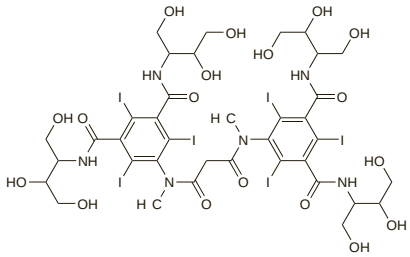
Iotrolan *(BAN, USAN, rINN)*

Iotrol; Iotrolán; Iotrolane; Iotrolanum; Iotrolum; Jotrolaani; Jotrolan; ZK-39482. *N,N′,N″,N‴*-Tetrakis(2,3-dihydroxy-1-hydroxymethylpropyl)-2,2′,4,4′,6,6′-hexaiodo-5,5′-(*N,N′*-dimethylmalonyldi-imino)di-isophthalamide.

Йотролан

$C_{37}H_{48}I_6N_6O_{18}$ = 1626.2.
CAS — 79770-24-4.
ATC — V08AB06.
ATC Vet — QV08AB06.



Description. Iotrolan contains about 46.8% of I.

Pharmacopoeias. In *Eur.* (see p.vii).
Ph. Eur. 6.2 (Iotrolan). A white or yellowish-white, hygroscopic powder. Very soluble in water; practically insoluble in alcohol; freely soluble in dimethyl sulfoxide. Store in airtight containers. Protect from light.

Adverse Effects, Treatment, and Precautions

As for the amidotrizoates, p.1475. For the adverse effects relating to the use of nonionic contrast media such as iotrolan for myelography, see under Iohexol, p.1483.

Pharmacokinetics

Iotrolan is excreted unchanged in the urine. After intrathecal injection, about 80% is excreted in the urine within 24 hours.

Uses and Administration

Iotrolan is a nonionic dimeric iodinated radiographic contrast medium (p.1474). It is given intrathecally for myelography and for contrast enhancement in computed tomography, and by instillation into body ducts or cavities for procedures including lymphography, arthrography, hysterosalpingography, cholangiopancreatography, and for visualisation of the mammary ducts. It may also be given orally for imaging of the gastrointestinal tract.

Iotrolan is usually available as solutions containing 51.3% or 64.1% of iotrolan (equivalent to 240 or 300 mg/mL of iodine, respectively) and the dose and strength used vary according to the procedure and route.

Preparations

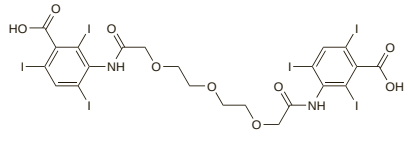
Proprietary Preparations (details are given in Part 3)
Austral.: Isovist†; ***Austria:*** Isovist; ***Canad.:*** Osmovist†; ***Cz.:*** Isovist†; ***Denm.:*** Isovist; ***Fin.:*** Isovist†; ***Ger.:*** Isovist; ***Hung.:*** Isovist; ***Neth.:*** Isovist; ***NZ:*** Isovist; ***S.Afr.:*** Isovist; ***Switz.:*** Isovist; ***UK:*** Isovist.

Iotroxic Acid *(BAN, USAN, rINN)*

Acide Iotroxique; Ácido iotróxico; Acidum Iotroxicum; Jotroksihappo; Jotroxsyra; SH-213AB. 3,3′-(3,6,9-Trioxaundecanedioyldi-imino)bis(2,4,6-tri-iodobenzoic acid).

Йотроксовая Кислота

$C_{22}H_{18}I_6N_2O_9$ = 1215.8.
CAS — 51022-74-3.
ATC — V08AC02.
ATC Vet — QV08AC02.



Description. Iotroxic acid contains about 62.6% of I.

Pharmacopoeias. In *Int.* and *Jpn.*

Meglumine Iotroxate *(BANM, rINNM)*

Dimeglumine Iotroxate; Iotroxate de Méglumine; Iotroxate Meglumine; Iotroxato de meglumina; Meglumine Iotroxinate; Meglumini Iotroxas. The di(*N*-methylglucamine)salt of iotroxic acid.

Меглумина Йотроксат

$C_{22}H_{18}I_6N_2O_9.2C_7H_{17}NO_5$ = 1606.2.
CAS — 68890-05-1.
ATC — V08AC02.
ATC Vet — QV08AC02.

Description. Meglumine iotroxate contains about 47.4% of I.

Adverse Effects, Treatment, and Precautions

See under the amidotrizoates, p.1475.

Pharmacokinetics

After intravenous injection, iotroxic acid binds to plasma proteins and is taken up by the liver; plasma-protein binding is about 60 to 90%. It is excreted primarily unchanged in the bile; a small amount is metabolised and excreted in the urine.

Uses and Administration

Iotroxic acid is an ionic dimeric iodinated radiographic contrast medium (see p.1474); it is taken up by the liver and excreted in bile, and is used in cholecystography and cholangiography.

Iotroxic acid is given intravenously as a solution containing 10.5% of the meglumine salt. The usual dose is 10.5 g of meglumine iotroxate (equivalent to about 5 g of iodine), given by infusion over at least 15 minutes. Alternatively, a solution containing 22.8% of meglumine iotroxate may be used.

Preparations

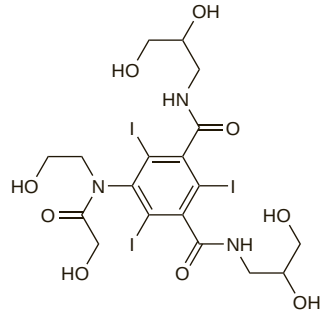
Proprietary Preparations (details are given in Part 3)
Austral.: Biliscopin; ***Austria:*** Biliscopin; ***Ger.:*** Biliscopin; ***Gr.:*** Biliscopin; ***NZ:*** Biliscopin; ***Spain:*** Bilisegrol†; ***Swed.:*** Biliscopin†; ***Switz.:*** Biliscopin; ***UK:*** Biliscopin.

Ioversol *(BAN, USAN, rINN)*

Ioversolum; Joversol; Joversoli; MP-328. *N,N′*-Bis(2,3-dihydroxypropyl)-5-[*N*-(2-hydroxyethyl)glycolamido]-2,4,6-tri-iodoisophthalamide.

Йоверсол

$C_{18}H_{24}I_3N_3O_9$ = 807.1.
CAS — 87771-40-2.
ATC — V08AB07.
ATC Vet — QV08AB07.



Description. Ioversol contains about 47.2% of I.

Pharmacopoeias. In *US.*
USP 31 (Ioversol). Store at a temperature of 25°, excursions permitted between 15° and 30°.

Adverse Effects, Treatment, and Precautions

See under the amidotrizoates, p.1475.

Pharmacokinetics

When given intravascularly, ioversol is rapidly eliminated unchanged in the urine, with a half-life of about 1.5 hours; more than 95% of a dose is eliminated within 24 hours. Binding to plasma or serum proteins is very low.

Uses and Administration

Ioversol is a nonionic monomeric iodinated radiographic contrast medium (p.1474) that is given intra-arterially or intravenously for angiography and urography. It is also used for contrast enhancement during computed tomography. It is usually available as a solution containing 34 to 74% of ioversol (equivalent to 160 to 350 mg/mL of iodine). The dose and strength used vary according to the procedure and route.

◊ References.

1. Floriani I, *et al.* Clinical profile of ioversol: a metaanalysis of 57 randomized, double-blind clinical trials. *Invest Radiol* 1996; **31:** 479–91.

Preparations

USP 31: Ioversol Injection.

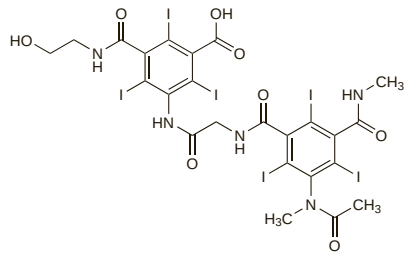
Proprietary Preparations (details are given in Part 3)
Arg.: Optiray; ***Austral.:*** Optiray; ***Austria:*** Optiray; ***Belg.:*** Optiject; Optiray; ***Canad.:*** Optiray; ***Cz.:*** Optiray; ***Denm.:*** Optiray; ***Fin.:*** Optiray; ***Fr.:*** Optiject; Optiray; ***Ger.:*** Optiray†; ***Gr.:*** Optiray; ***Hung.:*** Optiray; ***Israel:*** Optiray; ***Ital.:*** Optiray; ***Neth.:*** Optiray; ***Norw.:*** Optiray; ***Port.:*** Optiray; ***Spain:*** Optiray; ***Swed.:*** Optiray; ***Switz.:*** Optiray; ***UK:*** Optiray; ***USA:*** Optiray.

Ioxaglic Acid *(BAN, USAN, rINN)*

Acide ioxaglique; Ácido ioxáglico; Acidum ioxaglicum; Joksagliinihappo; Joksagliko rūgštis; Joxaglinsav; Joxaglinsyra; Kyselina joxaglová; P-286. *N*-(2-Hydroxyethyl)-2,4,6-tri-iodo-5-[2′,4′,6′-tri-iodo-3′-(*N*-methylacetamido)-5′-methylcarbamoylhippuramido]-isophthalamic acid.

Йоксагловая Кислота

$C_{24}H_{21}I_6N_5O_8$ = 1268.9.
CAS — 59017-64-0.
ATC — V08AB03.
ATC Vet — QV08AB03.



Description. Ioxaglic acid contains about 60% of I.

Pharmacopoeias. In *Eur.* (see p.vii) and *US.*
Ph. Eur. 6.2 (Ioxaglic Acid). A white or almost white hygroscopic powder. Very slightly soluble in water and in dichloromethane; slightly soluble in alcohol. It dissolves in dilute solutions of alkali hydroxides. Store in airtight containers. Protect from light.
USP 31 (Ioxaglic Acid). Store at a temperature of 25°, excursions permitted between 15° and 30°.

Meglumine Ioxaglate *(BANM, rINNM)*

Ioxaglate de Méglumine; Ioxaglate Meglumine *(USAN)*; Ioxaglato de meglumina; Meglumini Ioxaglas; MP-302 (meglumine ioxaglate with sodium ioxaglate). The *N*-methylglucamine salt of ioxaglic acid.

Меглумина Йоксаглат

$C_{24}H_{21}I_6N_5O_8.C_7H_{17}NO_5$ = 1464.1.
CAS — 59018-13-2.
ATC — V08AB03.
ATC Vet — QV08AB03.

Description. Meglumine ioxaglate contains about 52% of I.

Sodium Ioxaglate *(BANM, rINNM)*

Ioxaglate de Sodium; Ioxaglate Sodium *(USAN)*; Ioxaglato sódico; MP-302 (sodium ioxaglate with meglumine ioxaglate); Natrii Ioxaglas; Natriumjoksaglaatti; Natriumjoxaglat.

Натрий Йоксаглат

$C_{24}H_{20}I_6N_5NaO_8$ = 1290.9.
CAS — 67992-58-9.
ATC — V08AB03.
ATC Vet — QV08AB03.

Description. Sodium ioxaglate contains about 59% of I.

Adverse Effects, Treatment, and Precautions

See under the amidotrizoates, p.1475.

Pharmacokinetics

On intravascular use, ioxaglates are rapidly distributed throughout the extracellular fluid. Protein binding is reported to be very low. They are mainly excreted unchanged in the urine, although biliary excretion may predominate in renal impairment. With normal renal function, about 90% of a dose is excreted in the urine within 24 hours; an elimination half-life of about 90 minutes has been reported. Ioxaglates cross the placenta and are distributed into breast milk. They are removed by haemodialysis and peritoneal dialysis.

Uses and Administration

Ioxaglic acid is an ionic dimeric iodinated radiographic contrast medium (p.1474). It is given intravenously, intra-arterially, intra-articularly, or by instillation into body ducts and cavities and is used in diagnostic procedures including angiography, arthrography, hysterosalpingography, and urography. It is also used for contrast enhancement during computed tomography.

Ioxaglic acid is usually available as solutions containing a mixture of the sodium and meglumine salts. Commonly used solutions contain 39.3% of meglumine ioxaglate and 19.6% of sodium ioxaglate (equivalent to 320 mg/mL of iodine) or 24.6% of meglumine ioxaglate and 12.3% of sodium ioxaglate (equivalent to 200 mg/mL of iodine). The dose and strength used depend upon the procedure and route.

Preparations

USP 31: Ioxaglate Meglumine and Ioxaglate Sodium Injection.

Proprietary Preparations (details are given in Part 3)
Arg.: Hexabrix; ***Austral.:*** Hexabrix; ***Austria:*** Hexabrix; ***Belg.:*** Hexabrix; ***Braz.:*** Hexabrix†; ***Canad.:*** Hexabrix; ***Chile:*** Hexabrix; ***Cz.:*** Hexabrix; ***Denm.:*** Hexabrix; ***Fin.:*** Hexabrix; ***Fr.:*** Hexabrix; ***Ger.:*** Hexabrix; ***Gr.:*** Hexabrix; ***Hung.:*** Hexabrix; ***Israel:*** Hexabrix; ***Ital.:*** Hexabrix; ***Neth.:***

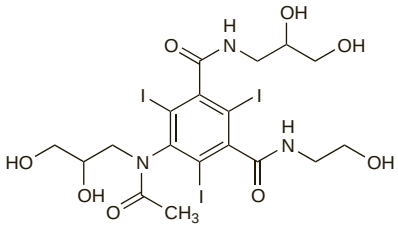
Hexabrix; ***Norw.:*** Hexabrix; ***NZ:*** Hexabrix; ***Port.:*** Hexabrix; ***Spain:*** Hexabrix; ***Swed.:*** Hexabrix; ***Switz.:*** Hexabrix; ***UK:*** Hexabrix; ***USA:*** Hexabrix; ***Venez.:*** Hexabrix.

Ioxilan *(USAN, rINN)*

Ioxilán; Ioxilane; Ioxilanum. *N*-(2,3-Dihydroxypropyl)-5-[*N*-(2,3-dihydroxypropyl)acetamido]-*N*′-(2-hydroxyethyl)-2,4,6-triidoisophthalamide.

Йоксилан

$C_{18}H_{24}I_3N_3O_8$ = 791.1.
CAS — 107793-72-6.
ATC — V08AB12.
ATC Vet — QV08AB12.



Description. Ioxilan contains about 48.1% of I.

Pharmacopoeias. In *US*.

USP 31 (Ioxilan). A white to off-white, practically odourless, powder. Soluble in water and in methyl alcohol. pH of a 10% solution in water is between 5.0 and 7.5. Store at a temperature of 25°, excursions permitted between 15° and 30°. Protect from light.

Adverse Effects, Treatment, and Precautions

See under the amidotrizoates, p.1475.

Pharmacokinetics

After intravascular use, ioxilan is rapidly eliminated unchanged in the urine; about 94% of a dose is excreted within 24 hours. Protein binding is reported to be very low. Ioxilan is dialysable.

Uses and Administration

Ioxilan is a nonionic monomeric iodinated radiographic contrast medium (see p.1474). It is given intra-arterially or intravenously for procedures including angiography and urography; it is also used for contrast enhancement during computed tomography.

Ioxilan is usually available as solutions containing 62.3 or 72.7% of ioxilan (equivalent to 300 or 350 mg/mL of iodine). The dose and strength used vary according to the procedure and route.

Preparations

USP 31: Ioxilan Injection.

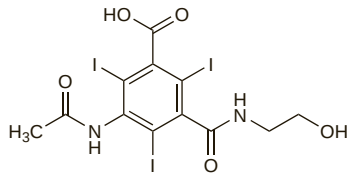
Proprietary Preparations (details are given in Part 3)
Jpn: Imagenil; ***USA:*** Oxilan.

Ioxitalamic Acid *(rINN)*

Acide Ioxitalamique; Ácido ioxitalámico; Acidum Ioxitalamicum; AG-58107; Ioxithalamic Acid; Joksitalaamihappo; Joxitalamsyra. 5-Acetamido-*N*-(2-hydroxyethyl)-2,4,6-tri-iodoisophthalamic acid.

Йокситаламовая Кислота

$C_{12}H_{11}I_3N_2O_5$ = 643.9.
CAS — 28179-44-4.
ATC — V08AA05.
ATC Vet — QV08AA05.



Description. Ioxitalamic acid contains about 59.1% of I.

Pharmacopoeias. In *Fr.*

Meglumine Ioxitalamate *(rINNM)*

Ioxitalamate de Méglumine; Ioxitalamate Meglumine; Ioxitalamato de meglumina; Meglumini Ioxitalamas. The *N*-methylglucamine salt of ioxitalamic acid.

Меглумина Йокситаламат

$C_{12}H_{11}I_3N_2O_5.C_7H_{17}NO_5$ = 839.2.
CAS — 29288-99-1.
ATC — V08AA05.
ATC Vet — QV08AA05.

Description. Meglumine ioxitalamate contains about 45.4% of I.

Sodium Ioxitalamate *(rINNM)*

Ioxitalamate de Sodium; Ioxitalamate Sodium; Ioxitalamato sódico; Natrii Ioxitalamas.

Натрий Йокситаламат

$C_{12}H_{10}I_3N_2NaO_5$ = 665.9.
CAS — 33954-26-6.
ATC — V08AA05.
ATC Vet — QV08AA05.

Description. Sodium ioxitalamate contains about 57.2% of I.

Profile

Ioxitalamic acid is an ionic monomeric iodinated radiographic contrast medium (p.1474) with actions similar to those of the amidotrizoates (p.1475). It is given intravenously or by instillation into body cavities for procedures including angiography, cholangiography, cystography, hysterosalpingography, and urography; it may be given orally or rectally for imaging of the gastrointestinal tract. It is also used for contrast enhancement in computed tomography.

Ioxitalamic acid is usually available as a solution containing 21% of the sodium salt (equivalent to 120 mg/mL of iodine), 55.1 to 66% of the meglumine salt (equivalent to 250 to 300 mg/mL of iodine), or as a mixture of both salts. The dose and strength used vary according to the procedure and route.

Monoethanolamine ioxitalamate has also been used.

Preparations

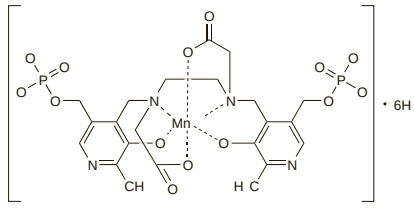
Proprietary Preparations (details are given in Part 3)
Arg.: Telebrix 30; Telebrix 38; Telebrix Coronario; Telebrix Hystero; ***Belg.:*** Telebrix; Telebrix Gastro; Telebrix Hystero; ***Braz.:*** Telebrix†; ***Canad.:*** Telebrix; ***Chile:*** Telebrix 30; Telebrix 35; ***Cz.:*** Telebrix 30; Telebrix 35; Telebrix Gastro; ***Fr.:*** Telebrix 12; Telebrix 30; Telebrix 35; Telebrix Gastro; Telebrix Hystero; ***Ger.:*** Telebrix Gastro; Telebrix N 180 and 300; ***Gr.:*** Telebrix Gastro; Telebrix Hystero†; ***Hung.:*** Telebrix; Telebrix Gastro; ***Israel:*** Telebrix; Telebrix Gastro; ***Mex.:*** Telebrix; ***Neth.:*** Telebrix 12; Telebrix 30; Telebrix 35; Telebrix Gastro; Telebrix Hystero; ***Port.:*** Telebrix 12; Telebrix 30; Telebrix 35; Telebrix Gastro; Telebrix Hystero; ***Switz.:*** Telebrix 12; Telebrix 30; Telebrix 35; Telebrix Gastro; Telebrix Hystero; ***Venez.:*** Telebrix 30; Telebrix 35; Telebrix Hystero.

Mangafodipir Trisodium *(BANM, USAN, rINNM)*

Mangafodipir trisódico; Mangafodipir Trisodique; Mangafodipirum Trinatricum; MnDPDP (mangafodipir); S-095 (mangafodipir); Win-59010; Win-59010-2 (mangafodipir). Trisodium trihydrogen (*OC*-6-13)-{[*N*,*N*′-ethylenebis(*N*-{[3-hydroxy-5-(hydroxymethyl)-2-methyl-4-pyridyl]methyl}glycine) 5,5′-bis(phosphato)](8-)} manganate(6-); Trisodium trihydrogen (*OC*-6-13)-*N*,*N*′-ethane-1,2-diylbis{N-[2-methyl-3-oxido-κ*O*-5-(phosphonatooxymethyl)-4-pyridylmethyl]glycinato(*O*,*N*)}manganate(II).

Тринатрий Мангафодипир

$C_{22}H_{27}MnN_4Na_3O_{14}P_2$ = 757.3.
CAS — 155319-91-8 (mangafodipir); 140678-14-4 (mangafodipir trisodium).
ATC — V08CA05.
ATC Vet — QV08CA05.



(mangafodipir)

Pharmacopoeias. In *US*.

USP 31 (Mangafodipir Trisodium). Pale yellow crystals or crystalline powder. Freely soluble in water; very slightly soluble in alcohol and in acetone; slightly soluble in chloroform; sparingly soluble in methyl alcohol. pH of a 1% solution in water is between 5.5 and 7.0. Store at a temperature not exceeding 8°.

Adverse Effects and Precautions

The most common adverse effects of mangafodipir are injection site discomfort, feelings of warmth or flushing, headache, nausea, vomiting, abdominal pain, and taste disturbances. Hypersensitivity reactions, including anaphylactoid reactions, may occur. Transient increases in bilirubin and liver transaminase concentrations and decreases in plasma-zinc concentrations have been reported.

Mangafodipir should be used with caution in patients with hepatic or renal impairment and should be avoided if impairment is severe. It should not be given to patients with phaeochromocytoma.

◊ References.

1. Federle MP, *et al.* Safety and efficacy of mangafodipir trisodium (MnDPDP) injection for hepatic MRI in adults: results of the U.S. multicenter phase III clinical trials (safety). *J Magn Reson Imaging* 2000; **12:** 186–97.

Pharmacokinetics

After intravenous injection, mangafodipir is dephosphorylated and manganese is exchanged for zinc leading to the release of free manganese ions and the formation of 2 inactive metabolites. Manganese is rapidly taken up by the liver, pancreas, kidney and spleen; about 15 to 20% is excreted in the urine within 24 hours, with most of the remainder excreted in the faeces over about 4 days. The metabolites are almost entirely excreted in the urine within 24 hours.

Uses and Administration

Mangafodipir is a manganese chelate that is used as a magnetic resonance contrast medium (p.1474) for imaging of the liver and pancreas. Manganese has paramagnetic properties that increase the relaxivity of hydrogen ions, leading to signal enhancement. Free manganese is released from mangafodipir in the body and is taken up by normal liver and pancreatic tissue, increasing the degree of contrast.

Mangafodipir is given intravenously as the trisodium salt.

In the UK, a solution containing mangafodipir trisodium 7.57 mg/mL (10 micromol/mL) is used. Usual doses for imaging are:

- liver: 0.5 mL/kg (5 micromol/kg) given by intravenous infusion at a rate of 2 to 3 mL/minute
- pancreas: 0.5 mL/kg (5 micromol/kg) given by intravenous infusion at a rate of 4 to 6 mL/minute

In the USA, a more concentrated preparation is used, containing mangafodipir trisodium 37.9 mg/mL (50 micromol/mL). Usual doses are:

- liver: 0.1 mL/kg (5 micromol/kg), given by slow intravenous injection to a maximum dose of 15 mL

Preparations

USP 31: Mangafodipir Trisodium Injection.

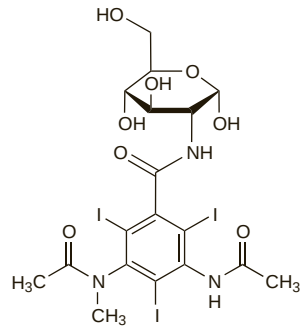
Proprietary Preparations (details are given in Part 3)
Austria: Teslascan; ***Belg.:*** Teslascan; ***Cz.:*** Teslascan; ***Denm.:*** Teslascan†; ***Fin.:*** Teslascan†; ***Fr.:*** Teslascan; ***Ger.:*** Teslascan; ***Gr.:*** Teslascan; ***Hung.:*** Teslascan; ***Ital.:*** Teslascan; ***Neth.:*** Teslascan; ***Norw.:*** Teslascan; ***NZ:*** Teslascan; ***Port.:*** Teslascan; ***Spain:*** Teslascan; ***Swed.:*** Teslascan; ***Switz.:*** Teslascan; ***UK:*** Teslascan; ***USA:*** Teslascan.

Metrizamide *(BAN, USAN, rINN)*

Metritsamidi; Metrizamid; Metrizamida; Métrizamide; Metrizamidum; Win-39103. 2-[3-Acetamido-2,4,6-tri-iodo-5-(*N*-methylacetamido)benzamido]-2-deoxy-D-glucose.

Метризамид

$C_{18}H_{22}I_3N_3O_8$ = 789.1.
CAS — 31112-62-6 (metrizamide); 55134-11-7 (metrizamide, glucopyranose form).
ATC — V08AB01.
ATC Vet — QV08AB01.



Description. Metrizamide contains about 48.2% of I.

Profile

Metrizamide is a nonionic monomeric iodinated radiographic contrast medium (p.1474) that has been used in myelography, angiography, intravenous urography, and arthrography, and also for contrast enhancement during computed tomography.

Breast feeding. No adverse effects have been seen in breast-feeding infants whose mothers were receiving metrizamide and the American Academy of Pediatrics considers[1] that it is therefore usually compatible with breast feeding.

1. American Academy of Pediatrics. The transfer of drugs and other chemicals into human milk. *Pediatrics* 2001; **108:** 776–89. Correction. *ibid.*; 1029. Also available at: http://aappolicy.aappublications.org/cgi/content/full/pediatrics%3b108/3/776 (accessed 27/03/06)