

DIAGNOSIS OF SARCOCYSTIS SPECIES IN CATTLE IN KONYA REGION

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Summary: In this study, the trypsin trypsin technique was used to investigate the presence and prevalence of *Sarcocystis* spp. in the cattle in Konya province.

Trypsin technique was able to detect *Sarcocystis* spp. in 92 (92%) of 100 cattle (samples of heart, diaphragm and oesophagus) in which macroscopically cysts were not observed. Corresponding values for the *Sarcocystis* species were as follows: single infections 74 (74 %) *S. bovicanis*, 15 (15 %) for *S. bovis* and 3 (3 %) *S. bovis*; in mixed infections 7 (7 %) *S. bovicanis* + *S. bovis*, 3 (3 %) *S. bovicanis* + *S. bovis*, 3 (3 %) *S. bovis* + *S. bovis* and 20 (20 %) *S. bovicanis* + *S. bovis* + *S. bovis* respectively.

In conclusion, microscopically cysts observed the highest number in oesophagus among samples examined. In this study, *Sarcocystis* spp. are very common and *S. bovicanis* is the dominant species in cattle in the Konya region.

Keywords: Cattle, *Sarcocystis* spp, diagnosis, Konya.

Konya Yöresi Sığırlarında *Sarcocystis* Türlerinin Teşhisi

Özet: Bu araştırma Konya bölgesi sığırlarında *Sarcocystis* türlerinin prevalansının tespiti amacıyla tripsin tekniği kullanılarak gerçekleştirilmiştir.

Sığırların kalp, diyafram, ve özefaguslarında %92 oranında mikroskopik kistlere rastlanmış olup, makroskopik kistler tespit edilememiştir. Kist duvarının yapısına göre üç tip mikroskopik kist bulunmuş olup, *S. bovicanis* 74 (%74), *S. bovis* 15 (%15) ve *S. bovis* 3 (%3) oranlarında tespit edilmiştir. Miks olarak ise *S. bovicanis* + *S. bovis* 7 (%7), *S. bovicanis* + *S. bovis* 3 (%3), *S. bovis* + *S. bovis* 3 (%3) ve *S. bovicanis* + *S. bovis* + *S. bovis* 20 (%20) oranlarında teşhis edilmiştir.

Sonuç olarak; Konya bölgesi sığırlarında *Sarcocystis* spp'ye en fazla özefaguslarda rastlanıldığı, en yaygın türün *S. bovicanis* olduğu tespit edilmiştir.

Anahtar sözcükler: Sığır, *Sarcocystis* spp, teşhis, Konya.

INTRODUCTION

Sarcocystis is a protozoan parasite that utilises vertebrates as both intermediate and definitive host. *Sarcocystis* species causing acute and chronic disease are obligator intracellular protozoa with a typical coccidian life cycle consisting of merogony, gamogony and sporogony¹⁻³.

The genus *Sarcocystis* is composed of 130 species of heteroxenous cyst-forming coccidia with differences in life cycle and pathogenicity. Pathogenic *Sarcocystis* spp. can cause disease in their intermediate host, in particularly in ruminants³.

There are three species of cattle species; *S. cruzii* (*S. bovicanis*) of which canine are definitive hosts; *S. hirsuta* (*bovis*) transmitted by cats and *S. hominis* (*bovis*) transmitted by man⁴. *Sarcocystis* infections are distributed world-wide⁵⁻⁷.

The cyst of *Sarcocystis* spp can be easily identified from cyst wall structure by the trypsin technique. The *S. bovicanis* and *S. bovis* are microscopic in size. Whereas, those of *S. bovis* may reach a length of several millimeters and are then macroscopically visible⁸.

MATERIALS and METHODS

Materials were obtained from the oesophagus, heart and diaphragm of cattle from slaughtered in Konet abattoir in Konya. The materials were investigated for the presence of *Sarcocystis* spp. by trypsin technique.

Trypsin technique

Pieces of materials were minced stirred for 20 min at 25°C in a magnetic water bath and then the suspension was decanted and filtered through gauze.

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The cystozoites were isolated from density gradient centrifugation as described in detail³.

RESULTS

Trypsin technique was able to detect *Sarcocystis* spp. in the 92 (92 %) of 100 cattle (samples of heart, diaphragm and oesophagus) in which macroscopically cysts were not observed.

Corresponding values for the *Sarcocystis* species were as follows: single infections 74 (74 %) *S. bovicanis*, 15 (15 %) *S. bovifelis* and 3 (3 %) *S. bovi hominis*; in mixed infections, 7 (7 %) *S. bovicanis* + *S. bovi hominis*, 3 (3 %) *S. bovicanis* + *S. bovifelis*, 3 (3 %) *S. bovi hominis* + *S. bovifelis* and 20 (20 %) *S. bovicanis* + *S. bovi hominis* + *S. Bovifelis*, respectively.

In conclusion, microscopically cysts observed the highest number in eosophaugs among samples examined. Samples examined were summarised in Table 1.

Table 1. Samples examined.
Tablo 1. İncelenen materyaller.

Sample examined	Number of samples N	Numbers positive N	Prevalence %
Oesophagus	100	92	92
Heart	100	84	84
Diaphragm	100	63	63

DISCUSSION

Sarcosporidiosis can result in poor productivity, anaemia, inappetence, weight loss, and fever. Some animals show neurological signs, especially in pregnant ewes. It has been reported that experimental infection with microscopic *Sarcocystis* species can lead to abortion, fetal death, and stillbirth³. During the chronic phase of the infection, weight gain and wool growth can be affected^{3,9,10}.

Diagnosis of sarcocyst species is based on visualisation of the cysts and their features¹¹⁻¹⁴. Identification of the cysts is performed using trypsin technique, trichinoscopie and hystological examinations. Serological tests can not differentiate between *Sarcocystis* species because of antigenic cross reactivity. This is only possible during the sate phase of infection, after tissue cysts have developed and can be differentiated macroscopically or microscopically by their sizes and cyst walls. Since

the differentiation of *Sarcocystis* species is only possible by microscopic examination of post mortem the cysts, and since serological tests are not species specific, a diagnostic probe for the detection and differentiation of *Sarcocystis* species would be of great value¹³. Epidemiological data is a prerequisite for the development of measures such as farm management, treatment schedules or potential vaccines. Also, presently available tests to diagnose sarcocystiosis require to the animal to be slaughtered for a post mortem. Of these, the trypsin technique is preferred to the others¹⁵⁻¹⁷.

In these study, the trypsin technique is evaluated to determine *Sarcocyst* spp in cattle.

The prevalence of bovine Sarcosporidiosis in different countries is reported to ranges from 63.1 % to 100 % microscopic cyst and to be 6.8 % macroscopic cyst^{6,7,14}. The prevalence of microscopic cysts and macroscopic cysts is reported to be 55-100 % and 4 %, respectively, in cattle in Turkey¹⁸.

In the present study, 92 % of cattle examined were determined to cary microscopic cysts, but no macroscopic cyst was observed. The high prevalence of *Sarcocystis* (92%) determined in this study cattle is correspondence with other studies¹⁸⁻²⁰.

In a previous study carried out in Elazığ, the distribution of *Sarcocystis* spp in cattle was reported as fallow: *S. bovicanis* 56 %, 70%, 65.6%, *S. bovi hominis* 48%, 51.2%, 63.3%, *S. bovifelis* 42%, 43.7%, 34.5 % in the cattle examined, 25% and 19.6 % these cattle only by *S. bovicanis*, 87.1% and 19.7% only by *S. bovi hominis* and 2.5% and 7.9% only by *S. bovifelis*. On the other hand, of the cattle 100% and 26.1% with *S. bovicanis* and *S. bovi hominis*; 8.7% with *S. bovicanis* and *S. bovifelis*; 6.2% and 7.4% with *S. bovi hominis* and *S. bovifelis* and 26.2% and 10.5% with *S. bovicanis*, *S. bovi hominis* and *S. bovifelis*, were reported to be infected concurrently¹⁸.

In this study, corresponding values for the *Sarcocystis* species were as follows: single infections 74 (74%) for *S. bovicanis*, 15 (15%) for *S. bovifelis* and 3 (3%) for *S. bovi hominis*; in mixed infections, 7 (7%) for *S. bovicanis* + *S. bovi hominis*, 3 (3%) for *S. bovicanis* + *S. bovifelis*, 3 (3 %) *S. bovi hominis* + *S. bovifelis* and 20 (20 %) *S. bovicanis* + *S. bovi hominis* + *S. Bovifelis*, respectively.

It has been various studies that reported *Sarcocyst* cysts are usually localized in oesophagi however, in one study, they were more common in diaphragma¹⁸.

In current study, microcysts were usually seen in oesophagus, which in agreement with other studies^{18,19}.

In conclusion, microscopically cysts observed the highest number in eosophaugs among samples examined. In this study, *Sarcocystis* spp. are very common in cattle and *S. bovicanis* is the dominant species in the Konya region.

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