

# Clinical Effect of Dimethylsulphoxide in Sheep Suffering from Heartwater

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## Introduction

Clinical heartwater, an often-fatal tick-borne disease, is caused by the rickettsia *Cowdria ruminantium* transmitted by the *Amblyomma* tick species. This disease is characterized by pyrexia (rectal temperature exceeding 40°C/104°F), listlessness and depression, inappetence and forestomach atony, hyperesthesia, hypermetria, lateral recumbency and agonal paddling of the limbs. Petechiation of the mucous membranes is common and chemosis (edema) of the conjunctiva may be evident. There are numerous strains of the causative organism that result in various presentations of clinical disease. The disease is the third most important cause of financial loss to livestock farmers in sub-Saharan Africa.

Heartwater is known to occur on Guadeloupe, and it has been suggested that the disease may spread to the American mainland either via subclinically infected imported livestock or on migrating cattle egrets that carry the vector. Climatic conditions suitable for establishment of the vector exist, and large populations of susceptible white-tailed deer offer the possibility of wide-scale spread of the disease.

Oxytetracyclines are the therapeutic drug group of choice in treatment of the disease. While anecdotal evidence of the beneficial effects of other symptomatic treatments exist none of these have been subjected to scientific scrutiny. Dimethylsulphoxide (DMSO), an aprotic hygroscopic solvent that, by its oxygen radical scavenging effect, displays anti-inflammatory properties, has been used as a symptomatic treatment with anecdotal beneficial effect. In a trial comparing anti-inflammatory agents in the treatment of mice suffering from heartwater, the group treated with DMSO had a higher survival rate. Based on this data, a trial was designed to gauge the clinical effect of DMSO in sheep suffering from heartwater.

## Materials and Methods

Four random treatment groups were formed from 32 approximately year-old Merino-type, heartwater susceptible sheep. Treatment groups were allocated as follows:

	Treated with DMSO	Not treated
Infected with heartwater	2	1
Not infected	3	4

Each of the animals in groups 1 and 2 as infected with a lethal dose of the Welgevonden strain of *Cowdria ruminantium*. To simulate field conditions, each sheep in group 2 as treated with DMSO 48 hours after the initial rise in body temperature. The DMSO was given intravenously at 1g per kilogram of body mass, twice daily as a 10 percent solution in polyionic intravenous fluid. The sheep in group 3 were paired with those in group 2 and treated accordingly. Clinical parameters were measured daily, and arterial and venous blood samples were collected and evaluated daily.

## Results and Conclusions

Clinical parameters and blood results varied widely within treatment groups. However, the infected sheep treated with DMSO produced significantly less pleural effusion and had a significantly lower PaCO<sub>2</sub> and blood pH than the untreated group. The treated group also had a significantly higher PaO<sub>2</sub>. The detrimental effect to the healthy sheep was that they had a significantly reduced food intake compared to the untreated group.