirhumatisme No 2; Mincifit; Resource; Rhubagil; Veinobiase; **Ger.:** Venobiase†; **Ital.:** Nepiros; Ribovin†; **Pol.:** Melisal; Melised; **Spain:** Exodren; Fitosvelt†.

Black Currant Seed Oil

Blackcurrant seed oil.

Profile

Black currant seed oil is derived from the seeds of *Ribes nigrum* (Grossulariaceae). It contains gamolenic acid (p.2308) and is used similarly to evening primrose oil (p.2302).

Preparations

Proprietary Preparations (details are given in Part 3)

Austral.: Proglan†.

Black Haw

American Sloe; Nanny Bush; Stag Bush.

Калина Сивомистная

Pharmacopoeias. In *Fr.*

Profile

The bark of black haw, *Viburnum prunifolium* (Adoxaceae) is claimed to have spasmolytic activity on uterine and other smooth muscle. It is included in herbal preparations for peripheral vascular disorders and menstrual disorders. The root bark is also used.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **Braz.:** Bromidrastina†; Gineburno†; **Canad.:** Thunas Tab for Menstrual Pain†; **Fr.:** Aphloine P; Climaxol; Jouvence de l'Abbe Soury; Phlebosedol†; **Mex.:** Reglosedy†; **Mon.:** Fluon.

Black Nightshade

Hierba mora; Morelle Noire.

Profile

Black nightshade is the leaves and flowering tops of the black or garden nightshade, *Solanum nigrum* (Solanaceae). It contains solanine and its allied alkaloids. Black nightshade is distributed throughout most of the world as a weed of cultivation. It appears to have little medicinal value but was used in liniments, poultices, and decoctions for external application. Ingestion can cause typical antimuscarinic effects that may require treatment as described under Atropine, p.1220.

The symbol † denotes a preparation no longer actively marketed

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **Pol.:** Liv 52; **Rus.:** Дипана (Дипана); Liv 52 (Лив 52).

Blackthorn

Black Thorn; Épine noir; Prugnolo; Prundier; Schlehe; Schwarzdorn; Sloe.

Тёрн; Терновник

Profile

The flowers of the blackthorn or sloe, *Prunus spinosa* (Rosaceae), are included in herbal preparations for constipation and urinary-tract disorders.

The fruit (sloes) are used for mild inflammation of oral and pharyngeal mucosa.

Prunus spinosa is used in homeopathic medicine.

Culinary uses of sloes include preserves and as a flavour in alcoholic beverages.

Preparations

Proprietary Preparations (details are given in Part 3)

S.Afr.: Schlehen Elixir.

Multi-ingredient: **Ger.:** Nasenbalsam; Nasenbalsam für Kinder; **S.Afr.:** Lotio Pruni Comp cum Cupro; **Switz.:** Wala Baume nasal; Wala Baume nasal doux.

Blue Cohosh

Caulófilo; Caulophyllum; Papoose Root; Squaw Root.

NOTE. Distinguish from Black Cohosh, which is *Cimicifuga*, p.2282.

Profile

Blue cohosh, the rhizome and roots of *Caulophyllum thalictroides* (Berberidaceae), has uterotonic and antirheumatic properties. It is used for menstrual and other gynaecological disorders.

Homeopathy. Blue cohosh has been used in homeopathic medicines under the following names: Caulophyllum; Caulophyllum thalictroides; Caulph.

Adverse effects. Acute myocardial infarction associated with profound congestive heart failure and shock has been reported in a newborn infant whose mother ingested blue cohosh to promote uterine contractions.¹

1. Jones TK, Lawson BM. Profound neonatal congestive heart failure caused by maternal consumption of blue cohosh herbal medication. *J Pediatr* 1998; **132**: 550–2.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **Austral.:** Dyzzo; Lifesystem Herbal Formula 4 Women's Formula†; Women's Formula Herbal Formula 3†.

Bog Myrtle

Sweet Gale.

NOTE. Bog myrtle has also been used as a common name for *Mentha trifoliata* (see *Mentha*, p.2340). Bayberry (see p.2263) has also been used as a synonym for bog myrtle.

Profile

The essential oil obtained from bog myrtle, *Myrica gale* (Myricaceae), has been used as an insect repellent.

Preparations

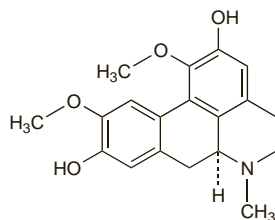
Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **UK:** MuzzyOff Cocktail.

Boldo

Boldi folium; Boldo, feuille de; Boldo Folium; Boldo Leaves; Boldoblád; Boldólevél; Boldonlehti; Boldovníkový list; Kva-pijúq čilmedžij lapai; Liść boldo; Peumus.

CAS — 476-70-0 (*boldine*); 1398-22-7 (*boldoglucin*).



(boldine)

Pharmacopoeias. In *Eur.* (see p.vii), which also includes Boldo Leaf Dry Extract.

Fr. includes Boldine.

Ph. Eur. 6.2 (Boldo Leaf). The whole or fragmented dried leaf of *Peumus boldus*. It contains not more than 4% v/w of essential oil calculated with reference to the anhydrous drug. It contains not less than 0.1% of total alkaloids, expressed as boldine ($C_{19}H_{21}NO_4 = 327.4$), calculated with reference to the anhydrous drug. It has a characteristic odour especially when rubbed. Protect from light.

Profile

Boldo is employed in herbal medicine as a diuretic, for hepatobiliary disorders and for gastrointestinal disorders such as constipation. The alkaloid boldine is also used.

Homeopathy. Boldo has been used in homeopathic medicines under the following names: Peumus boldus.

Preparations

Proprietary Preparations (details are given in Part 3)

Braz.: Prinachol; **Mex.:** Bliz.

Multi-ingredient: **Arg.:** Bil 13; Biliosan Compuesto†; Boldina; Digenat; Dioxicolagol; Drenocol†; Hepacur; Hepatagina; Hepatodirectol; Hepatotal Family†; Herbaccion Dig Fresh†; Herbaccion Digestivo†; Metigen; Opobyl; Radicura; Trixol†; **Austral.:** Berberis Complex; Lexat†; **Austria:** St Bonifatius-Tee; **Braz.:** Alcafelol†; Alcaflor†; Bilifelt†; Boldopeptan†; Boljuprima†; Colachofra; Dorveran†; Ductoveran; Emagrevit†; Eparema; Figatil; Gotas Digestivas; Hepatogregius†; Jurubleno†; Solvobil; **Chile:** Hepabil; Nature Complex Reduct-Te; Reduct-Te; Te Laxante; **Cz.:** The Salvat; **Fr.:** Bolditol; Drainactil; Elixir Spark; Grains de Vals; Hepaclem; Hepax; Jecopeptol; Mediflor no 11 Draineur Renal et Digestif†; Mediflor Tisane Hepatique No 5; Mucinum a l'Extrait de Cascara; Opobyl; Oxyboldine; Petites Pilules Carters; Solution Stago Diluee; Tisane Hepatique de Hoerd†; Vegela†; **Ger.:** Cynarzym N†; Gallemolan G†; Heumann Leber- und Gallente Solu-Hepar S†; Heumann Verdaungstee Solu-Lipar; **Hong Kong:** Mucinum Cascara†; **Ital.:** Amaro Medicinale; Boldina He; Caramelle alle Erbe Digestive; Coladren; Colax; Confeetti Lassativi CM; Critichol; Digela†; Dis-Cinil Complex; Eparema; Eparema-Levul; Eupatol; Frangulina†; Hepatos; Hepatos B12; Magisbile†; Mepalax; Schias-Amaro Medicinale†; Solvobil; **Mex.:** Chofabot; Hopedren; Ifuchol; Peptochol†; **Pol.:** Boldaloin; Boldovera; **Port.:** Mucinum; **Spain:** Boldolaxin†; Menabil Complex†; Natusor Hepavescal†; Nico Hepatocyn; Odisor†; Opobyl; Resolutivo Regium; Solucion Schoum; **Switz.:** Boldocynara; Heparfelen; Stago N†; Tisane hepatiche et biliaire; **UK:** Adios; Boldex; HealthAid Boldo-Plus; Weight Loss Aid; **Venez.:** Cynascocool; Natrossil.

Boneset

Feverwort; Thoroughwort.

NOTE. Boneset has also been used as a common name for *Symphytum officinale* (see Comfrey, p.2286).

Profile

Boneset, the aerial parts of *Eupatorium perfoliatum* (Compositae), has diaphoretic and immunostimulant properties and has been used in the treatment of fever, influenza, the common cold, and other upper respiratory-tract disorders.

Homeopathy. Boneset has been used in homeopathic medicines under the following names: Eupatorium perfoliatum; Eup. perf.

◇ References.

1. Habtemariam S, Macpherson AM. Cytotoxicity and antibacterial activity of ethanol extract from leaves of a herbal drug, boneset (*Eupatorium perfoliatum*). *Phytother Res* 2000; **14**: 575–7.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **Austral.:** Flavos; **UK:** Catarrh Mixture.

Borage

Borrajá; Bourrache.

Pharmacopoeias. *Fr.* includes monographs for flowers and flowering tops.

Profile

The aerial parts of borage *Borago officinalis* (Boraginaceae), have been used in herbal medicine as a demulcent and emollient. However, it contains pyrrolizidine alkaloids that may be toxic and internal use is not recommended.

Borage seeds are the source of borage oil (below), which is used as a source of gamolenic acid.

Preparations

Proprietary Preparations (details are given in Part 3)

Chile: Dexol.

Multi-ingredient: **Chile:** Celltech Gold; **Ital.:** Sclerovis H; **Mex.:** Aven-dix; **NZ:** Mr Nits.

Borage Oil

Boraginis Oleum; Borage officinalis oleum; Borrajá, aceite de; Bourrache, huile de; Brútnákový olej; Gürkörtolja; Purasruo-hoöljy; Starflower Oil; Vaistinių augurkių aliejus.

Pharmacopoeias. In *Eur.* (see p.vii).

Ph. Eur. 6.2 (Borage (Starflower) Oil, Refined; Refined Borage Oil BP 2008). The fatty oil obtained from seeds of *Borago officinalis* by extraction and/or expression. It is then refined. A suitable antioxidant may be added. A clear, light yellow or yellow liquid. Relative density about 0.921. Practically insoluble in water and in alcohol; miscible with petroleum spirit. Store in well-filled, airtight containers under an inert gas. Protect from light.