A Review of Morantel Tartrate

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A Product Profile

Morantel tartrate is in the tetrahydropyrimidine family of compounds. It is the 3-methyl thiophene tartrate salt analog of pyrantel tartrate, a swine and equine anthelmintic effective against the immature and adult stages of certain nematodes.(3)

Morantel tartrate, manufactured by Pfizer, Inc., was approved in the United States for use in cattle in 1981, and entered the market in early 1982. Three formulations have been approved in the United States: RUMATEL® Medicated Premix-88; RUMATEL Cattle Wormer Bolus, and PARATEECT FLEX™ Diffuser, a sustained release bolus.(1) While all three formulations were approved, Pfizer is currently marketing only RUMATEL Medicated Premix-88 in the United States at this time. All three formulations approved in the United States are for use in all classes of cattle including lactating dairy cattle at any stage of lactation. There is no milk withholding required; however, there is a 14 day meat withdrawal in cattle.(1)

RUMATEL Medicated Premix-88 contains 88 gm/lb of morantel tartrate, with a dose level of 4.4 mg/lb body weight. The drug is absorbed rapidly from the abomasum and upper part of the small intestine, reaching peak blood levels in about 4-6 hours. About 74% of the oral dose is excreted in the feces largely unchanged. Approximately 14%, is excreted by the kidneys as metabolic breakdown products. The remaining 12% or so is metabolized and eliminated through tissue and/or milk. Maximum daily excretion occurred 24-48 hours post-dosing.(2) Metabolites of morantel tartrate will be found in milk within 12 hours after dosing.; however, the level is not at or near the tolerance level allowed by the F&DA. The tolerance level was established to be 240 parts per billion (ppb) and has a 1000 fold safety factor. (2)

There are two apparent modes of action on parasites by morantel tartrate. The first is similar to benzimidazole activity of inhibiting the fumarate reductase system of the parasite. The second is a direct action on acetylcholine receptors at neuromuscular junctions. This latter action results in paralysis and death of the parasite. It is a nicotinic type of response causing a spastic paresis, an over-stimulation of the nervous system.(2)
The main activity of morantel tartrate is against the adult stages of certain nematodes found in the gastrointestinal tract. There is a sporadic activity against the larval stages. The affected larval stages are found in the intestinal lumen. There is no appreciable effect against the inhibited stage of *Ostertagia*.

Claims for adult nematodes include *Haemonchus* spp., *Ostertagia* spp., *Trichostrongylus* spp., *Cooperia* spp., *Nematodirus* spp., and *Oesophagostomum radiatum*. Percent efficacy according to the RUMATEL Technical Manual was 91-100% depending upon the particular parasite (Table 1). There is no efficacy against lungworms (*Dictyocaulus*).(3)

Table 1. Efficacy (%) of morantel tartrate at 10 mg/kg against adult stages of various gastrointestinal parasites of cattle:

<table>
<thead>
<tr>
<th>Source</th>
<th><em>Haemonchus</em></th>
<th><em>Ostertagia</em></th>
<th><em>Trichostrongylus</em></th>
<th><em>Cooperia</em></th>
<th><em>Nematodirus</em></th>
<th><em>O. radiatum</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pfizer</td>
<td>&gt;99</td>
<td>91</td>
<td>97</td>
<td>&gt;99</td>
<td>100</td>
<td>&gt;99</td>
</tr>
<tr>
<td>Ciordia(4)</td>
<td>100</td>
<td>89</td>
<td>99</td>
<td>100</td>
<td>ND*</td>
<td>ND*</td>
</tr>
<tr>
<td>Conway(5)</td>
<td>&gt;99</td>
<td>90</td>
<td>97</td>
<td>100</td>
<td>100</td>
<td>ND*</td>
</tr>
<tr>
<td>feed</td>
<td>100</td>
<td>85</td>
<td>98</td>
<td>100</td>
<td>100</td>
<td>ND*</td>
</tr>
<tr>
<td>bolus</td>
<td>98</td>
<td>94-98</td>
<td>ND*</td>
<td>98</td>
<td>ND*</td>
<td>ND*</td>
</tr>
</tbody>
</table>

*Cornwell et al* found that infections with *Ostertagia* less than 21 days old were not affected by morantel tartrate, and even at a 2X dose the effect was minimal (52%). They also found that efficacy against infections that were 7 days old with both *Cooperia* and *Haemonchus* were poor. *Dictyocaulus* was not controlled by the product.(6)

According to Pfizer's Technical Manual, morantel tartrate was given at 20X the normal dose level with no problems. It can also be given with vaccines, implants, organophosphate sprays and dips, and other injectable pharmaceuticals. Morantel tartrate is approved for use in the United States in pregnant cows as well as breeding bulls. It is also approved for use in goats.

Since morantel tartrate is not effective against inhibited *Ostertagia* and *Dictyocaulus* other products on the market may be of more value in dairy heifers. However, morantel tartrate is effective against some of the economically important adult nematodes that infect cattle. Research and field experience have not indicated any toxicity problems with the product when
used according to label directions. It is approved for use in dairy cattle including lactating animals and does not require a withholding of milk from the treated animals.

The product does not, however, control many larval stages including inhibited Ostertagia or lungworm infections. This may require the retreatment of animals in 2-4 weeks that are heavily infected or in a highly contaminated environment. Type II ostertagiasis will also necessitate another treatment if the animals had been treated prior to the emergence of the Ostertagia larvae from glands of the abomasum.

**References:**


