

**Profile**

Citronellone has been used in the treatment of hepatic disorders and as a mucolytic. Hypersensitivity reactions have been reported.

## ♦ References.

- de Barrio M, et al. Recurrent fixed drug eruption caused by citronellone. *J Invest Allergol Clin Immunol* 1997; 7: 193-4.

**Preparations**

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

**Spain:** Mucorex†.

**Multi-ingredient: Spain:** Hubergrip†.

**Citral**

Cytral, 3,7-Dimethyl-2,6-octadienal.

$C_{10}H_{16}O = 152.2$ .

CAS — 5392-40-5 (citral); 141-27-5 (geranial); 106-26-3 (neral).

**Profile**

Citral is a terpenoid constituent of lemon oil (p.2332), lemon grass oil (p.2333), melissa oil (p.2339), and many other essential oils; it exists as 2 isomers, *trans*-citral (geranial) and *cis*-citral (neral). It has been used in preparations for respiratory-tract, musculoskeletal, and other disorders. It is also used as a flavour and perfume.

**Hypersensitivity. References.**

- Heydorn S, et al. Citral a fragrance allergen and irritant. *Contact Dermatitis* 2003; 49: 32-6.

**Preparations**

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

**Multi-ingredient: Fr.:** Bronchorectine au Citral; **Switz.:** Carmol Plus†.

**Anhydrous Citric Acid**

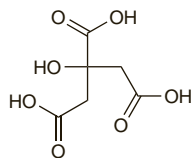
Acidum Citricum; Acidum citricum anhydricum; Cítrico anhidro, ácido; Citrinü rügstis, bevandené; Citrique (acide) anhydre; Citronensäure; Citronsyra, vattenfri; E330; Kyselina citronová; Sitruunahappo, vedetön; Vízmentes citromsav. 2-Hydroxypropane-1,2,3-tricarboxylic acid.

$C_6H_8O_7 = 192.1$ .

CAS — 77-92-9.

ATC — A09AB04.

ATC Vet — QA09AB04.



**Pharmacopoeias.** In *Eur.* (see p.vii), *Int.*, *Jpn.*, and *US*.

**Ph. Eur. 6.2** (Citric Acid, Anhydrous). Colourless crystals or granules or a white or almost white crystalline powder. Very soluble in water; freely soluble in alcohol.

**USP 31** (Anhydrous Citric Acid). Colourless, translucent crystals, or a white, granular to fine, crystalline powder. Soluble 1 in 0.5 of water, 1 in 2 of alcohol, and 1 in 30 of ether. Store in airtight containers.

**Citric Acid Monohydrate**

Ácido del Limón; Acidum citricum monohydricum; Cítrico monohidratado, ácido; Citrinü rügstis monohidratas; Citrique (acide) monohydraté; Citromsav-monohidrát; Citronsyramonohydrat; Hydrous Citric Acid; Kwas cytrynowy jednowodny; Kyselina citronová monohydrát; Sitruunahappomonohydraatti.

$C_6H_8O_7 \cdot H_2O = 210.1$ .

CAS — 5949-29-1.

ATC — A09AB04.

ATC Vet — QA09AB04.

**Pharmacopoeias.** In *Chin.*, *Eur.* (see p.vii), *Int.*, *Jpn.*, *US*, and *Viet*.

**Ph. Eur. 6.2** (Citric Acid Monohydrate). Efflorescent, colourless crystals or granules, or a white or almost white crystalline powder. Very soluble in water; freely soluble in alcohol. Store in airtight containers.

**USP 31** (Citric Acid Monohydrate). Colourless, translucent crystals, or a white, granular to fine, crystalline powder. It is efflorescent in dry air. Soluble 1 in 0.5 of water, 1 in 2 of alcohol, and 1 in 30 of ether. Store in airtight containers.

**Adverse Effects and Precautions**

Citric acid ingested frequently or in large quantities may cause erosion of the teeth and have a local irritant action.

**Interactions**

**Aluminium hydroxide.** Intestinal absorption of aluminium ions may be enhanced by oral doses of citrates. Caution is needed in patients with chronic renal disease receiving aluminium hy-

droxide as a phosphate binder who are given a calcium supplement in the form of effervescent tablets that contain citric acid.<sup>1</sup>

- Mees EJD, Başçı A. Citric acid in calcium effervescent tablets may favour aluminium intoxication. *Nephron* 1991; 59: 322.

**Uses and Administration**

Citric acid is used in effervescent mixtures; the monohydrate is used in the preparation of effervescent granules.

Citric acid monohydrate is used as a synergist to enhance the effectiveness of antioxidants.

Preparations containing citric acid are used in the management of dry mouth (p.2140) and to dissolve renal calculi, alkalise the urine, and prevent encrustation of urinary catheters. Citric acid is an ingredient of citrated anticoagulant solutions. Citric acid has also been used in preparations for the treatment of coughs, gastrointestinal disturbances, and metabolic acidosis.

**Preparations**

**BP 2008:** Lemon Syrup; Paediatric Compound Tolu Linctus; Paediatric Simple Linctus; Potassium Citrate Mixture; Simple Linctus.

**Ph. Eur.:** Anticoagulant Acid-Citrate-Glucose Solutions (ACD); Anticoagulant Citrate-Phosphate-Glucose Solution (CPD).

**USP 31:** Anticoagulant Citrate Dextrose Solution; Anticoagulant Citrate Phosphate Dextrose Adenine Solution; Anticoagulant Citrate Phosphate Dextrose Solution; Citric Acid, Magnesium Oxide, and Sodium Carbonate Irrigation; Magnesium Carbonate and Citric Acid for Oral Solution; Magnesium Carbonate, Citric Acid, and Potassium Citrate for Oral Solution; Magnesium Citrate Oral Solution; Potassium and Sodium Bicarbonates and Citric Acid Effervescent Tablets for Oral Solution; Potassium Citrate and Citric Acid Oral Solution; Sodium Citrate and Citric Acid Oral Solution; Tricrates Oral Solution.

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

**Gr.:** Citrolithin; **India:** Revidi; **Mex.:** Lipocinetic; **Pol.:** Citrolyt; **S.Afr.:** Crystacit; **Venez.:** Policitra.

**Multi-ingredient: Arg.:** Alikal; Alka-Seltzer Doble Accion; Sal de Fruta Eno; Uvasal; **Austral.:** Alka-Seltzer; Citralite; Citravescant; Duralex X-Pack†; Eno; Picolax†; Picoprep; Ural; Uricalm†; **Austria:** Alka-Seltzer; Duplotrast X; Helo-acid; Kalioral; **Belg.:** Alka-Seltzer; **Braz.:** Citrosodine†; Digesthem; Regulador Xavier N-2†; Sal de Andrews; Sal de Fruta Eno; Sonisal; **Canada:** Alka-Seltzer; Bromo Madelon; Dicitrate†; Pico-Salax; **Chile:** Disfruta; Fenokomp 39; Justegas†; Kanacitrin; Sal de Fruta Eno; Summer's Eve Hieras†; Uroalquine; Yasta; **Cz.:** Alka-Seltzer; Blemaren N; Carbocit; E-Z-Gas†; Herbadent; **Fin.:** Alka-Seltzer; **Fr.:** Alka-Seltzer; Citrocholine; Doculysé; Elixir Grez†; Hepargitol; Ormitaine; Sebum AKN; Sphingogel†; **Ger.:** Alka-Seltzer; Barlux; Brausetabletten†; Blemaren N; Citropepsin†; Lithurex S†; Pepsitrat; Retterspitz Ausserlich; Retterspitz Innerlich; Uronor†; **Gr.:** E-Z-Gas; Gastroison†; **Hong Kong:** Alka-Seltzer; Eno†; **Hung.:** Alka-Seltzer; Blemaren N; E-Z-Gas; Magurli†; **India:** Carmicide; Coscopin; Coscopin Plus; Dristan Expectorant; Unisoda; **Indon.:** Koffex for Children; Promethazine Ikaparmino; **Ir.:** Andrews; Carbex†; Cymalon; Mictral†; **Israel:** E-Z-Gas II; Eno; Unikal; **Ital.:** Alka-Seltzer; Citroepatina; Duogas; Gelfer; Lavanda Sofar; **Malaysia:** Alka-Seltzer; Citravescant†; Ezee; Picoprep; Potcit; Ural; **Mex.:** Kaposalt; Lipo Slim N†; Urodasio NF; **Neth.:** Alka-Seltzer; Gastrogas; **NZ:** Alka-Seltzer; Lemsip Dry Cough†; Picoprep; Ural; **Philipp.:** Alka-Seltzer; **Pol.:** Citropepsin; **Port.:** Alka-Seltzer; Creme Laser Hidrante; Detoxergon; Eno; **Rus.:** Alka-Seltzer (Алка-Зельцер); Blemaren (Блемарен); **S.Afr.:** Adco-Sodasol; Alkafiz; Betasoda†; Citro-Soda; Citrocid†; Effersol†; Effersol; Quatro-Soda†; Uni-Alk; Vicks Cough Syrup; **Singapore:** Alka-Seltzer; Dicitrate; Potcit; **Spain:** Alka-Seltzer; Justegas; Pastillas Antisept Garg L; Sal de Fruta Eno; Sales de Frutas P G; Uralyt Urato; **Swed.:** Alka-Seltzer; Renapur; **Switz.:** Alka-Seltzer; E-Z-Gas II; Pepsi-Chlor†; Siesta-I; **Thai.:** Alka-Seltzer; Carmicide†; **Turk.:** Alka-Seltzer; **UK:** Alka-Seltzer; Alka-Seltzer XS; Allens Junior Cough; Andrews; Carbex; Cymalon; Effercitrate; Eno; Hill's Balsam Chesty Cough for Children; Lemsip Cough & Cold Dry Cough; Potters Children's Cough Pastilles; Resolve; Uniflex G; Uniflex R; Uro-Tainer Solution R; Uro-Tainer Suby G; Zubes Blackcurrant; Zubes Honey & Lemon; **USA:** Alka-Seltzer; Alka-Seltzer Antacid; Alka-Seltzer with Aspirin; Bicitra; Bromo Seltzer Effervescent Granules; Cytra-2; Cytra-3; Cytra-K; Cytra-LC; Extra Strength Alka-Seltzer Effervescent Tablets; Gold Alka-Seltzer; Oracit; Original Alka-Seltzer Effervescent Tablets; Polycitra; Polycitra-K; Polycitra-LC; Renacidin; Sparkles; Zee-Seltzer; **Venez.:** Alka-Seltzer; Eno.

**Citronella Oil**

Citrinözüli eterinis aliejus; Citronela, aceite esencial de; Citronellae aetheroleum; Citronellae Etheroleum; Citronellaöl; Citronellojla; Citronelová silice; Citronnelle, huile essentielle de; Oleum Citronellae; Sitronellaölj.

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

**Ph. Eur. 6.2** (Citronella Oil). The oil obtained by steam distillation from the fresh or partially dried aerial parts of *Syzygium winterianus*. It contains 30.0 to 45.0% citronellal, 9.0 to 15.0% citronellol, 2.0 to 4.0% citronellyl acetate, less than 2.0% geranial, 20.0 to 25.0% geraniol, 3.0 to 8.0% geranyl acetate, 1.0 to 5.0% limonene, and less than 2.0% neral. A pale yellow to brownish-yellow liquid with a very strong odour of citronellal. Store in well-filled containers. Protect from light.

**Profile**

Citronella oil is used as a perfume and insect repellent. It is also used in aromatherapy. Hypersensitivity has been reported.

**Preparations**

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

**Arg.:** Aulo Gello Repelente; Repelente Rep; **Canada:** Buzz Away†; Druide Insect Repellent†; **Ger.:** Kneipp Beruhigungs-Bad spezial; Schuppis Melissen Ölbad†; **Malaysia:** Moz-Away; **UK:** Mozzie Patch; Natrapel.

**Multi-ingredient: Arg.:** Aulo Repelente De Pjojos; Repelente Rep; **Austral.:** Apex Repel Natural; **Austria:** Valin Baldrian; **Belg.:** Mouskito Travel Stick; **Canada:** Natrapel; **Cz.:** Amol; **Fr.:** Ysol 206; **Ger.:** esto-gast; Melisengeist; **Indon.:** Corsabalm; **Ital.:** Air Citronella†; Citrosystem; Mistick Verde; **NZ:** Apex Repel Natural; **Pol.:** Carmolis; **S.Afr.:** Melisengeist; No-Bite†; **Switz.:** Baume du Chalet; Novital; Saltrates†; Sansilla; **UK:** Snowfire; **USA:** Treo.

**Clivers**

Amor de hortelano; Cleavers; Galii Aparinis Herba; Galium; Goosegrass.

**Profile**

Clivers is the dried aerial parts of *Galium aparine* (Rubiaceae). It has been used in herbal medicine, mainly as a diuretic.

**Preparations**

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

**Multi-ingredient: Austral.:** Dermaco; Galium Complex†; Herbal Cleanse†; Uva-Ursi Complex†; **UK:** Anlitis; Aqua Ban Herbal; Athera; Backache; Cascade; Gerard House Water Relief Tablets; HealthAid Boldo-Plus; Kas-Bah; Modern Herbals Menopause; Modern Herbals Water Retention; Psorasolv; Sciargo; Skin Cleansing; Tabritis; Water Naturtabs; Watershed.

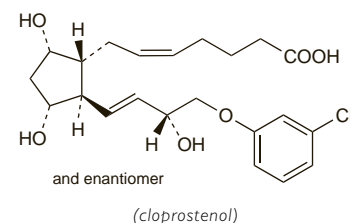
**Cloprostenol Sodium** (BANM, USAN, rINN)

Cloprostenol sódico; Cloprosténol sodique; Cloprostenoli natrium; ICI-80996; Natrii Cloprostenolum. Sodium (±)-(Z)-7-((1R,2R,3R,5S)-2-[(E)-(3R)-4-(3-chlorophenoxy)-3-hydroxybut-1-enyl]-3,5-dihydroxyisoclopentyl}hept-5-enoate.

Натрий Клопростенол

$C_{22}H_{28}ClNaO_6 = 446.9$ .

CAS — 40665-92-7 (cloprostenol); 55028-72-3 (cloprostenol sodium).



**Pharmacopoeias.** In *BP(Vet)*.

**BP(Vet) 2008** (Cloprostenol Sodium). A white or almost white amorphous hygroscopic powder. Freely soluble in water, in alcohol, and in methyl alcohol; practically insoluble in acetone. Protect from light and moisture.

**Profile**

Cloprostenol is a synthetic analogue of dinoprost (prostaglandin F<sub>2</sub>). The sodium salt is used as a luteolytic in veterinary medicine.

**Clove**

Caryoph.; Caryophylli flos; Caryophyllum; Clavo; Clou de girofle; Cloves; Cravinho; Cravo-da-Índia; Gewürznelke; Giroflie; Gvazdikéliai; Hřebíčkovo cvět; Kryddnejlika; Mausteneilikka; Szegfűszeg; Tropical Myrtle.

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

**Ph. Eur. 6.2** (Clove). The whole flower buds of *Syzygium aromaticum* (*Eugenia caryophyllus*), containing not less than 15% w/w of volatile oil, dried until they become reddish-brown, and with a characteristic aromatic odour. Protect from light.

The BP 2008 directs that when Powdered Clove is prescribed or demanded, material containing not less than 12.0% v/w of essential oil shall be dispensed or supplied.

**Profile**

Clove is a carminative and is used as a flavour. It is the source of clove oil (below).

Clove and clove oil have been abused in the form of cigarettes.

**Abuse.** Smoking of cigarettes composed of a mixture of tobacco and cloves is a habit that originated in Indonesia and has spread to the USA. There have been reports of severe and sometimes fatal respiratory illness related to smoking clove cigarettes and there is also evidence from animal studies that clove cigarette smoke and eugenol (the principal constituent of clove oil) have harmful pulmonary effects. The Council on Scientific Affairs of the American Medical Association considers that in addition to the hazards associated with smoking tobacco, clove cigarettes may also produce severe lung injury in certain susceptible individuals and could also induce pulmonary aspiration in healthy individuals due to diminution of the gag reflex produced by the local anaesthetic action of eugenol.<sup>1</sup> The American Academy of Pediatrics has also alerted paediatricians in the USA to clove-cigarette smoking by young people and warned of the risks.<sup>2</sup>

1. American Medical Association Council on Scientific Affairs. Evaluation of the health hazard of clove cigarettes. *JAMA* 1988; 260: 3641-4.

2. Committee on Substance Abuse. Hazards of clove cigarettes. *Pediatrics* 1991; 88: 395-6.