1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Marfloxin 100 mg/ml solution for injection for cattle and pigs

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each ml contains:

Active substances:
Marbofloxacin 100 mg

Excipients:

Qualitative composition of excipients and other constituents	**Quantitative composition if that information is essential for proper administration of the veterinary medicinal product**
Disodium edetate	0.10 mg
Monothioglycerol	1 mg
Metacresol	2 mg
Gluconolactone	
Water for injections	

Clear, greenish yellow to brownish yellow solution.

3. CLINICAL INFORMATION

3.1 Target species

Cattle and pigs.

3.2 Indications for use for each target species

In cattle:
- treatment of respiratory infections caused by sensitive strains of *Pasteurella multocida, Mannheimia haemolytica* and *Histophilus somni.*
- treatment of acute *E.coli* mastitis.

In pigs:
- treatment of Metritis Mastitis Agalactia (MMA) syndrome caused by susceptible strains of organisms.

3.3 Contraindications

Do not use in cases of hypersensitivity to fluoroquinolones, or to any of the excipients.
Do not use in cases where the pathogen involved is resistant to other fluoroquinolones (cross resistance).

3.4 Special warnings

None.

3.5 Special precautions for use

Special precautions for safe use in the target species:

Official and local antimicrobial policies should be taken into account when the veterinary medicinal product is used. Fluoroquinolones should be reserved for the treatment of clinical conditions which have responded poorly, or are expected to respond poorly, to other classes of antimicrobials. Whenever possible, fluoroquinolones should only be used based on susceptibility testing. Use of the veterinary medicinal product deviating from the instructions given in the SPC may increase the prevalence of bacteria resistant to the fluoroquinolones and may decrease the effectiveness of treatment with other quinolones due to the potential for cross resistance.

Special precautions to be taken by the person administering the veterinary medicinal product to animals:

People with known hypersensitivity to fluoroquinolones should avoid contact with the veterinary medicinal product.
In case of contact with skin or eyes, rinse with plenty of water.
Accidental self-injection can induce a slight irritation.
In case of accidental self-injection or ingestion, seek medical advice immediately and show package leaflet or the label to the physician.

Special precautions for the protection of the environment:

Not applicable.

3.6 Adverse events

Cattle:

Undetermined frequency (cannot be estimated from the available data):	Injection site oedema[2], injection site pain[1,2], injection site inflammation[1,2]

[1]Administration by subcutaneous route, without clinical impact.
[2]Administration by intramuscular route, transient, may persist for at least 12 days after injection.

Fluoroquinolones are known to induce arthropathies. Nevertheless, this effect has never been observed with marbofloxacin in cattle.

Reporting adverse events is important. It allows continuous safety monitoring of a veterinary medicinal product. Reports should be sent, preferably via a veterinarian, to either the marketing authorisation holder or its local representative or the national competent authority via the national reporting system. See the package leaflet for respective contact details.

3.7 Use during pregnancy, lactation or lay

Pregnancy and lactation:

Studies in laboratory rats and rabbits have not produced any evidence of a teratogenic, embryotoxic or maternotoxic effects.
Can be used in pregnant and lactating cows and sows when administered at 2 mg/kg.
Safety of the veterinary medicinal product at 8 mg/kg has not been established during pregnancy and lactation. Use only according to the benefit/risk assessment by the responsible veterinarian.

3.8 Interaction with other medicinal products and other forms of interaction

None known.

3.9 Administration routes and dosage

Cattle: Subcutaneous, intramuscular or intravenous use.
Pigs: Intramuscular use.

Cattle:
- treatment of acute *E. coli* mastitis: 2 mg/kg i.e. 1 ml/50 kg in a single daily injection by intramuscular, subcutaneous or intravenous routes. Treatment duration is 3 to 5 days.

- treatment of respiratory infections caused by sensitive strains of *Pasteurella multocida, Mannheimia haemolytica*, and *Histophilus somni*:

either 2 mg/kg i.e. 1 ml/50 kg in a single daily injection by intramuscular, subcutaneous or intravenous routes. Treatment duration is 3 to 5 days.

or 8 mg/kg i.e. 2 ml/25 kg body weight in a single intramuscular injection on a single occasion.

If the volume to be injected is more than 20 ml, it should be divided between two or more injection sites.

Pigs:
- treatment of Metritis Mastitis Agalactia (MMA) syndrome caused by sensitive strains of organisms: 2 mg/kg i.e. 1 ml/50 kg in a single daily injection by intramuscular route. Treatment duration is 3 days.

In cattle and pigs, the preferred injection site is the neck area.

To ensure a correct dosage, bodyweight should be determined as accurately as possible.

The cap may be safely punctured up to 25 times. It is recommended that a draw-off needle be used to reduce the number of times the septum is punctured.

3.10 Symptoms of overdose (and where applicable, emergency procedures and antidotes)

No sign of overdosage has been observed after administration of 3 times the recommended dose and no severe side-effects are to be expected at doses up to 3 to 5 times the recommended dose in cattle and pigs.
Overdosage may cause signs such as acute neurological disorders which should be treated symptomatically.

3.11 Special restrictions for use and special conditions for use, including restrictions on the use of antimicrobial and antiparasitic veterinary medicinal products in order to limit the risk of development of resistance.

Not applicable.

3.12 Withdrawal periods

Cattle

2 mg/kg for 3 to 5 days (**i.m./s.c./i.v.)**
Meat and offal: 4 days.
Milk: 24 hours.

8 mg/kg on a single occasion (**i.m.)**
Meat and offal: 3 days.
Milk: 72 hours.

Pigs

Meat and offal: 2 days.

4. PHARMACOLOGICAL INFORMATION

4.1 ATCvet code: QJ01MA93

4.2 Pharmacodynamics

Marbofloxacin is a synthetic, bactericidal antimicrobial, belonging to the fluoroquinolone group which acts by inhibition of DNA gyrase. It is effective against a wide range of Gram positive bacteria (in particular *Staphylococci, Streptococci*) and Gram negative bacteria (*Citrobacter* spp., *Enterobacter* spp., *Escherichia coli, Histophilus somni., Klebsiella* spp., *Mannheimia haemolytica, Pasteurella multocida*). It should be noted that some strains of *Streptococci* and *Pseudomonas* may not be sensitive to marbofloxacin.

The marbofloxacin in vitro activity against pathogens isolated in 2004 from bovine respiratory diseases during a clinical field trial in France, Germany, Spain and Belgium, is good: MIC values are comprised between 0.015 and 0.25 µg/ml for *M. haemolytica* (MIC_{90} = 0.124 µg/ml; MIC_{50} = 0.025 µg/ml), between 0.004 and 0.12 µg/ml for *P. multocida* (MIC_{90} = 0.022 µg/ml; MIC_{50} = 0.009 µg/ml) and between 0.015 and 2 µg/ml for *Histophilus somni*. Strains with MIC ≤ 1 µg/ml are sensitive to marbofloxacin whereas strains with MIC ≥ 4 µg/ml are resistant to marbofloxacin.

Resistance to fluoroquinolones occurs by chromosomal mutation with three mechanisms: decrease of the bacterial wall permeability, expression of efflux pump or mutation of enzymes responsible for molecule binding.

4.3 Pharmacokinetics

After subcutaneous or intramuscular administration in cattle and intramuscular administration in pigs at the recommended dose of 2 mg/kg, marbofloxacin is readily absorbed and reaches maximal plasma concentrations of 1.5 µg/ml within less than 1 hour. Its bioavailability is close to 100%.
It is weakly bound to plasma proteins (less than 10% in pigs, and 30% in cattle) extensively distributed and in most tissues (liver, kidney, skin, lung, bladder, uterus, digestive tract) it achieves a higher concentration than in plasma.
In cattle, marbofloxacin is eliminated slowly in pre-ruminating calves ($t_{½}\beta$ = 5-9 hrs) but faster in ruminant cattle ($t_{½}\beta$ = 4-7 hrs) predominantly in the active form in urine (3/4 in pre-ruminating calves, ½ in ruminants) and faeces (1/4 in pre-ruminating calves, ½ in ruminants).
In pigs, marbofloxacin is eliminated slowly ($t_{½}\beta$ = 8-10 hrs) predominantly in the active form in urine (2/3) and faeces (1/3).

After a single intramuscular administration in cattle at the recommended dose of 8 mg/kg, the maximum plasma concentration of marbofloxacin (c_{max}) is 7.3 µg/ml reached in = 0.78 hrs (t_{max}). Binding to plasma proteins is about 30%. Marbofloxacin is eliminated slowly ($t_{1/2}$ = 15.60 h), predominantly in the active form in urine and faeces.

5. PHARMACEUTICAL PARTICULARS

5.1 Major incompatibilities

In the absence of compatibility studies, this veterinary medicinal product must not be mixed with other veterinary medicinal products.

5.2 Shelf life

Shelf life of the veterinary medicinal product as packaged for sale: 3 years.
Shelf life after first opening the immediate packaging: 28 days.

5.3 Special precautions for storage

Store in the original package in order to protect from light.
Do not freeze.

5.4 Nature and composition of immediate packaging

50 ml or 100 ml or 250 ml amber glass vial (Ph. Eur. type II) sealed with a bromobutyl rubber stopper and aluminium closure packaged in an outer carton.

Not all pack sizes may be marketed.

5.5 Special precautions for the disposal of unused veterinary medicinal products or waste materials derived from the use of such products

Medicines should not be disposed of via wastewater or household waste.

Use take-back schemes for the disposal of any unused veterinary medicinal product or waste materials derived thereof in accordance with local requirements and with any national collection systems applicable to the veterinary medicinal product concerned.

6. NAME OF THE MARKETING AUTHORISATION HOLDER

KRKA, d.d., Novo mesto

7. MARKETING AUTHORISATION NUMBER(S)

VPA10774/014/002

8. DATE OF FIRST AUTHORISATION

26/08/2011

9. DATE OF THE LAST REVISION OF THE SUMMARY OF THE PRODUCT CHARACTERISTICS

16/06/2025

10. CLASSIFICATION OF VETERINARY MEDICINAL PRODUCTS

Veterinary medicinal product subject to prescription.

Detailed information on this veterinary medicinal product is available in the Union Product Database (https://medicines.health.europa.eu/veterinary).