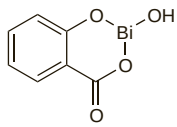
### Bismuth Salicylate

Basic Bismuth Salicylate; Bázisos bizmut-szalicilát; Bismuth Oxysalicylate; Bismuth, sous-salicylate de; Bismuth Subsalicylate *(USAN)*; Bismuthi subsalicylas; Bismuto subsalicilatas; Salicilato de bismuto; Salicylan bismutitý zásaditý; Vismutsubsalicylat; Vismuttisubsalisylaatti.

Салицилат Висмута

$C_7H_5BiO_4$ = 362.1.

*CAS — 14882-18-9.*



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

**Ph. Eur. 6.2** (Bismuth Subsalicylate). A complex of bismuth and salicylic acid. It contains not less than 56% and not more than 59.4% of Bi, calculated with reference to the dried substance. A white or almost white powder. Practically insoluble in water and in alcohol; dissolves in mineral acids with decomposition. Protect from light.

**USP 31** (Bismuth Subsalicylate). A basic salt corresponding to $C_7H_5BiO_4$ and containing not less than 56.0% and not more than 59.4% of Bi and not less than 36.5% and not more than 39.3% of total salicylates. It is a fine, odourless, white to off-white microcrystalline powder. Practically insoluble in water, in alcohol, and in ether. It reacts with alkalis and mineral acids. Store in airtight containers. Protect from light.

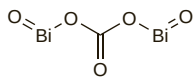
### Bismuth Subcarbonate *(USAN)*

Basic Bismuth Carbonate; Basisches Wismutkarbonat; Bázisos bizmutkarbonát; Bism. Carb.; Bismuth Carbonate; Bismuth Oxycarbonate; Bismuth, sous-carbonate de; Bismuthi subcarbonas; Bismuto subkarbonatas; Bismutylum Carbonicum; Carbonato de Bismutila; Subcarbonato de bismuto; Uhličitan bismutitý zásaditý; Vismutsubkarbonat; Vismuttisubkarbonaatti.

Основный Углекислый Висмут

$CBi_2O_5$ = 510.0.

*CAS — 5892-10-4 (anhydrous bismuth subcarbonate); 5798-45-8 (bismuth subcarbonate hemihydrate).*



*(anhydrous bismuth subcarbonate)*

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

**Ph. Eur. 6.2** (Bismuth Subcarbonate). A white or almost white powder. Practically insoluble in water and in alcohol. It dissolves in mineral acids with effervescence. Protect from light.

**USP 31** (Bismuth Subcarbonate). A white or almost white powder. Practically insoluble in water, in alcohol, and in ether; dissolves in dilute acids with effervescence. Protect from light.

### Bismuth Subcitrate Potassium *(USAN)*

10012777; Biskalcitrate potassium; Bismuth Biscalcitrate; Bismuth biskalcitrate. Bismuth pentapotassium dihydroxide bis(2-hydroxypropane-1,2,3-tricarboxylate hydrate).

Основный Калиевый Цитрат Висмута

$C_{12}H_{14}BiK_5O_{17}$ = 834.7.

*CAS — 880149-29-1.*

NOTE. Do not confuse with bismuth citrate (p.1710) or tripotassium dicitratobismuthate (colloidal bismuth subcitrate, p.1711).

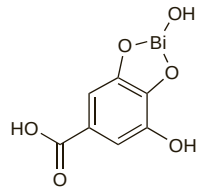
### Bismuth Subgallate *(USAN)*

Basic Bismuth Gallate; Basisches Wismutgallat; Bázisos bizmutgallát; Bism. Subgall.; Bismuth Oxygallate; Bismuth, sous-gallate de; Bismuthi subgallas; Bismuto subgalatas; Bizmut Subgalat; Bizmutu galusan zasadowy; Gallan bismutitý zásaditý; Subgalato de bismuto; Vismutsubgallat; Vismuttisubgallaatti.

Основный Галловокислый Висмут

$C_7H_5BiO_6$ = 394.1.

*CAS — 99-26-3.*



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

**Ph. Eur. 6.2** (Bismuth Subgallate). A complex of bismuth and gallic acid. It contains not less than 48% and not more than 51% of Bi, calculated with reference to the dried substance. A yellow powder. Practically insoluble in water and in alcohol; dissolves in mineral acids with decomposition and in alkali hydroxides, producing a reddish-brown liquid. Protect from light.

**USP 31** (Bismuth Subgallate). A basic salt containing 52 to 57% of $Bi_2O_3$ when dried at 105° for 3 hours. It is an odourless amorphous bright yellow powder. Practically insoluble in water, in alcohol, in chloroform, and in ether; insoluble in very dilute mineral acids; dissolves readily with decomposition in warm, moderately dilute hydrochloric, nitric, or sulfuric acids; readily dissolves in solutions of alkali hydroxides to form a clear yellow liquid which rapidly becomes deep red. Store in airtight containers. Protect from light.

### Bismuth Subnitrate

Basic Bismuth Nitrate; Basisches Wismutnitrat; Bázisos bizmut-nitrát; Bism. Subnit.; Bismuth Hydroxide Nitrate Oxide; Bismuth Nitrate, Heavy; Bismuth Oxynitrate; Bismuth, sous-nitrate de; Bismuth (Sous-Nitrate de) Lourd; Bismuthi subnitras; Bismuthyl Nitrate; Bismuto subnitratas; Bismuto subnitratas sunkusis; Bizmut Subnitrat; Bizmutu azotan zasadowy; Bizmutu(III) azotan zasadowy; Magistery of Bismuth; Nitrato de Bismutilo; Subazotato de Bismuto; Subnitrato de bismuto; Vismutsubnitrat; Vismuttisubnitraatti; White Bismuth.

Основный Азотнокислый Висмут

$Bi_5O(OH)_9(NO_3)_4$ = 1462.0.

*CAS — 1304-85-4.*

*ATC — A02BX12.*

*ATC Vet — QA02BX12.*

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

*Fr.* also includes Bismuth (Sous-Nitrate de) Léger (Bismuthi Subnitras Levis) which is described as a variable mixture of bismuth hydroxide, carbonate, and subnitrate.

**Ph. Eur. 6.2** (Bismuth Subnitrate, Heavy). It contains not less than 71% and not more than 74% of Bi, calculated with reference to the dried substance. A white or almost white powder. Practically insoluble in water and in alcohol; dissolves in mineral acids with decomposition.

**USP 31** (Bismuth Subnitrate). A basic salt containing not less than 79% of $Bi_2O_3$ calculated on the dried basis. It is a white, slightly hygroscopic powder. Practically insoluble in water and in alcohol; readily dissolves in nitric and hydrochloric acids.

### Tripotassium Dicitratobismuthate

Bizmut Subsitrat; Colloidal Bismuth Subcitrate; Dicitratobismutato tripotásico; Tripotasyum Disitratobizmutat.

Висмут Трикалия Дицитрат

*CAS — 57644-54-9.*

*ATC — A02BX05.*

*ATC Vet — QA02BX05.*

NOTE. Do not confuse with bismuth citrate (p.1710) or bismuth subcitrate potassium (p.1711).

## Adverse Effects, Treatment, and Precautions

The bismuth compounds listed above are insoluble or very poorly soluble, and bismuth toxicity does not appear to be common if they are used for limited periods. However, excessive or prolonged dosage may produce symptoms of bismuth poisoning, and for this reason long-term systemic therapy is not recommended. Reversible encephalopathy (see below) was once a problem in some countries, notably France and Australia; bone and joint toxicity had also occurred, sometimes associated with the encephalopathy. This led to restrictions on the use of bismuth salts and a virtual disappearance of these toxic effects.

Nausea and vomiting have been reported. Darkening or blackening of the faeces and tongue may occur due to conversion to bismuth sulfide in the gastrointestinal tract.

The effects of *acute bismuth intoxication* include gastrointestinal disturbances, skin reactions, stomatitis, and discoloration of mucous membranes; a characteristic blue line may appear on the gums. There may be renal failure and liver damage.

Other adverse effects may not be related to the bismuth content. With bismuth subnitrate given orally there is a risk of the nitrate being reduced in the intestines to nitrite and the development of methaemoglobinaemia. Absorption of salicylate occurs from oral bismuth salicylate and therefore the adverse effects, treatment of adverse effects, and precautions of aspirin (p.20) should be considered.

Gastric lavage should be considered in overdosage; activated charcoal by mouth and the use of a chelating agent such as dimercaprol, succimer, or unithiol have been recommended (see also Overdosage, below). Renal function should be monitored for 10 days after acute overdosage.

Bismuth compounds should not be given to patients with moderate to severe renal impairment.

**Encephalopathy.** Reviews[1,2] and reports[3-11] of bismuth encephalopathy. Many of the original reports implicated bismuth subgallate or subnitrate, in most but not all cases at high doses or for prolonged periods; toxicity has also occurred with other salts.[6-9] Patients receiving the subcitrate (480 mg daily) or the subnitrate (1.8 g daily) for 8 weeks in the treatment of *Helicobacter pylori* infection, showed no evidence of neurological changes compared with a control group.[12]


1. Winship KA. Toxicity of bismuth salts. *Adverse Drug React Acute Poisoning Rev* 1983; **2:** 103–21.
2. Slikkerveer A, de Wolff FA. Pharmacokinetics and toxicity of bismuth compounds. *Med Toxicol Adverse Drug Exp* 1989; **4:** 303–23.
3. Morrow AW. Request for reports: adverse reactions with bismuth subgallate. *Med J Aust* 1973; **1:** 912.
4. Martin-Bouyer G. Intoxications par les sels de bismuth administrés par voie orale: enquête épidémiologique. *Therapie* 1976; **31:** 683–702.
5. Stahl JP, *et al.* Encéphalites au sel insoluble de bismuth: toujours d'actualité. *Nouv Presse Med* 1982; **11:** 3856.
6. Hasking GJ, Duggan JM. Encephalopathy from bismuth subsalicylate. *Med J Aust* 1982; **2:** 167.
7. Weller MPI. Neuropsychiatric symptoms following bismuth intoxication. *Postgrad Med J* 1988; **64:** 308–10.
8. Mendelowitz PC, *et al.* Bismuth absorption and myoclonic encephalopathy during bismuth subsalicylate therapy. *Ann Intern Med* 1990; **112:** 140–1.
9. Playford RJ, *et al.* Bismuth induced encephalopathy caused by tri potassium dicitrato bismuthate in a patient with chronic renal failure. *Gut* 1990; **31:** 359–60.
10. Von Bose MJ, Zaudig M. Encephalopathy resembling Creutzfeldt-Jakob disease following oral, prescribed doses of bismuth nitrate. *Br J Psychiatry* 1991; **158:** 278–80.
11. Teepker M, *et al.* Myoclonic encephalopathy caused by chronic bismuth abuse. *Epileptic Disord* 2002; **4:** 229–33.
12. Noach LA, *et al.* Bismuth salts and neurotoxicity: a randomised, single-blind and controlled study. *Hum Exp Toxicol* 1995; **14:** 349–55.


***TOPICAL APPLICATION.*** Encephalopathy has been associated with the use of bismuth iodoform paraffin paste (BIPP) for the packing of wound cavities after surgery to the head and neck, although there is some debate as to whether the bismuth or the iodoform component is responsible—see p.1650.

**Overdosage.** Bismuth salicylate or tripotassium dicitratobismuthate in recommended doses are rarely associated with serious adverse effects but there are reports of renal failure,[1-6] encephalopathy,[7-9] and neurotoxicity[1] in acute[1-6,8] or chronic[7,9] overdose. Bismuth has been detected in the blood, urine, stools, and kidneys of these patients; a blood concentration of 1.6 micrograms/mL was found[2] 4 hours after an oral dose of 9.6 g.

The optimal treatment of bismuth overdosage is unknown. Gastric lavage, purgation, and hydration should be considered, even if the patient presents late, as bismuth may be absorbed from the colon.[1,2] Chelating agents may be effective; unithiol has been reported to increase the renal clearance of bismuth with a reduction in the blood concentration.[7] Haemodialysis may be necessary[1-3] but whether this hastens tissue clearance is uncertain. Haemodialysis plus unithiol treatment has been reported to successfully eliminate bismuth.[6] Peritoneal dialysis has also been effectively used in a paediatric patient.[5]

Prolonged ingestion of bismuth salicylate in excessive doses by an elderly diabetic was associated with hearing disturbances, vertigo, acid–base abnormalities and mild clotting disturbances.[10] The toxicity was thought to be due to the salicylate component.


1. Hudson M, Mowat NAG. Reversible toxicity in poisoning with colloidal bismuth subcitrate. *BMJ* 1989; **299:** 159.
2. Taylor EG, Klenerman P. Acute renal failure after colloidal bismuth subcitrate overdose. *Lancet* 1990; **335:** 670–1.
3. Huwez F, *et al.* Acute renal failure after overdose of colloidal bismuth subcitrate. *Lancet* 1992; **340:** 1298.

4. Akpolat I, *et al.* Acute renal failure due to overdose of colloidal bismuth. *Nephrol Dial Transplant* 1996; **11:** 1890–8.
5. İşlek İ, *et al.* Reversible nephrotoxicity after overdose of colloidal bismuth subcitrate. *Pediatr Nephrol* 2001; **16:** 510–14.
6. Hruz P, *et al.* Fanconi's syndrome, acute renal failure, and tonsil ulcerations after colloidal bismuth subcitrate intoxication. *Am J Kidney Dis* 2002; **39:** E18.
7. Playford RJ, *et al.* Bismuth induced encephalopathy caused by tri potassium dicitrato bismuthate in a patient with chronic renal failure. *Gut* 1990; **31:** 359–60.
8. Hasking GJ, Duggan JM. Encephalopathy from bismuth subsalicylate. *Med J Aust* 1982; **2:** 167.
9. Mendelowitz PC, *et al.* Bismuth absorption and myoclonic encephalopathy during bismuth subsalicylate therapy. *Ann Intern Med* 1990; **112:** 140–1.
10. Vernace MA, *et al.* Chronic salicylate toxicity due to consumption of over-the-counter bismuth subsalicylate. *Am J Med* 1994; **97:** 308–9.

**Toxicity from non-conventional use.** The FDA has warned against use of an injectable product called bismacine or chromacine, which contains large amounts of bismuth. There are reports of death or serious adverse effects associated with its use. Although unlicensed for any use, bismacine has apparently been used in alternative medicine to treat Lyme disease.[1]

1. FDA. FDA warns consumers and health care providers not to use bismacine, also known as chromacine (issued 21st July 2006). Available at: http://www.fda.gov/bbs/topics/NEWS/2006/NEW01415.html (accessed 28/01/08)

## Interactions

Bismuth salts given orally reduce the absorption of tetracyclines, possibly by chelation or by reducing tetracycline solubility as a result of increasing the gastric pH. This interaction can be minimised by separating doses of the two drugs by a couple of hours. The clinical significance of this interaction to the use of bismuth salts for peptic ulcer disease is unclear; tripotassium dicitratobismuthate or bismuth salicylate have been given at the same time as tetracycline as part of triple therapy for the eradication of *Helicobacter pylori*.

**Antisecretory drugs.** Pretreatment with *omeprazole* resulted in about a threefold increase in absorption of bismuth from tripotassium dicitratobismuthate in 6 healthy subjects.[1] The mean peak plasma concentration of bismuth after a single dose of 240 mg of tripotassium dicitratobismuthate was increased from 36.7 to 86.7 nanograms/mL after omeprazole suggesting an increased risk of toxicity from combined therapy. The mechanism was thought to be the increase in gastric pH produced by the antisecretory drug as similar results had been reported with *ranitidine*.[2] However, the clinical significance of these interactions to the use of antisecretory drugs with bismuth compounds for eradication of *Helicobacter pylori* is unclear; bismuth compounds have been combined with proton pump inhibitors or $H_2$ antagonists in short-term regimens as part of triple or quadruple therapy.

1. Treiber G, *et al.* Omeprazole-induced increase in the absorption of bismuth from tripotassium dicitrato bismuthate. *Clin Pharmacol Ther* 1994; **55:** 486–91.
2. Nwokolo CU, *et al.* The effect of histamine H -receptor blockade on bismuth absorption from three ulcer-healing compounds. *Gastroenterology* 1991; **101:** 889–94.

## Pharmacokinetics

Poorly soluble bismuth compounds are largely converted to insoluble bismuth oxide, hydroxide, and oxychloride in the acidic environment of the stomach. Most of the bismuth compounds included in this monograph are thus only slightly absorbed. Increased gastric pH may increase bismuth absorption—see Antisecretory Drugs, above. Unabsorbed bismuth is excreted in the faeces. Absorbed bismuth is distributed throughout body tissues, including bone, and is slowly excreted in the urine and bile. It has a plasma half-life of about 5 days and continues to be excreted for about 12 weeks after stopping therapy.

◊ References.

1. Nwokolo CU, *et al.* The absorption of bismuth from oral doses of tripotassium dicitrato bismuthate. *Aliment Pharmacol Ther* 1989; **3:** 29–39.
2. Froomes PRA, *et al.* Absorption and elimination of bismuth from oral doses of tripotassium dicitrato bismuthate. *Eur J Clin Pharmacol* 1989; **37:** 533–6.
3. Lacey LF, *et al.* Comparative pharmacokinetics of bismuth from ranitidine bismuth citrate (GR122311X), a novel anti-ulcerant and tripotassium dicitrato bismuthate (TDB). *Eur J Clin Pharmacol* 1994; **47:** 177–80.

## Uses and Administration

Some insoluble salts of bismuth are given orally for their supposed antacid action and for their mildly astringent action in various gastrointestinal disorders, including diarrhoea (p.1694) and dyspepsia (p.1695). Such salts include the aluminate, salicylate, subcarbonate, and subnitrate. Bismuth salicylate, which is given as an antidiarrhoeal and weak antacid in doses up to about 4 g daily in divided doses, possesses in addition the properties of the salicylates.

Tripotassium dicitratobismuthate is active against *Helicobacter pylori* and has been used as triple therapy (with metronidazole and either tetracycline or amoxicillin) to eradicate this organism and thereby prevent relapse of duodenal ulcer. It is also used as a mucosal protectant for the treatment of peptic ulcer disease (p.1702). Bismuth subcitrate potassium and bismuth salicylate are also active against *H. pylori* and have been used similarly in eradication regimens.

The usual oral dose of tripotassium dicitratobismuthate in benign gastric and duodenal ulceration is 240 mg twice daily, or 120 mg four times daily before food. Treatment is for a period of 4 weeks, extended to 8 weeks if necessary. Maintenance therapy with tripotassium dicitratobismuthate is not recommended although treatment may be repeated after a drug-free interval of one month. When used as part of triple therapy the usual dose of tripotassium dicitratobismuthate has been 120 mg four times daily for 2 weeks. The usual dose of bismuth salicylate as part of triple therapy is 525 mg four times daily for 2 weeks. Appropriate antisecretory treatment with a histamine $H_2$-antagonist or a proton pump inhibitor is usually added to these regimens.

A complex of bismuth citrate with ranitidine, ranitidine bismuth citrate (p.1768), is also used in the treatment of peptic ulcer disease.

Some insoluble salts of bismuth have been used topically in the treatment of skin disorders, wounds, and burns. Some have been used as ingredients of ointments or suppositories (sometimes containing more than one bismuth salt) in the treatment of haemorrhoids and other anorectal disorders (p.1697). Bismuth compounds that have been used topically and/or rectally include the oxide, subgallate, and subnitrate; bismuth resorcinol compounds have also been used. For the use of bismuth subnitrate and iodoform paste as a wound dressing, see Iodoform, p.1650.

Numerous other salts and compounds of bismuth have been promoted for various therapeutic purposes. Glycobiarsol was formerly given orally as an amoebicide.

**Homoeopathy.** Bismuth has been used in homoeopathic medicines under the following names: Bismuthum; Bismutum metallicum.

Bismuth oxide has been used in homoeopathic medicines under the following names: Bismuthum oxydatum; Bis. ox.

Bismuth subnitrate has been used in homoeopathic medicines under the following names: Heavy bismuth subnitrate; Bismuthi subnitras ponderosus; Bismutum subnitricum; Bism. sub.

## Preparations

***BPC 1954:*** Bismuth Subnitrate and Iodoform Paste;
***USP 31:*** Bismuth Subsalicylate Magma; Bismuth Subsalicylate Oral Suspension; Bismuth Subsalicylate Tablets; Compound Resorcinol Ointment; Milk of Bismuth.

**Proprietary Preparations** (details are given in Part 3)
***Arg.:*** Re-Dux; Sesamoil; ***Braz.:*** Pepto-Bismol; Peptosan†; Peptulan; Senophile†; ***Canad.:*** Bismed†; Maalox Multi-action; Neo-Laryngobis; Pepto-Bismol; Personnel; ***Cz.:*** De-Nol†; Jatrox†; ***Fr.:*** Amygdorectol†; ***Ger.:*** Angass S†; Dermatol†; Haemo-Exhirud Bufexamac; Katulcin-R†; Stryphnasal N; Telen†; Ulkowis†; ***Gr.:*** De-Nol; ***Hong Kong:*** De-Nol; ***Hung.:*** De-Nol†; ***India:*** Trymo; ***Indon.:*** Scantoma; ***Irl.:*** De-Noltab†; ***Israel:*** Kalbeten; Pink Bismuth; ***Ital.:*** De-Nol; ***Mex.:*** Biselic†; Bismed; Bismofarma; Bisval; Facidmol; Itamol; Pepto-Bismol; Siparox; Sucrato; ***Neth.:*** De-Nol; ***NZ:*** De-Nol; ***Port.:*** De-Nol†; ***Rus.:*** De-Nol (Де-Нол); ***S.Afr.:*** De-Nol; ***Singapore:*** De-Nol; ***Spain:*** Gastrodenol; Rectamigdol; ***Switz.:*** Amygdorectol; ***Thai.:*** Gastro-Bismol; ***Turk.:*** De-Nol; Dermatol; ***UK:*** De-Noltab; Pepto-Bismol; ***USA:*** Bismatrol; Children's Kaopectate; Devrom; K-Pek†; Kao-Tin; Kaopectate; Kapectolin; Maalox Total Stomach Relief; Peptic Relief; Pepto-Bismol; ***Venez.:*** Pepto-Bismol†.

**Multi-ingredient:** ***Arg.:*** Anusol; Anusol Duo S; Benitol; Bismuto con Pectina; Colistop; Colistoral†; Crema De Bismuto; Cutidermin†; Gastop; Gastranil†; Gastricur; Histidanol†; Lemil; Mabis; ***Belg.:*** Gastrofilm†; Procto-Synalar; Rectovasol; ***Braz.:*** Aftine; Anusol-HC; Bismu-Jet; Bisuisan†; Claudemor; Colutoide; Cutisanol; Magnesia Bisurada; Neoseptil†; Salicilato de Bismuto Composto†; Senophile†; ***Canad.:*** Bismutal; Onrectal; Pepto-Bismol; Thunas Pile†; ***Cz.:*** Carbocit; Mastu S; Sagittaproct†; Spofax; Suspensio Visnevski cum Pice Liquida Herbacos; ***Fin.:*** Tannopon; ***Fr.:*** Anoreine; Anusol; Cutiphile†; Paps; Pholcones Bismuth; ***Ger.:*** Angass; Anisan†; Bismolan H Corti; Bismolan N†; Bismolan†; Combustin Heilsalbe; Duoventrin; Eulatin N; Eulatin NN; Faktu akut; Friosmin N†; Hamo-ratiopharm N; Hamoagil plus; Mastu S; Nervogastrol N†; Pascomag†; Spasmo-Nervogastrol†; Tamposit N†; Ventricon N; Vit-u-pept†; Wismut comp†; ***Hong Kong:*** Anusol; Anusol-HC†; Haemoral; Mastu S; Rowatanal; ***Hung.:*** Bolus Adstringens; Dermaforine†; Mastu S; Nilacid; ***Indon.:*** Anusol; Anusol-HC; ***Irl.:*** Anugesic-HC; Anusol; Anusol-HC; Rowatanal; ***Israel:*** Anusol†; Hemo; Rectozorin; Rekiv; ***Ital.:*** Antiemorroidali; Anusol; ***Malaysia:*** Rowatanal; ***Mex.:*** Estomacurol; Heliton; ***Neth.:*** Anaesthetica; Roteroblong Maagtabletten; Theranal; ***Pol.:*** Gastro; Hemorectal; ***Port.:*** Claudemor†; Servetinal†; Synalar Rectal; ***Rus.:*** Anaesthesol (Анестезол); Anusol (Анузол); Neo-Anusol (Нео-анузол); Proctosan (Проктозан); Simetrid (Симетрид); ***S.Afr.:*** Anugesic; Anusol; Arola Rosebalm; Biskapect; Bisma Rex†; Chloropect; Enterodyne; Kantrexil; Sentinel Ulcer Mixture; ***Singapore:*** Rowatanal; ***Spain:*** Grietalgen; Grietalgen Hidrocort†; Hemodren Compuesto†; Nasopomada; Pomada Infantil Vera†; Sabanotropico; Synalar Rectal; ***Switz.:*** Bismorectal; Cicafissan; Euproctol N; Fissan†; Furodermal; Haemocortin; Haemolan; La pommade du Dr Brand; Leucen; Magenpulver Hafter†; Magentabletten Hafter†; Rectoseptal-Neo bismuthe; ***Thai.:*** Anusol; Biodan†; Mastu S; Ulgastrin; ***Turk.:*** Dermikolin; Hemoralgine; Kortos; Metamorfoz; ***UK:*** Anugesic-HC; Anusol; Anusol-HC, Plus HC; Bisma-Rex; Hemocane; Moorland; OxBipp; Stomach Mixture; ***USA:*** Anumed; Anumed HC; BFI; Calmol; Heliadc; Hem-Prep; Hemril; K-C; Kao-Paverin; Kaodene Non-Narcotic; Mammol; Pylera; Rectagene Medicated Rectal Balm; ***Venez.:*** Claudemor†; Klincosal; Polantac.

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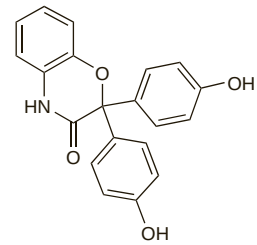
### Bisoxatin Acetate *(BANM, USAN, rINNM)*

Acetato de bisoxatina; Bisoxatin Diacetate; Bisoxatine, Acétate de; Bisoxatini Acetas; Wy-8138. 2,2-Bis(4-hydroxyphenyl)-1,4-benzoxazin-3(2*H*,4*H*)-one diacetate.

Бизоксатина Ацетат

$C_{24}H_{19}NO_6$ = 417.4.
*CAS — 17692-24-9 (bisoxatin); 14008-48-1 (bisoxatin acetate).*
*ATC — A06AB09.*
*ATC Vet — QA06AB09.*



*(bisoxatin)*

#### Profile

Bisoxatin acetate is a stimulant laxative that has been used in the treatment of constipation (p.1693).

#### Preparations

**Proprietary Preparations** (details are given in Part 3)
***Belg.:*** Wylaxine; ***Venez.:*** Regoxal.

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# Bran

Crusca; Farelo; Kleie; Salvado; Son.

Отруби

**Description.** Bran consists of the fibrous outer layers of cereal grains. It contains celluloses, polysaccharides or hemicelluloses, protein, fat, minerals, and moisture and may contain part of the germ or embryo. Bran provides water-insoluble fibre and, depending on the source, may also provide water-soluble fibre (see also Dietary Role, below). It comprises about 12% of the weight of the grain and is a byproduct of flour milling. It is available in various grades.

**Pharmacopoeias.** *US* includes wheat bran.
**USP 31** (Wheat Bran). The outer fraction of the cereal grain (comprising the pericarp, seed coat (testa), nucellar tissue, and aleurone layer) derived from *Triticum aestivum*, *T. compactum*, *T. durum*, or other common einkorn and emmer wheat cultivars. It is obtained by milling and processing the whole wheat grain, and is available in a variety of particle sizes depending on the degree of milling. It contains not less than 36% of dietary fibre. It is a light tan powder having a characteristic aroma. Practically insoluble in cold water and in alcohol.

## Adverse Effects

Large quantities of bran may temporarily increase flatulence and abdominal distension, and intestinal obstruction may occur rarely.

**Colonic atony.** Colonic atony has been reported in patients who had increased their intake of dietary fibre to relieve constipation associated with systemic sclerosis.[1]

1. Gough A, *et al.* Dietary advice in systemic sclerosis: the dangers of a high fibre diet. *Ann Rheum Dis* 1998; **57:** 641–2.