

SUMMARY OF PRODUCT CHARACTERISTICS

1. NAME OF THE VETERINARY MEDICINAL PRODUCT

PANOMEK Injection for Cattle, Sheep and Pigs
(ivermectin)

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Per 1ml:
Ivermectin 10 mg

For full list of excipients, see section 6.1

3. PHARMACEUTICAL FORM

Solution for injection.

4. CLINICAL PARTICULARS

4.1 Target species

Cattle, sheep and pigs.

4.2 Indications for use, specifying the target species

PANOMEK Injection for Cattle, Sheep and Pigs is indicated for the effective treatment and control of the following harmful parasites of cattle, sheep and pigs:

CATTLE

PARASITE	Adult	L4	Inhibited L4
Gastrointestinal Roundworms			
<i>Ostertagia lyrata</i>	•	•	
<i>Ostertagia ostertagi</i>	•	•	•
<i>Cooperia oncophora</i>	•	•	
<i>Cooperia pectinata</i>	•	•	
<i>Cooperia punctata</i>	•	•	
<i>Haemonchus placei</i>	•	•	
<i>Trichostrongylus axei</i>	•	•	
<i>Trichostrongylus colubriformis</i>	•	•	
<i>Bunostomum phlebotomum</i>	•	•	
<i>Oesophagostomum radiatum</i>	•	•	
<i>Strongyloides papillosus</i>	•		
<i>Nematodirus helvetianus</i>	•		
<i>Nematodirus spathiger</i>	•		
<i>Trichuris</i> spp.	•		
Lungworms			
<i>Dictyocaulus viviparus</i>	•	•	
Eye Worms			
<i>Thelazia</i> spp	•		

Warbles

Hypoderma bovis

H. lineatum

Mange Mites

Psoroptes ovis

Sarcoptes scabiei var. *bovis*

Sucking Lice

Linognathus vituli

Haematopinus eurysternus

Solenopotes capillatus

PANOMEK Injection for Cattle, Sheep and Pigs may also be used as an aid in the control of biting lice (*Damalinia bovis*) and the mange mite *Chorioptes bovis*, but complete elimination may not occur.

Persistent Activity

PANOMEK Injection for Cattle, Sheep and Pigs given at the recommended dosage of 0.2 mg per kg bodyweight controls re-infection with:

Parasite	No. Of Days After Treatment
Barbers pole worm – <i>Haemonchus placei</i>	14
Small intestinal worm – <i>Cooperia</i> spp.	14
Hairworm – <i>Trichostrongylus axei</i>	14
Brown stomach worm – <i>Ostertagia ostertagi</i>	21
Nodular worm – <i>Oesophagostomum radiatum</i>	21
Lungworm – <i>Dictyocaulus viviparus</i>	28

The timing of treatment should be based on epidemiological factors and should be customised for each individual farm. A dosing program should be established by a qualified professional person

SHEEP

PARASITE	Adult	L4	Inhibited L4
Gastrointestinal Roundworms			
<i>Ostertagia circumcincta</i>	•	•	•
<i>O. trifurcata</i>	•	•	
<i>Haemonchus contortus</i>	•	•	•
<i>Trichostrongylus axei</i>	•		
<i>T. colubriformis</i>	•	•	
<i>T. vitrinus</i>	•		
<i>Cooperia curticei</i>	•	•	
<i>Oesophagostomum columbianum</i>	•	•	
<i>O. venulosum</i>	•		
<i>Nematodirus filicollis</i>	•	•	
<i>Chabertia ovina</i>	•	•	
<i>Trichuris ovis</i>	•		
Lungworms			
<i>Dictyocaulus filaria</i>	•	•	

Protostrongylus rufescens •
Nasal Bots
Oestrus ovis
Mange Mites
*Psoroptes ovis**

*For the treatment and control of sheep scab, two injections with a seven-day interval are required to treat clinical signs of scab and to eliminate mites.

PIGS

PARASITE	Adult	L4
<i>Gastrointestinal Roundworms</i>		
<i>Ascaris suum</i>	•	•
<i>Hyostrogylus rubidus</i>	•	•
<i>Oesophagostomum</i> spp	•	•
<i>Strongyloides ransomi</i> *	•	
<i>Lungworms</i>		
<i>Metastrongylus</i> spp	•	
Lice		
<i>Haematopinus suis</i>		
Mange Mites		
<i>Sarcoptes scabiei</i> var. <i>suis</i>		

* Includes somatic larval stages

4.3 Contra-indications

Do not use intramuscularly or intravenously.

PANOMEK Injection for Cattle, Sheep and Pigs has been formulated specifically for use in these target species. Do not use in other species as severe adverse reactions, including fatalities in dogs, may occur.

4.4 Special warnings for each target species

Details provided above apply. See also points 4.2, 4.3 and 4.5.

Care should be taken to avoid the following practices because they increase the risk of development of resistance and could ultimately result in ineffective therapy:

- Too frequent and repeated use of anthelmintics from the same class, over an extended period of time.
- Underdosing, which may be due to underestimation of bodyweight, misadministration of the product, or lack of calibration of the dosing device (if any).

Suspected clinical cases of resistance to anthelmintics should be further investigated using appropriate tests (e.g. Faecal Egg Count Reduction Test). Where the results of the test(s) strongly suggest resistance to a particular anthelmintic, an anthelmintic belonging to another pharmacological class and having a different mode of action should be used.

Resistance to macrocyclic lactones (which includes ivermectin) has been reported in *Teladorsagia* spp. in sheep and in *Cooperia* spp. in cattle within the EU. Therefore, the use of this product should be based on local (regional, farm) epidemiological information about susceptibility of nematodes and recommendations on how to limit further selection for resistance to anthelmintics.

4.5 Special precautions for use

i. Special precautions for use in animals

In sheep treatment of psoroptic mange (sheep scab) with one injection is not recommended because, although a clinical improvement may be seen, elimination of all mites may not occur.

Sheep scab (*Psoroptes ovis*) is an extremely contagious external parasite of sheep. Following treatment of infected sheep, great care must be taken to avoid re-infestation, as mites may be viable for up to 15 days off the sheep. It is important to ensure all sheep which have been in contact with infected sheep are treated.

Contact between treated infected and non-treated, non-infected flocks must be avoided until at least 7 days after the last treatment.

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

Take care to avoid self-injection: the product may cause local irritation and/or pain at the injection site.

Do not smoke, eat or drink while handling the product.

Wash hands after use.

In case of accidental self-injection, seek medical advice and show the label or package leaflet to the physician.

4.6 Adverse reactions (frequency and seriousness)

Cattle

Transitory discomfort has been observed in some cattle following subcutaneous administration. A low incidence of soft tissue swelling at the injection site has been observed.

Sheep

Immediately following subcutaneous injection, activity suggesting pain, sometimes intense but usually transient, has been observed in some sheep.

Pigs

Mild and transient pain reactions may be seen in some pigs following subcutaneous injection.

All these reactions disappeared without treatment.

4.7 Use during pregnancy, lactation or lay

PANOMEK Injection for Cattle, Sheep and Pigs can be administered to cows and ewes at any stage of pregnancy or lactation provided that the milk is not intended for human consumption, and to sows at any stage of pregnancy or lactation. It can be used in breeding ewes, rams, sows and boars and will not affect fertility. PANOMEK Injection for Cattle, Sheep and Pigs can be given to all ages of animals including young calves, lambs and piglets.

Please also refer to point 4.4.

4.8 Interaction with other medicinal products and other forms of interaction

PANOMEK Injection for Cattle, Sheep and Pigs has been used concurrently without adverse effects with foot and mouth disease vaccine or clostridial vaccine, given at separate injection sites.

Adequate vaccination of sheep against clostridial infections is strongly recommended.

4.9 Amounts to be administered and administration route

PANOMEK Injection for Cattle, Sheep and Pigs should be given only by subcutaneous injection at the recommended dosage level of 200 mcg ivermectin per kg bodyweight under the loose skin in front of, or behind, the shoulder in cattle and in the neck in sheep. At the recommended dosage level of 300 mcg ivermectin per kg of bodyweight, PANOMEK Injection for Cattle, Sheep and Pigs should be given only subcutaneously in the neck in pigs.

Syringes must be filled from the vial through a dry sterile draw-off needle that has been placed in the vial stopper. Vial stoppers must not be breached more than 20 times.

This product does not contain an antimicrobial preservative. Swab septum before removing each dose.

Use sterile needle and syringe. When treating groups of animals use only an automatic dosing device (with vented draw-off apparatus when using the 50ml vial).

To ensure administration of a correct dose, body weight should be determined as accurately as possible; accuracy of the dosing device should be checked.

Use this chart as a guide in working out the appropriate dose rate:

Cattle (1ml/50kg)		Sheep (0.5ml/25kg)		Pigs (1ml/33kg)	
Bodyweight (kg)	Dose Volume (ml)	Bodyweight (kg)	Dose Volume (ml)	Bodyweight (kg)	Dose Volume (ml)
Up to 50	1.0	Up to 5	0.1	Less than 4	0.1
51 – 100	2.0	5.1 – 10	0.2	5 – 7	0.2
101 – 150	3.0	10.1 – 15	0.3	8 – 10	0.3
151 – 200	4.0	15.1 – 25	0.5	11 – 13	0.4
201 – 250	5.0	25.1 – 50	1.0	14 – 16	0.5
251 – 300	6.0	50.1 – 75	1.5	17 – 33	1.0
301 – 350	7.0	75.1 - 100	2.0	34 – 50	1.5
351 - 400	8.0			51 – 66	2.0
				67 – 99	3.0
				100 – 133	4.0
				134 – 166	5.0
				167 - 200	6.0
For cattle weighing over 400kg calculate the dose at the rate of 1ml per 50kg bodyweight.		For sheep weighing over 100kg calculate the dose at the rate of 0.5ml per 25kg bodyweight.		For pigs weighing over 200kg calculate the dose at the rate of 1ml per 33kg bodyweight.	

When treating pigs and sheep of less than 16kg, seek veterinary advice regarding the use of 1ml disposable syringes graduated in increments of 0.1ml. When treating individual sheep, a syringe, not exceeding 2ml and calibrated in increments of 0.1 ml, should be used.

Each ml contains 10 mg of ivermectin sufficient to treat 50 kg of bodyweight of cattle and sheep and 33 kg of bodyweight of pigs. The injection may be given with any standard automatic or single-dose or hypodermic syringe. Use of 17 gauge x 1/2 inch needle is suggested.

Replace with a fresh sterile needle after every 10 to 12 animals. Injection of wet or dirty animals is not recommended.

For the treatment and control of sheep scab (*Psoroptes ovis*), two injections with a seven-day interval are required to treat clinical signs of scab and to eliminate mites.

4.10 Overdose (symptoms, emergency procedures, antidotes), if necessary

Cattle

Single doses of 4.0 mg ivermectin per kg (20 x the use level) given subcutaneously resulted in ataxia and depression.

Sheep

At oral dose levels up to 4 mg ivermectin per kg (20 x the use level) given subcutaneously resulted in ataxia and depression.

Pigs

A dose of 30 mg ivermectin per kg (100 x the recommended dose of 0.3 mg per kg) injected subcutaneously to pigs caused lethargy, ataxia, bilateral mydriasis, intermittent tremors, laboured breathing and lateral recumbency.

No antidote has been identified; however, symptomatic therapy may be beneficial.

4.11 Withdrawal periods

Cattle (meat & Offal) : 49 days

Cattle (milk) : Do not use in cattle producing milk for human consumption.

Do not use in non-lactating dairy cows, including pregnant heifers, within 60 days of calving.

Sheep (meat & offal) : 37 days

Sheep (milk) : Do not use in sheep producing milk for human consumption

Pigs (meat & offal) : 19 days.

5. PHARMACOLOGICAL PROPERTIES

Pharmacotherapeutic group:

Endectocides, macrocyclic lactones, avermectins

ATCVet code: QP54AA01

5.1 Pharmacodynamic properties

Mechanism of Action

Ivermectin is a member of the macrocyclic lactone class of endectocides which have a unique mode of action. Compounds of the class bind selectively and with high affinity to glutamate-gated chloride ion channels which occur in invertebrate nerve and muscle cells. This leads to an increase in the permeability of the cell membrane to chloride ions with hyperpolarization of the nerve or muscle cell, resulting in paralysis and death of the parasite. Compounds of this class may also interact with other ligand-gated chloride channels, such as those gated by the neurotransmitter gamma-aminobutyric acid (GABA).

The margin of safety for compounds of this class is attributable to the fact that mammals do not have glutamate-gated chloride channels, the macrocyclic lactones have a low affinity for other mammalian ligand-gated chloride channels and they do not readily cross the blood-brain barrier.

5.2 Pharmacokinetic properties

Maximum plasma concentration

Cattle

At a dose level of 0.2 mg ivermectin per kg a maximum plasma concentration of 35-50 ng/ml is reached in +/- 2 days and the half-life in plasma is 2.8 days. It is also established that ivermectin is carried mainly in the plasma (80%). This distribution between plasma and blood cells remain relatively constant.

Sheep

At a dose level of 0.3 mg ivermectin per kg an average peak of 16 ng/ml is reached one day after injection.

Pigs

During trials carried out at a dose rate of 0.2 mg/kg ivermectin, a plasma concentration of 10-20 ng/ml was reached in +/- 2 days and half-life in plasma was 0.5 day.

Excretion: length of time and route

Cattle

A liquid chromatographic method with fluorescence detection allows the determination of ivermectin residues in tissues. After an injection of 0.3 mg ivermectin per kg, the liver (target tissue) had residues ranging from 454 ppb at 2 days post treatment to 11 ppb at 28 days post treatment.

The injection site had residues shortly after treatment, ranging up to 69 ppm at 2 days withdrawal, but by 28 days the average residue was negligible (< 2 ppb). Cattle receiving a single dose of tritium-labelled ivermectin (0.2 - 0.3 mg/kg body weight) were slaughtered at 7, 14, 21 and 28 days after dosing. Composites of faeces collected during the first 7 days after dosing contained almost all the dosed radioactivity. Only about 1-2 % of the dosed radioactivity was excreted in the urine.

Analyses of the faeces showed that about 40-50% of the excreted radioactivity was present as unaltered drug. The remaining 50-60% was present as metabolites or degradation products almost all which were more polar than the ivermectin.

Sheep

A liquid chromatographic method with fluorescence detection allows the determination of ivermectin residues in tissues. After an injection of 0.3 mg ivermectin per kg, the liver (target tissue) had residues ranging from 160 ppb at 3 days post treatment to 7.2 ppb at 28 days post treatment. The highest residue levels were recovered in fat (from 230 ppb at 3 days post treatment to 13 ppb at 28 days post treatment). Residues in all tissues were below 30 ppb at 28 days post treatment. Radioactive ivermectin was administered to sheep at a dose rate of 0.3 mg per kg. Analyses of the faeces showed that about 99% of the drug and its metabolites are excreted in the faeces, +/- 1 % being excreted in the urine.

Pigs

A liquid chromatographic method with fluorescence detection allows the determination of ivermectin residues in tissues. After an injection of 0.4 mg/kg ivermectin the liver (target tissue) contained average residues ranging from 69 ppb at 3 days post dose to 13 ppb at 14 days post dose. No liver residue (< 2 ppb) was found at 28 days post dose. Swine receiving a single dose of tritium-labelled ivermectin (0.3-0.4 mg/kg) were slaughtered at 1, 7, 14 and 28 days after dosing. Composites of faeces collected during the first 7 days after dosing contained only about 36% of the dosed radioactivity. Less than 1% of the dosed radioactivity was found in the

urine. Analysis of the faeces showed that about 40% of the excreted radioactivity was unaltered drug.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Glycerol Formal
Propylene Glycol

6.2 Incompatibilities

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

6.3 Shelf-life

Shelf-life of the veterinary medicinal product as packaged for sale: 5 years.
Shelf-life after first opening the immediate packaging: 6 months.

6.4 Special precautions for storage

Protect from direct sunlight and store below 30°C.
Keep out of reach of children.
This product does not contain any antimicrobial preservative.
Following withdrawal of the first dose, use the product within 6 months.
Discard unused material.

6.5 Nature and composition of immediate packaging

Multiple-dose rubber-capped polyethylene bottles of 50 ml, 200 ml and 500 ml containing a sterile non-aqueous solution for parenteral administration. Bottles are stoppered and then either sealed by heat or crimp-sealed with an aluminium cap.

6.6 Special precautions for the disposal of unused veterinary medicinal product or waste materials derived from the use of such products, if appropriate

EXTREMELY DANGEROUS TO FISH AND AQUATIC LIFE. Do not contaminate ponds, waterways or ditches with product or empty container. Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal products should be disposed of in accordance with local requirements.

7. MARKETING AUTHORISATION HOLDER

Boehringer Ingelheim Animal Health UK Ltd
Ellesfield Avenue
Bracknell
Berkshire
RG12 8YS

8. MARKETING AUTHORISATION NUMBER

Vm 08327/4193

9. DATE OF FIRST AUTHORISATION

6 April 1995

10. DATE OF REVISION OF THE TEXT

October 2018

11. ANY OTHER INFORMATION REQUIRED BY THE SECRETARY OF STATE

Not applicable.

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Approved 30 October 2018