

# Summary of Product Characteristics

## 1 NAME OF THE VETERINARY MEDICINAL PRODUCT

Pulmovet 250 mg/ml solution for use in drinking water or milk replacer for cattle, pigs, chickens and turkeys

## 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

One ml contains:

### **Active substance:**

Tilmicosin (as tilmicosin phosphate): 250 mg

### **Excipients:**

Propyl gallate (E310): 0.2 mg

Disodium edetate: 2.0 mg

For the full list of excipients, see section 6.1.

## 3 PHARMACEUTICAL FORM

Solution for use in drinking water or milk replacer.  
Clear yellow to brown solution.

## 4 CLINICAL PARTICULARS

### 4.1 Target Species

Cattle (pre-ruminant), pigs, chickens (except hens producing eggs for human consumption) and turkeys.

### 4.2 Indications for use, specifying the target species

Calves: For the treatment and metaphylaxis of bovine respiratory disease, associated with *Mannheimia haemolytica*, *Pasteurella multocida*, *Mycoplasma bovis* and *M. dispar* susceptible to tilmicosin.

Pigs: For the treatment and metaphylaxis of respiratory disease associated with *Mycoplasma hyopneumoniae*, *Pasteurella multocida*, *Actinobacillus pleuropneumoniae* susceptible to tilmicosin.

Chickens: For the treatment and metaphylaxis of respiratory disease associated with *Mycoplasma gallisepticum* and *M. synoviae* susceptible to tilmicosin.

Turkeys: For the treatment and metaphylaxis of respiratory disease associated with *Mycoplasma gallisepticum* and *M. synoviae* susceptible to tilmicosin.

The presence of the disease in the group/flock must be established before the product is used.

### 4.3 Contraindications

Do not allow horses and other equines access to drinking water containing tilmicosin.  
Do not use in case of hypersensitivity to tilmicosin or to any of the excipients.

#### 4.4 Special warnings for each target species

Important: Must be diluted before administration to animals.

Pigs, chickens and turkeys: Water consumption should be monitored in order to guarantee adequate dosing. In case water consumption does not match quantities for which recommended concentrations were calculated, the concentration of the product has to be adapted in a way that the recommended dosage will be taken up by the animals or different medication should be considered.

The uptake of medication by animals can be altered as a consequence of illness. In case of insufficient uptake of water or milk replacer, animals should be treated parenterally using an appropriate injectable product.

Repeated use of the product should be avoided by improving management practices and thorough cleansing and disinfection.

#### 4.5 Special precautions for use

##### Special precautions for use in animals

For oral use only. Contains disodium edetate; do not inject.

Use of the product should be based on susceptibility testing of the bacteria isolated from the animal. If this is not possible, therapy should be based on local (regional, farm level) epidemiological information about susceptibility of the target bacteria. Use of the product deviating from the instructions given in the SPC may increase the prevalence of bacteria resistant to tilmicosin and may decrease the effectiveness of treatment with other macrolides, lincosamides and streptogramin B due to the potential for cross-resistance.

Official, national and regional antimicrobial policies should be taken into account when the product is used.

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

Tilmicosin may induce irritation. Macrolides, such as tilmicosin, may also cause hypersensitivity (allergy) following injection, inhalation, ingestion or contact with skin or eye. Hypersensitivity to tilmicosin may lead to cross reactions to other macrolides and vice versa. Allergic reactions to these substances may occasionally be serious and therefore direct contact should be avoided.

To avoid exposure during preparation of the medicated drinking water or milk replacer, wear overalls, safety glasses, and impervious gloves. Do not eat, drink or smoke when handling this product. Wash hands after use.

In the case of accidental ingestion, wash out mouth immediately with water and seek medical advice. In the event of accidental skin contact, wash thoroughly with soap and water. In case of accidental eye contact, flush the eyes with plenty of clean, running water.

Do not handle the product if you are allergic to ingredients in the product.

If you develop symptoms following exposure, such as skin rash, you should seek medical advice and show the physician this warning. Swelling of the face, lips and eyes or difficulty in breathing are more serious symptoms and require urgent medical attention.

#### 4.6 Adverse reactions (frequency and seriousness)

In very rare cases (less than 1 animal in 10,000 animals treated, including isolated reports), a decrease in water intake has been observed.

#### 4.7 Use during pregnancy, lactation or lay

The safety of the veterinary medicinal product has not been established during pregnancy, lactation or lay. Use only according to the benefit/risk assessment by the responsible veterinarian.

#### 4.8 Interaction with other medicinal products and other forms of interactions

Tilmicosin may lessen the antibacterial activity of beta-lactam antibiotics.

Do not use simultaneously with bacteriostatic antimicrobial agents.

#### 4.9 Amounts to be administered and administration route

For oral use only. The product must be diluted in drinking water (pigs, chickens, turkeys) or milk replacer (calves) before administration.

Calves: 12.5 mg tilmicosin/kg body weight (i.e. 1 ml of product per 20 kg BW), twice daily, for 3-5 consecutive days.

Pigs: 15-20 mg tilmicosin/kg body weight/day (i.e. 6-8 ml of product per 100 kg of BW per day), for 5 consecutive days, which may be achieved by the inclusion of 200 mg of tilmicosin per litre (80 ml of product per 100 litres).

Chickens: 15-20 mg tilmicosin/kg body weight/day (i.e. 6-8 ml of product per 100 kg of BW per day), for 3 consecutive days, which may be achieved by the inclusion of 75 mg of tilmicosin per litre (30 ml of product per 100 litres).

Turkeys: 10-27 mg tilmicosin/kg body weight/day (i.e. 4-11 ml of product per 100 kg of BW per day), for 3 consecutive days, which may be achieved by the inclusion of 75 mg of tilmicosin per litre (30 ml of product per 100 litres).

The exact daily amount of the veterinary medicinal product required can be calculated according to the following formula:  
$$\text{ml product per litre drinking water per day} = [\text{ml product per kg bodyweight per day} \times \text{average bodyweight (kg)}] / \text{average daily water intake (litre)}.$$

One 960 ml bottle of product is sufficient to medicate 1200 litres of drinking water for pigs or 3200 litres of drinking water for chickens or turkeys. One 5040 ml bottle is sufficient to medicate 6300 litres of drinking water for pigs or 16800 litres of drinking water for chickens or turkeys.

One 960 ml bottle and 5040 ml can of product are sufficient to medicate in milk replacer respectively 48 to 80 and 252 to 420 veal calves each of 40 kg body weight depending on the duration of treatment.

To ensure a correct dosage, bodyweight should be determined as accurately as possible to avoid under-dosing.

The required dose should be measured using suitably calibrated measuring equipment.

Only sufficient medicated drinking water should be prepared to cover the daily requirements.

The medicated water should be the only source of drinking water for the animals for the entire duration of the treatment period.

Water intake should be monitored at frequent intervals during medication.

After the end of the medication period, the water supply system should be cleaned appropriately to avoid intake of sub-therapeutic amounts of the active substance.

Medicated drinking water should be prepared fresh every 24 hours. Medicated milk replacer should be prepared fresh every 6 hours.

The medicinal product should be diluted with water or milk replacer prior to its use and the concentration of the prediluted solution should not exceed 200 ml of product/litre (i.e. 1 in 5). The lowest concentrations of the product at which stability can be assured are 0.3 ml product/litre drinking water and 0.7 ml product/litre milk replacer.

The uptake of medicated water/milk replacer depends on the clinical condition of the animals. In order to obtain the correct dosage, the concentration of the product should be adjusted accordingly.

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

No symptoms of overdose, with exception of a slight decrease in the milk consumption, have been seen in calves given twice daily doses 5 times the maximum recommended dose or for twice the maximum recommended duration of treatment.

When pigs are offered drinking water containing 300 or 400 mg tilmicosin/litre (equivalent to 22.5-40 mg tilmicosin/kg body weight or 1.5-2 times the recommended concentration) commonly animals exhibit a reduced water intake. Although this has a self-limiting effect on tilmicosin intake, it could, in extreme circumstances, result in dehydration. This can be corrected by the removal of the medicated drinking water and replacement with fresh unmedicated water.

No symptoms of overdose have been seen in chickens given drinking water containing levels of tilmicosin up to 375 mg/litre (equivalent to 75-100 mg tilmicosin/kg body weight or 5 times the recommended dose) for 5 days; daily treatment with 75 mg tilmicosin/litre (equivalent to the maximum recommended dose) for 10 days resulted in a reduction in faecal consistency.

No symptoms of overdose have been seen in turkeys given drinking water containing levels of tilmicosin up to 375 mg/litre (equivalent to 50-135 mg tilmicosin/kg body weight or 5 times the recommended dose) for 3 days; daily treatment with 75 mg tilmicosin/litre (equivalent to the maximum recommended dose) for 6 days also produced no symptoms of overdose.

#### 4.11 Withdrawal period(s)

Calves: meat and offal: 42 days.

Pigs: meat and offal: 14 days.

Chickens: meat and offal: 12 days.

Turkeys: meat and offal: 19 days.

Not authorised for use in animals producing milk for human consumption.

Not authorised for use in birds producing eggs for human consumption.

Do not use within 2 weeks of the start of the laying period.

## 5 PHARMACOLOGICAL or IMMUNOLOGICAL PROPERTIES

**Pharmacotherapeutic group:** Antibacterial for systemic use, macrolides.

**ATCvet-code:** QJ01FA91

### 5.1 Pharmacodynamic properties

Tilmicosin is a semi-synthetic antibiotic of the macrolide group and is believed to affect protein synthesis. It has bacteriostatic action but at high concentrations it may be bactericidal.

Tilmicosin is primarily active against Gram-positive bacteria, although some Gram-negative bacteria and mycoplasmas are also affected by this drug. In particular, activity has been demonstrated against the following microorganisms:

- Calves: *Mannheimia haemolytica*, *Pasteurella multocida*, *Mycoplasma bovis* and *M. dispar*.
- Pigs: *Mycoplasma hyopneumoniae*, *Pasteurella multocida* and *Actinobacillus pleuropneumoniae*
- Chickens and turkeys: *Mycoplasma gallisepticum* and *Mycoplasma synoviae*

NCCLS breakpoints	resistant	intermediate	susceptible
Bovine <i>Pasteurella</i> spp	≥ 32 µg/ml	16 µg/ml	≤ 8 µg/ml
Porcine <i>Pasteurella multocida</i>	≥ 32 µg/ml		≤ 16 µg/ml
Porcine <i>Actinobacillus pleuropneumoniae</i>	≥ 32 µg/ml		≤ 16 µg/ml

Scientific evidence suggests that macrolides act synergistically with the host immune system. Macrolides appear to enhance phagocyte killing of bacteria. Tilmicosin has been shown to inhibit in vitro the replication of the Porcine Reproductive and Respiratory Syndrome virus in alveolar macrophages in a dose dependent fashion.

Cross-resistance between tilmicosin and other macrolides and lincomycin has been observed.

Macrolides inhibit protein synthesis by reversibly binding to the 50S ribosomal subunit. Bacterial growth is inhibited by induction of the separation of peptidyl transfer RNA from the ribosome during the elongation phase.

Ribosomal methylase, encoded by the *erm* gene, can precipitate resistance to macrolides by alteration of the ribosomal binding site.

The gene that encodes for an efflux mechanism, *mef*, also brings about a moderate degree of resistance.

Resistance is also brought about by an efflux pump that actively rids the cells of the macrolide. This efflux pump is chromosomally mediated by genes referred to as *acrAB* genes.

## 5.2 Pharmacokinetic particulars

Whilst blood concentrations of tilmicosin are low, there is pH-dependent macrophage accumulation of tilmicosin in inflamed tissues.

Calves: As early as 6 hours after oral administration of 25 mg tilmicosin/kg body weight/day in milk replacer, an average active substance concentration of 3.1 µg/g was detected in lung tissue. 78 hours after the start of treatment, the tilmicosin concentration in lung tissue was 42.7 µg/g. Therapeutically effective concentrations of tilmicosin were measured up to 60 hours after treatment.

Pigs: After oral administration of 200 mg tilmicosin/l drinking water, the average active substance concentrations detected in lung tissue, alveolar macrophages and bronchial epithelium 5 days after the start of treatment were 1.44 µg/ml, 3.8 µg/ml and 7.4 µg/g respectively.

Poultry: As early as 6 hours after oral administration of 75 mg tilmicosin/l drinking water, the average active substance concentrations detected in lung and alveolar tissue were 0.63 µg/g and 0.30 µg/g respectively. 48 hours after the start of treatment, the tilmicosin concentrations in lung and alveolar tissue were 2.3 µg/g and 3.29 µg/g respectively.

Turkeys: After oral administration of 75 mg tilmicosin/l drinking water, the average active substance concentrations detected in lung tissue, air sac tissue and plasma 5 days after the start of treatment were 1.89 µg/ml, 3.71 µg/ml and 0.02 µg/g respectively. The highest mean tilmicosin concentration detected for lung tissues was 2.19 µg/g at 6 days; for air sac tissue it was 4.18 µg/g at 2 days and in the plasma it was 0.172 µg/g at 3 days.

## 5.3 Environmental properties

The active ingredient tilmicosin is persistent in soils.

# 6 PHARMACEUTICAL PARTICULARS

## 6.1 List of excipients

Disodium edetate  
Propyl gallate (E310)  
Phosphoric acid, concentrated (for pH adjustment)  
Purified water

## 6.2 Major 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: 3 years.  
Shelf life after first opening of the immediate packaging: 3 months.  
Shelf life after reconstitution in drinking water: 24 hours.  
Shelf life after reconstitution in milk replacer: 6 hours.

## 6.4 Special precautions for storage

Store below 25°C. Do not refrigerate or freeze. Protect from frost. Protect from light.

### **6.5 Nature and composition of immediate packaging**

- High-density polyethylene bottles with low-density polyethylene screw cap containing 960 ml of product;
- High-density polyethylene can with high-density polyethylene screw cap containing 5040 ml of product.

Not all pack sizes may be marketed.

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

Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal products should be disposed of in accordance with local requirements.

Veterinary medicinal product must not be disposed of via waste water or the drainage systems.

## **7 MARKETING AUTHORISATION HOLDER**

Dopharma Research B.V.  
Zalmweg 24  
4941 VX Raamsdonksveer  
Netherlands

## **8 MARKETING AUTHORISATION NUMBER(S)**

VPA10791/010/001

## **9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION**

Date of first authorisation: 4<sup>th</sup> May 2018

## **10 DATE OF REVISION OF THE TEXT**

October 2019