

## INVESTIGATIONS OF ZINC SULPHATE EFFICACY IN OVINE INFECTIOUS FOOTROT TREATMENT

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### INTRODUCTION

In the literature there are numerous reports on effective topical administration of a variety of disinfectants and antibiotics in ovine infectious footrot (OIF) treatment. However, footrot control, and eradication in particular, is a serious problem because the effects of the agents applied are evident only where there prior thorough surgical treatment of affected hoofs, which is not usually done in an adequate way in practice. Therefore, attempts were made to achieve effectiveness with parenteral administration of drugs, for in that case surgical treatment could be reduced to a routine horn paring. In this way, antibiotic administration produced very good results in affected sheep treatment (Arhangel'ski, 1976; Graunke, 1977; Matthias, 1983), but due to their high cost and reinfection occurrence, antibiotics have not become extensively used yet.

An alternative to parenteral is topical administration of therapeutic agents that demonstrate pronounced ability of penetration into ovine hoof and act effectively on footrot causal agent. Based on literature data available (Prietz and Mauske, 1981; Malecki, 1982; Skerman et al., 1983), zinc sulphate meets the required criteria, particularly in regard with its ability of penetrating into ovine hoof. Namely, most researchers have achieved, on average, cure rate 90% for sheep by prior surgical treatment of affected hoofs and by treatment with 10-20% zinc sulphate solution (Cross and Parker, 1981; Glynn, 1993). Among the investigations on the efficacy of zinc sulphate solution in treating affected sheep, the results achieved by Malecki et al., (1983) and Malecki and Coffey, (1987) are the most prominent. The said researchers achieved nearly identical percentage of cured sheep in both unpared and surgically treated hoofs.

### MATERIALS AND METHODS

The trials included a total of 45 Pirot crossbreed sheep allocated to three groups comprising 15 sheep each. The groups were homogenous in respect of clinically affected sheep, that are their feet and degree of pathological changes on hoofs. Prior to treatment, the sheep from group I have undergone hoof surgical treatment, those from group II passed only a routine horn paring, and group III was a control. The treatment of sheep from trial groups was conducted daily with 20% zinc sulphate solution for 10 min. in the course of 14 days. Based on cured feet rate, the effectiveness of zinc sulphate solution was checked after 7- and 14-day treatments. The extent of marked footrot, appearance of horn and skin between hoofs was used to assess cure rate of affected feet.

## RESULTS AND DISCUSSION

The results of investigations on the efficacy of 20% zinc sulphate solution in affected sheep treatments are given in Tab. 1.

*Table 1. The results of feet treatment in affected sheep*

Group	The affected feet rate						The cured feet rate	
	At the trial initiation		During treatment					
			after 7 days		after 14 days			
	n	%	n	%	n	%	n	%
I	60	100.00	9	15.00	2	3.33	58	96.67
II	58	96.96	6	10.34	2	3.45	56	96.56
III	59	98.33	59	100.00	55	93.22	4	6.78

The presented results evidence that the affected feet rate prior to trial was uniform in all groups and ranged from 96.96% (group II) to 100% (group I). After a 7-day treatment percentage of affected feet substantially decreased in both trial groups. So in group I it amounted to 15% and in group II to 10.34% of the affected feet rate at the initiation of the trial, while in a control percentage of affected feet remained unchanged (98.33%). At trial termination, after a 14-day treatment, the affected feet rate amounted only to 3.33% for group I and to 3.45% for group II. In a control, at trial termination, the affected feet rate decreased as well (by 6.78%), and amounted to 93.22% of the total rate at the trial initiation.

Our results obtained for sheep that have undergone prior surgical treatment of hoofs conform to the results of Cross and Parker, (1981), and Prietz and Mauske, (1981). From the obtained data, it is also evident that surgical treatment relative to horn paring in affected hoofs did not have any substantial effect on percentage of cured sheep at trial termination. These results are in agreement with those obtained by Malecki and Coffey, (1987), and Cassey and Martin, (1983). The authors found explanation for their results in a greater capacity of horn for zinc binding with unpared hoofs in sheep.

Reinfection in cured sheep were not recorded for 30 days after trial termination, despite they were held in a stable together with infected sheep.

Very good results achieved in curing affected sheep, particularly sheep with unpared hoofs, evidence that zinc sulphate solution has marked ability of penetrating into hoof horn, which increases with detergent addition to a curing solution (Malecki and Coffey, 1987). In addition, zinc sulphate slows down proteolytic activity of *B. nodosus* (Vujić et al., 1981) and effects favourably hoof horn and skin epidermis quality and resistance (Golikov et al., 1982; Stamatović and Jovanović, 1992). We should also bear in mind previously proved immunostimulating role of zinc and its importance for immunity sustaining. Some authors have found that concurrent vaccination and peroral administration of zinc and vitamin A produce considerably more stable immunity compared with sheep that receive vaccination alone (Golikov et al., 1982; Katić et al., 1986).

Apart from high percentage of cured sheep, zinc sulphate is considerably better suited to practical use over formalin and copper sulphate, because it is without any smell, not irritating and toxic, easy to prepare, and its curing solution is more stable.

The results obtained in curing and comparative advantages over other agent point out that zinc sulphate can be recommended as a means of choice in OIF curing and control. In addition, to achieve optimal efficacy and rational use of zinc sulphate in sheep curing, it is of importance to establish the period of time when zinc sulphate can be used, the conducted treatment not being devaluated.



## CONCLUSIONS

Based on the results obtained in OIF curing by topical administration of 20% zinc sulphate solution, we have concluded as follows:

- average percentage of cured ovine feet in trial groups amounted to 96.60% of affected feet rate at trial initiation,
- surgical treatment compared with a routine horn paring in affected hoofs did not have any significant effect on percentage of cured feet at trial termination,
- in cured sheep no reinfection was recorded for the next 30 days on therapy termination, although the sheep were held on contaminated ground together with those infected,
- results achieved in affected sheep curing, as well as comparative advantages over other therapeutic agents, point out that zinc sulphate is a means of choice in curing OIF.

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## ИСТРАЖУВАЊА ЗА ЕФИКАСНОСТА НА ЦИНК СУЛФАТОТ ВО ЛЕКУВАЊЕТО НА ОВЧИОТ ЗАРАЗЕН ПОДОДЕРМАТИТИС

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Во литературата се присутни голем број на извештаи за ефикасната примена на дезинфекциони средства и антибиотици во лекувањето на овчиот заразен пододерматитис. Сепак, контролата и особено искоренувањето на заразниот пододерматитис претставува сериозен проблем, бидејќи ефектите на агенсите кои се применуваат се видливи само ако претходно имало темелна хируршка интервенција врз заболените чапунки, што вообичаено во практиката не се прави на соодветен начин. Затоа, беа направени обиди да се постигне поголема ефикасност со парантерална примена на лекаствата, за во тој случај да може хируршката интервенција да се ограничи на рутинско потсечување на чапунката. На овој начин, примената на антибиотиките даде многу добри резултати во лекувањето на заболените овци (Архангелски, 1976; Граунке 1977; Матиас 1983), но заради високата цена и појавите на повторно инфицирање, антибиотиките сеуште не се во широка употреба.

Алтернативен начин на парантералната, претставува примена на терапевтските агенси кои покажуваат висока способност на пенетрација во овчото копито и имаат ефективно дејство врз причинителниот агенс на заразниот пододерматитис. Врз база на достапната литература (Приц и Мауске, 1981; Малецки, 1982; Серман и др., 1983), цинк сулфатот ги исполнува бараните критериуми, особено во однос на неговата способност да пенетрира во овчата чапунка. Поголемиот дел од истражувачите имаат постигнато просечно 90% успех во лекувањето и на овците со непотсечени чапунки и на тие со чапунки врз кои имало извршено хируршка интервенција овците со претходна хируршка интервенција на заболените чапунки и со примена на 20%-тен раствор на цинк сулфат (Крос и Паркер, 1981; Глин, 1993). Меѓу истражувањата за ефикасноста на растворот на цинк сулфат во лечењето на заболените овци, резултатите постигнати од Малецки и др., (1983) и Малецки и Кофи, (1987) се најистакнати. Овие истражувачи постигнаа скоро идентичен просек на излечените овци и кај несечените и кај чапунките врз кои била извршена хируршка интервенција.