than the natural oil and is used in the preparation of lemon spirit and lemon syrup.

Photosensitivity is associated with citrus oils.

Preparations

BP 2008: Compound Orange Spirit; Lemon Spirit; Lemon Syrup.

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***UK:*** Lemsip Cough & Cold Dry Cough; Meltus Honey & Lemon.

Lemon Grass Oil

Essência de Capim-Limão; Indian Melissa Oil; Indian Verbena Oil; Lemongrass, aceite de; Lemongrass Oil; Oleum Graminis Citrati.

Profile

Lemon grass oil is the volatile oil obtained by distillation from *Cymbopogon flexuosus* or *C. citratus* (Gramineae). It contains citral (p.2284) and citronellal.

Lemon grass oil was formerly given as a carminative. It has been used in perfumery and as a flavour. It is also used in aromatherapy.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Austral.:*** Apex Repel Natural; ***NZ:*** Apex Repel Natural; ***Switz.:*** Carmol; Carmol Plus†.

Lemon Verbena

Herba Lippiae Citriodorae; Herba Verbenae Odoratae; Hierba luisa; Verbenae citriodoratae folium (lemon verbena leaf); Verveine Odorante; Verveine odorante, feuille de (lemon verbena leaf).

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

Ph. Eur. 6.2 (Lemon Verdana Leaf). The whole or fragmented, dried leaves of *Aloysia citriodora* (*A. triphylla*, *Verbena triphylla*, *Lippia citriodora*). It contains a minimum of 2.5% acteoside ($C_{29}H_{36}O_{15}$ = 624.6) expressed as ferulic acid and not less than 0.3% v/w essential oil for the whole drug and 0.2% v/w essential oil for the fragmented drug, all calculated with reference to the dried drug. After grinding it has a characteristic odour reminiscent of lemon.

Profile

Lemon verbena, the flowering tops or leaves of *Lippia citriodora* (*Aloysia triphylla*; *Verbena triphylla*) (Verbenaceae), has antispasmodic and sedative actions and has been used for gastrointestinal disorders and as a tonic. It is most commonly used as an ingredient of herbal teas.

Preparations

Proprietary Preparations (details are given in Part 3)

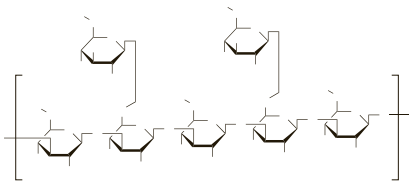
Multi-ingredient: ***Spain:*** Agua del Carmen.

Lentinan

LC-33; Lentinano.

Лентинан

CAS — 37339-90-5.
ATC — L03AX01.
ATC Vet — QL03AX01.



Profile

Lentinan is a β-1,3-D-glucan extracted from the shiitake mushroom *Lentinus edodes* (*Lentinula edodes*). It appears to act as an immunostimulant and has been tried in the treatment of malignant neoplasms and in HIV infection.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***USA:*** Better Cholesterol.

Lepromin

Lepromina.

Profile

Lepromin is a suspension of killed *Mycobacterium leprae* prepared from the skin of heavily infected patients suffering from lepromatous leprosy (lepromin H) or from armadillo tissue infected with *M. leprae* (lepromin A). It is used in an intradermal skin test for the classification of leprosy (p.176) and the assessment of immune responsiveness to *M. leprae.* The test is not diagnostic for leprosy.

◊ The original lepromin (of Mitsuda and Hayashi), a suspension of the whole autoclaved homogenised leproma including some tissue elements, is sometimes called integral lepromin, whereas purified bacillary suspensions are sometimes called bacillary lepromins.[1] Leprolins are the soluble proteins of the bacilli with or without proteins of the lepra, not coagulated by heating, and do not elicit the early reaction. The Dharmendra antigen is neither a lepromin nor a leprolin and is used especially for testing the early reactions; it gives only a weak late reaction. Purified protein derivatives of *Mycobacterium leprae*, such as leprosin A,[2] have also been developed.

1. Abe M, *et al*. Immunological problems in leprosy research. *Lepr Rev* 1974; **45:** 244–72.
2. Stanford JL. Skin testing with mycobacterial reagents in leprosy. *Tubercle* 1984; **65:** 63–74.

Leptin

Leptina; OB protein.

Лептин

Profile

Leptin, an endogenous peptide hormone produced mainly by white adipocytes in adipose tissue, is involved in the long-term maintenance of body-weight through regulation of food intake and energy expenditure. Leptin has a negative feedback effect on hypothalamic control of neurotransmitters involved in the control of appetite: thus, an increase in adipose tissue mass results in an increase in leptin concentrations that in turn suppresses expression of appetite stimulatory peptides and *vice versa*. Mutations of either the leptin receptor or the *ob* gene that encodes the leptin protein result in failure of leptin's control over appetite producing forms of morbid early-onset obesity. However, it is not clear that common obesity (p.2149) is associated with similar genetic mutations or, as also postulated, is associated with functional leptin resistance caused by sustained high leptin concentrations.

Leptin is produced in other tissues, and studies have suggested additional functions and properties including modulation of neuroendocrine, immune, and reproductive processes. The potential role of leptin in a variety of disease states including syndromes of insulin resistance, auto-immune diseases, and cardiovascular disorders is also being studied.

Replacement therapy with recombinant leptin is under investigation in the management of obesity as well as some other disorders including generalised lipodystrophy and hypothalamic amenorrhoea secondary to energy deficits or low body-weight.

◊ References.

1. Hukshorn CJ, *et al.* Weekly subcutaneous pegylated recombinant native human leptin (PEG-OB) administration in obese men. *J Clin Endocrinol Metab* 2000; **85:** 4003–4009.
2. Oral EA, *et al.* Leptin-replacement therapy for lipodystrophy. *N Engl J Med* 2002; **346:** 570–8.
3. Proietto J, Thorburn AW. The therapeutic potential of leptin. *Expert Opin Invest Drugs* 2003; **12:** 373–8.
4. Veniant MM, LeBel CP. Leptin: from animals to humans. *Curr Pharm Des* 2003; **9:** 811–8.
5. Cochran E, *et al.* Efficacy of recombinant methionyl human leptin therapy for the extreme insulin resistance of the Rabson-Mendenhall syndrome. *J Clin Endocrinol Metab* 2004; **89:** 1548–54.
6. Javor ED, *et al.* Proteinuric nephropathy in acquired and congenital generalized lipodystrophy: baseline characteristics and course during recombinant leptin therapy. *J Clin Endocrinol Metab* 2004; **89:** 3199–3207.
7. Ebihara K, *et al.* Long-term leptin-replacement therapy for lipoatrophic diabetes. *N Engl J Med* 2004; **351:** 615–6.
8. Welt CK, *et al.* Recombinant human leptin in women with hypothalamic amenorrhea. *N Engl J Med* 2004; **351:** 987–97.
9. Bell-Anderson KS, Bryson JM. Leptin as a potential treatment for obesity: progress to date. *Treat Endocrinol* 2004; **3:** 11–18.
10. Chan JL, Mantzoros CS. Role of leptin in energy-deprivation states: normal human physiology and clinical implications for hypothalamic amenorrhoea and anorexia nervosa. *Lancet* 2005; **366:** 74–85.
11. Zelissen PM, *et al.* Effect of three treatment schedules of recombinant methionyl human leptin on body weight in obese adults: a randomized, placebo-controlled trial. *Diabetes Obes Metab* 2005; **7:** 755–61.
12. Brennan AM, Mantzoros CS. Drug insight: the role of leptin in human physiology and pathophysiology — emerging clinical applications. *Nat Clin Pract Endocrinol Metab* 2006; **2:** 318–27.
13. Ebihara K, *et al.* Efficacy and safety of leptin-replacement therapy and possible mechanisms of leptin actions in patients with generalized lipodystrophy. *J Clin Endocrinol Metab* 2007; **92:** 532–41.
14. Chan JL, *et al.* Pharmacokinetics of recombinant methionyl human leptin after subcutaneous administration: variation of concentration-dependent parameters according to assay. *J Clin Endocrinol Metab* 2007; **92:** 2307–11.

Lerdelimumab *(rINN)*

Lérdelimumab; Lerdelimumabum. Immunoglobulin G4, anti-(human transforming growth factor β2) (human monoclonal CAT-152 γ4-chain), disulfide with human monoclonal CAT-152 λ-chain, dimer.

Лерделимумаб

CAS — 285985-06-0.

Profile

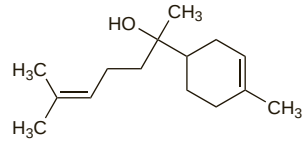
Lerdelimumab is a human monoclonal antibody specific for transforming growth factor β2 that has been investigated for the prevention of excessive postoperative scarring after glaucoma surgery.

Levomenol *(rINN)*

(–)-α-Bisabolol; Lévoménol; Levomenolum; Lewomenol. (–)-6-Methyl-2-(4-methyl-3-cyclohexen-1-yl)-5-hepten-2-ol.

Левоменол

$C_{15}H_{26}O$ = 222.4.
CAS — 23089-26-1.



Profile

Levomenol is a sesquiterpene isolated from the volatile oil of chamomile (p.2279). It has been tried as a transepidermal penetration enhancer and is present in many emollient preparations.

◊ References.

1. Kadir R, Barry BW. α-Bisabolol, a possible safe penetration enhancer for dermal and transdermal therapeutics. *Int J Pharmaceutics* 1991; **70:** 87–94.

Preparations

Proprietary Preparations (details are given in Part 3)

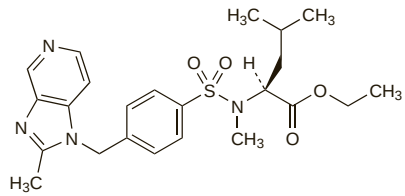
Multi-ingredient: ***Arg.:*** Confortel†; Keracnyl; ***Austria:*** Sensicutan; ***Belg.:*** Purigel Crisp; ***Chile:*** Cuidado Intimo; Eucerin Piel Grasa; Queratopil; Ruboril; Suavigel; ***Cz.:*** Fyterol†; Sensicutan; ***Fr.:*** Alpha 5 DS†; Apaisance†; Clean-AC; Dermophil Indien†; Epiphane†; Keracnyl; Keracnyl eau nettoyante; Seborheane; Squaphane E; Tefirax; ***Ger.:*** Mirfulan Spray N; Sensicutan; ***Hong Kong:*** Kamillosan†; ***Ital.:*** Biothymus DS; Broxo al Fluoro; Decon Lavanda; Intim; Pitiren; Saugella Poligyn 7; Tial-Z; ***Mex.:*** Aveendix; ***Port.:*** Hidratante VV; Lactonico†; ***Switz.:*** Antidry; Dermophil Indien; Tenderdol; ***Thai.:*** Kamillosan†; ***UK:*** Xclair; ***Venez.:*** Kamillosan.

Lexipafant *(BAN, USAN, rINN)*

BB-882; DO-6; Lexipafantum. Ethyl *N*-methyl-*N*-[α-(2-methylimidazo[4,5-c]pyridin-1-yl)tosyl]-L-leucinate.

Лексипафант

$C_{23}H_{30}N_4O_4S$ = 458.6.
CAS — 139133-26-9.



Profile

Lexipafant is a platelet-activating factor antagonist that is being investigated in the prevention of neurological and renal complications after cardiac surgery. It has also been studied for possible applications in asthma, sepsis, and pancreatitis.

Linseed

Flaxseed; Leinsamen; Lenmag; Lin; Lin, graine de; Linaza; Linfrö; Linho; Lini semen; Lini Semina; Linum; Lněné semeno; Nasienie lnu; Pellavansiemen; Sémenys; Semilla de Lino.

ATC — A06AC05.
ATC Vet — QA06AC05.

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

Ph. Eur. 6.2 (Linseed). The dried ripe seeds of *Linum usitatissimum*. Protect from light.

Profile

Preparations of linseed have been administered for their demulcent and laxative actions. Crushed linseed has been used as a

poultice. Linseed is the source of linseed oil, below. Linseed has also been tried as a dietary supplement to improve postmenopausal symptoms.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Chile:*** Aloelax; Instalax; ***Ger.:*** Duoventrin; Pascomag†; ***Pol.:*** Laxantol; ***Singapore:*** Tofupill†; ***Switz.:*** Linoforce; LinoMed; ***UK:*** Salinum.

Linseed Oil

Aceite de Linaza; Flaxseed Oil; Huile de Lin; Leinöl; Lenolaj; Lin, huile de; Linaza, aceite de; Lini oleum; Linolja; Lněný olej; Oleum Lini; Pellavaöljy; Sėmenų aliejus.

ATC — A06AC05.
ATC Vet — QA06AC05.

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

Ph. Eur. 6.2 (Linseed Oil, Virgin). The oil obtained by cold expression from ripe seeds of *Linum usitatissimum*. A suitable antoxidant may be added. A clear, yellow or brownish-yellow liquid. It turns dark and gradually thickens on exposure to air. When cooled, it becomes a soft mass at about –20°. Relative density about 0.931. Very slightly soluble in alcohol; miscible with petroleum spirit. Store in airtight containers. Protect from light.

Profile

Linseed oil is used in veterinary medicine as a purgative for horses and cattle. In man, linseed oil is included in topical preparations for a variety of skin disorders. It has been tried as a vegetable source of omega-3 fatty acids (p.1362).

Boiled linseed oil ('boiled oil') is linseed oil heated with litharge, manganese resinate, or other driers, to a temperature of about 150° so that metallic salts of the fatty acids are formed and cause the oil to dry more rapidly. It must not be used for medicinal purposes.

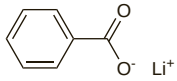
Preparations

Proprietary Preparations (details are given in Part 3)
Chile: Linna-Oil; ***Mex.:*** Omelina.

Multi-ingredient: ***Austria:*** Dermowund; ***Canad.:*** Prostate Ease; ***India:*** Buta-Proxyvon; Duoflam Gel; Nicip Super; Nimulid Nugel; ***Rus.:*** Dicloran Plus (Диклоран Плюс); ***Switz.:*** Epithelial†; Malvedrin; ***UK:*** Nine Rubbing Oils.

Lithium Benzoate ⊗

Litio, benzoato de.
$C_7H_5LiO_2$ = 128.1.
CAS — 553-54-8.



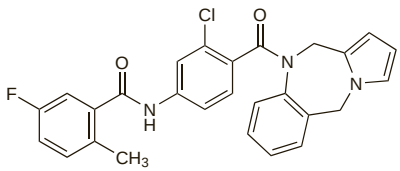
Profile

Lithium benzoate has been used as a diuretic and urinary disinfectant. Its use cannot be recommended because of the pharmacological effect of the lithium ion (p.401). Each g contains 7.8 mmol of lithium.

Lixivaptan *(USAN, rINN)* ⊗

Lixivaptán; Lixivaptanum; VPA-985; WAY-VPA-985. 3′-Chloro-5-fluoro-4′-(5*H*-pyrrolo[2,1-*c*][1,4]benzodiazepin-10(11*H*)-ylcarbonyl)-*o*-toluanilide.

Ликсиваптан
$C_{27}H_{21}ClFN_3O_2$ = 473.9.
CAS — 168079-32-1.



Profile

Lixivaptan is a selective vasopressin V_2-receptor antagonist under investigation for the treatment of hyponatraemia in patients with heart failure.

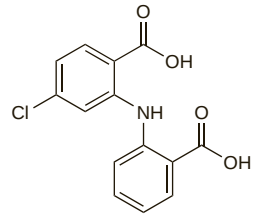
◊ References.

1. Abraham WT, *et al*. Aquaretic effect of lixivaptan, an oral, nonpeptide, selective V2 receptor vasopressin antagonist, in New York Heart Association functional class II and III chronic heart failure patients. *J Am Coll Cardiol* 2006; **47:** 1615–21.

Lobenzarit Sodium *(USAN, rINNM)*

CCA; Lobenzarit sódico; Lobenzarit Sodique; Natrii Lobenzaritum. 4-Chloro-2,2′-iminodibenzoate disodium.

Натрий Лобензарит
$C_{14}H_8ClNNa_2O_4$ = 335.7.
CAS — 63329-53-3 (lobenzarit); 64808-48-6 (lobenzarit sodium).



(lobenzarit)

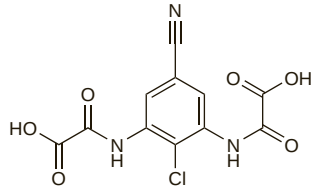
Profile

Lobenzarit sodium has been used as an immunomodulator in rheumatoid arthritis.

Lodoxamide *(BAN, rINN)*

Lodoksamidi; Lodoxamid; Lodoxamida; Lodoxamidum; U-42585. *N,N*′-(2-Chloro-5-cyano-*m*-phenylene)dioxamic acid.

Лодоксамид
$C_{11}H_6ClN_3O_6$ = 311.6.
CAS — 53882-12-5.
ATC — S01GX05.
ATC Vet — QS01GX05.



Lodoxamide Ethyl *(BANM, USAN, rINNM)*

Ethylum Lodoxamidum; Lodoxamida etilo; Lodoxamide Ethyle; U-42718. Diethyl *N,N*′-(2-Chloro-5-cyano-*m*-phenylene)dioxamate.

Этил Лодоксамид
$C_{15}H_{14}ClN_3O_6$ = 367.7.
CAS — 53882-13-6.

Lodoxamide Trometamol *(BANM, rINNM)*

Lodoksamid Trometamin; Lodoxamida trometamol; Lodoxamide Trométamol; Lodoxamide Tromethamine *(USAN)*; Lodoxamidum Trometamolum; U-42585E. *N,N*′-(2-Chloro-5-cyano-*m*-phenylene)dioxamic acid compound with trometamol.

Лодоксамид Трометамол
$C_{11}H_6ClN_3O_6.2C_4H_{11}NO_3$ = 553.9.
CAS — 63610-09-3.
ATC — S01GX05.
ATC Vet — QS01GX05.

Adverse Effects

Lodoxamide eye drops may cause local irritation. Reported effects include burning or stinging, and itching. Flushing and dizziness have also been reported.

Uses and Administration

Lodoxamide has a stabilising action on mast cells resembling that of sodium cromoglicate (p.1136). Lodoxamide trometamol is used in eye drops for allergic conjunctivitis (p.564), particularly vernal keratoconjunctivitis; a concentration equivalent to 0.1% of lodoxamide is used, 1 or 2 drops usually being instilled into the eye four times daily.

Lodoxamide has also been studied for its prophylactic effect in the treatment of asthma, but has not proved to be of benefit; it has usually been given orally as the ethyl ester or by inhalation as the trometamol salt.

Conjunctivitis. Lodoxamide is an effective treatment for vernal keratoconjunctivitis.[1,2] There is some evidence that it may be more effective than sodium cromoglicate for this purpose (see p.1138).

1. Anonymous. Lodoxamide for vernal keratoconjunctivitis. *Med Lett Drugs Ther* 1994; **36:** 26.
2. Lee S, Allard TRFK. Lodoxamide in vernal keratoconjunctivitis. *Ann Pharmacother* 1996; **30:** 535–7.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Alomide; ***Austral.:*** Lomide; ***Austria:*** Alomide†; ***Belg.:*** Alomide; ***Braz.:*** Alomide; ***Canad.:*** Alomide; ***Chile:*** Alomide; ***Cz.:*** Alomide; ***Denm.:*** Alomide; ***Fin.:*** Alomide; ***Fr.:*** Almide; ***Ger.:*** Alomide; ***Gr.:*** Alomide; Thilomide; ***Hong Kong:*** Alomide; ***Hung.:*** Alomide; ***Indon.:*** Alomide; ***Irl.:*** Alomide; ***Israel:*** Alomide; ***Ital.:*** Alomide; ***Malaysia:*** Alomide; ***Mex.:*** Alomide; ***Norw.:*** Alomide; ***NZ:*** Lomide; ***Philipp.:*** Alconmide; ***Pol.:*** Alomide; ***Port.:*** Alomide; ***Rus.:*** Alomide (Аломид); ***S.Afr.:*** Alomide; ***Singapore:*** Alomide; ***Spain:*** Alomide; ***Switz.:*** Alomide†; ***Thai.:*** Alomide; ***Turk.:*** Alomide; Thilomide; ***UK:*** Alomide; ***USA:*** Alomide; ***Venez.:*** Alomide.

Lomifylline *(rINN)*

Lomifilina; Lomifyllinum. 7-(5-Oxohexyl)theophylline.

Ломифиллин
$C_{13}H_{18}N_4O_3$ = 278.3.
CAS — 10226-54-7.

Profile

Lomifylline is a theophylline derivative that has been used in preparations for cerebrovascular disorders.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Arg.:*** Cervilane; Micerfin; ***Braz.:*** Norogil; ***Chile:*** Cervilane; ***Mex.:*** Cervilan; ***Port.:*** Cervilane†.

Loosestrife

Fackelblomster; Kyprejová nať; Lythri herba; Purple Loosestrife; Rantakukka; Raudoklių žolė; Réti fűzényfű; Salicaire.

NOTE. Do not confuse with yellow willowherb, *Lysimachia vulgaris* which is also known as loosestrife.

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

Ph. Eur. 6.2 (Loosestrife; Lythri Herba). The dried flowering tops, whole or cut, of *Lythrum salicaria*. It contains not less than 5.0 % of tannins, expressed as pyrogallol and calculated with reference to the dried drug. Protect from light.

Profile

Purple loosestrife, *Lythrum salicaria* (Lythraceae), is used in herbal medicine for the treatment of diarrhoea. It is also used for its astringent and antimicrobial properties.

Preparations

Proprietary Preparations (details are given in Part 3)
Fr.: Salicairine.

Multi-ingredient: ***Fr.:*** Saugella; ***Ital.:*** Gynegella P†; ***Spain:*** Natusor Astringel†.

Lorenzo's Oil

Lorenzo, aceite de.

Glyceryl Trierucate

Trierucin. 1,2,3-Propanetriol tri(13-docosenoate).
$C_{69}H_{128}O_6$ = 1053.8.
CAS — 2752-99-0.

Glyceryl Trioleate

Triolein. 1,2,3-Propanetriol tri(9-octandecenoate).
$C_{57}H_{104}O_6$ = 885.4.
CAS — 122-32-7.

Profile

Lorenzo's oil is a liquid containing glyceryl trierucate (a source of erucic acid) and glyceryl trioleate (a source of oleic acid), in the ratio 1 part to 4 parts respectively. It has been used with dietary modification for the treatment of adrenoleucodystrophy, a genetic disorder characterised by demyelination, adrenal cortical insufficiency, and accumulation of saturated 'very-long-chain fatty acids'.

Adrenoleucodystrophy. Adrenoleucodystrophy is a rare X-linked metabolic disorder in which accumulation of saturated very-long-chain fatty acids results in diffuse and multifocal demyelination of the nervous system and adrenocortical insufficiency. The most common form usually affects children and is characterised primarily by cerebral demyelination; it is usually fatal within a few years. In the adult variant, called adrenomyeloneuropathy, demyelination of the spinal cord and peripheral neuropathy progress slowly over many years.[1,2]

There appears to be no effective treatment for adrenoleucodystrophy or its variants. A high dietary intake of long-chain monounsaturated fatty acids, as provided by the mixture Lorenzo's oil (glyceryl trierucate with glyceryl trioleate), has been tried, the idea being to monopolise the specific enzyme involved in the conversion of long-chain fatty acids to very-long-chain fatty acids. Although dietary therapy with Lorenzo's oil has reduced plasma concentrations of saturated very-long-chain fatty acids, there is no evidence that this improves or delays progression of adrenoleucodystrophy or adrenomyeloneuropathy.[3-6] However, it has been suggested that these disorders may not respond to correction of the biochemical abnormality once neurological damage has occurred.[5] The effectiveness of treatment before the