# DETECTION OF *TRICHINELLA* BY VARIOUS METHODS IN YUGOSLAVIA

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**Abstract.** From studies performed on experimentally infected pigs, it was possible to conclude that enzymatic digestion methods are superior to trichinoscopy for inspection of pork for the presence of *Trichinella spiralis*. The analyses included comparative examination of samples taken from five different parts of diaphragm tissue.

## INTRODUCTION

During the period before and after World War II, only a small number of hogs infected with *Trichinella spiralis* (0.0013%) were detected by trichinoscopy, although there were sporadic infections in men in various regions of Serbia and Vojvodina (Modic, 1976). Because trichinoscopy is known to be a low sensitive detection method, in comparison to pooled sample digestion, it was suspected that its use in Yugoslavia did not give a true and reliable picture of trichinellosis in swine, the following studies were undertaken.

Swine were artificially infected with *Trichinella spiralis* larvae and examined as follows:

a) The diagnostic reliability of trichinoscopy and pooled sample digestion methods (magnetic stirring or a Stomacher) was compared with samples taken from various parts of the diaphragm muscle.

b) The suitability of the individual parts of the diaphragm (Crura diaphragmatis, pars costalis and pars sternalis diaphragmatis) for the detection of *Trichinella* was assessed.

The prevalence of trichinellosis in swine reared on privately owned farms and on state farms in six regions of Yugoslavia where the infection is believed to be endemic was also determined.

## MATERIAL AND METHODS

Fifteen experimental animals were divided into five groups of three swine. Within the groups each animal was infected with either 100, 300 or 500 larvae and was sacrificed at (first group) 15 post infection (p/i); 24 p/i (second group); 47 p/i (third group); 70, 80, 98 p/i (fourth group); 125 p/i (fifth group). Swine body weight at the time of sacrifice ranged between 36–120 kg.

The diagnostic reliability of trichinoscopy (T) and the pooled sample digestion method, using either a magnetic stirrer (MM) or Stomacher (SM) was compared on diaphragm muscle of the artificially infected hogs.

For that purpose, samples (10 subsamples for each of the methods mentioned) were taken from Crura diaphragmatis - basis, middle part and top (apex), then from Pars costalis and Pars sternalis diaphragmatis. For trichinoscopy, 200 mg of diaphragm (14 preparations) was examined and for the artificial digestion 1 g of examined tissue mixed with 99 g of a negative sample were analyzed.

The prevalence of swine trichinellosis by the pooled sample digestion method was conducted in 377,574 animals. Among these, 168,916 swine originated from private farms (325 villages) and 208,658 from 37 public or state farms.

## RESULTS AND DISCUSSION

### The comparative diagnostic reliability of trichinoscopy and pooled sample digestion using different sections of the diaphragm:

Artificially infected pigs, examined on the 15th day p/i, revealed no larvae by any of the

three diagnostic methods applied. The first larvae were detected in diaphragm tissue at day 24 p/i (second group) by all three methods.

The reliability of trichinoscopy, and the pooled sample digestion methods for *T. spiralis* detection in diaphragm tissue is given in Table 1. It can be seen that the more sensitive method is the Stomacher technique followed closely by the magnetic stirrer technique. Even at 5 larvae/g the probability of a positive finding is only about 50% by the trichinoscopic method. At 1 larva/g the probability of detection by trichinoscopy dropped to only 20%. With the other two methods, even at 1 or less larva/g, the sensitivity was higher than with trichinoscopy. Regardless of method, our results indicate that the amount of diaphragm tissue that should be examined by these two methods must be greater

Table 1

Probability of detection of *Trichinella spiralis* larvae in diaphragm by various methods.

| Larvae per g | Probability of positive findings (%) | | |
|---|---|---|---|
| | T | MM | SM |
| 10 | 90 | 100 | 100 |
| 5 | 50 | 100 | 100 |
| 1 | 20 | 65 | 68 |
| < 1 | | low probability | |
| Regardless of number of larvae | 67.8 | 97.4 | 100 |

T - Trichinoscopy
MM - Magnetic stirrer method
SM - Stomacher method

Table 2

Number of tested swine from six regions in Yugoslavia.

| Regions | Private farms | | | State farms | | | Total no. of swine | % swine with *T. spiralis* |
|---|---|---|---|---|---|---|---|---|
| | No. of swine | Infected swine | | No. of swine | Infected swine | | | |
| | | No. | % | | No. | % | | |
| P Vojvodina | 97,834 | 27 | 0.027 | 66,090 | 0 | 0 | 163,924 | 0.016 |
| R Croatia (Slavonia) | 14,063 | 0 | 0 | 6,055 | 0 | 0 | 20,118 | 0 |
| Belgrade | 22,538 | 3 | 0.013 | 68,865 | 0 | 0 | 91,403 | 0.0033 |
| Danub | 11,057 | 2 | 0.018 | 65,908 | 0 | 0 | 76,965 | 0.0026 |
| Macva | 11,764 | 3 | 0.025 | 1,740 | 0 | 0 | 13,504 | 0.022 |
| Kladovo | 11,660 | 64 | 0.55 | - | - | - | 11,660 | 0.55 |
| Total | 168,916 | 99 | 0.058 | 208,658 | | | 377,574 | 0.026 |

than 1 g. Unfortunately, this is not easy to perform in practice. From the results one can speculate that almost 30% of swine with a small number of larvae could not be detected by trichinoscopy.

The percentage of larvae detected in all parts of the diaphragm, except the apex, was highest when tested by the Stomacher method. As far as the apex is concerned, the percentage was slightly higher, 66.25% versus 65.00% when tested by the magnetic mixer method. The number of positive findings achieved by trichinoscopy lagged considerably behind, on average 1 to 2.5 times less compared with the digestion methods.

The largest total count of larvae was detected at the base and the middle part of Crura diaphragmatis, followed by Pars costalis diaphragmatis, less at the top of Crura diaphragmatis and the least in Pars sternalis diaphragmatis.

**Prevalence of trichinellosis in enzootic regions in Yugoslavia:**

The results of the studies of *T. spiralis* prevalence (1986, 1987, 1988) in swine originating from 6 regions in two republics (Serbia and Croatia) are shown in Table 2.

The total number of infected pigs discovered was 99 (0.026% of all examined animals). However, infected pigs originated only from private farms (0.058%). More than half the infected animals (64) originated from the Kladovo region. The degree of infection, generally speaking, was low in all examined regions. Thus, in Vojvodina infected hogs had a very low level of infection (< 1 larva/g to 8 larvae/g); the highest level of infection was 200 larvae/g. In swine from other regions, the number of larvae detected ranged between 1–31 larvae/g.

Based on the results obtained in these studies, as well as in studies of other colleagues from the USA and the EEC, a proposal has been presented to our Republic and Federal Authorities to replace compulsory trichinoscopy with the pooled sample digestion (PSD) method. This proposal has already been accepted and PSD has been introduced in large and medium sized slaughterhouses in Yugoslavia.

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## REFERENCES

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