DIAGNOSTIC SENSITIVITY / UNSENSITIVITY OF TRICHINOSCOPY (COMPRESSION) AND ARTIFICIAL DIGESTION OF POOLED SAMPLES

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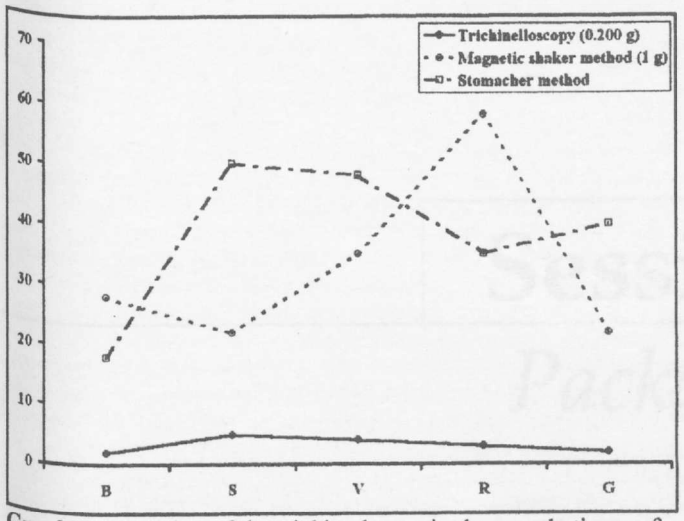
Background:
The common occurrence of trichinosis in the human population in the surrounding countries, has induced the scientists and professionals, to detect if the classical trichinoscopy is the right method for determination of trichinosis.

Objectives:
The objective of our researches was to establish a method which will increase the level of sequrity of the meat and meat products for human consumption.

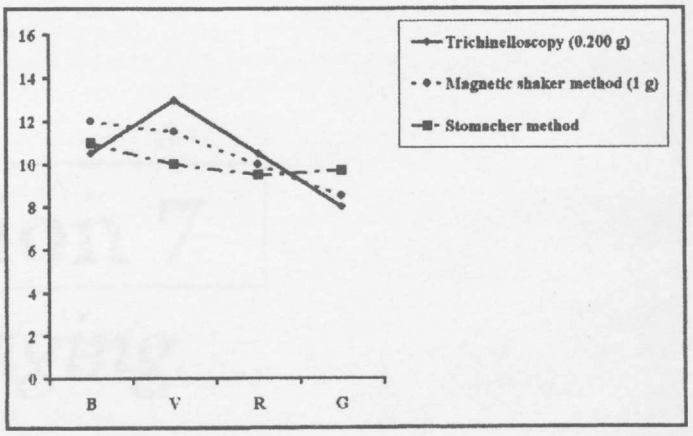
Material and methods:
Routine examination of the pork meat on Trichinosis has been implemented for the first time in some parts of Germany. Wirchow has been at the statepoint that a routine examination of pork meat has to be implemented by the Governmental veterinary inspections, which has been done in 1866 (Schwabe, 1984).
a) Examination of meat by trichinoscopy as a diagnostic tool for Trichinosis.
It is generally considered that a valid method should be able to detect the larvae of Trichina 17th day post infestation, when the larvae are becoming infective for the new hosts. The method has to be enough sensitive to detect a single larva per gram muscle, because that level of infestation of pigs is enough to cause clinical disease in men (Schwartz, 1962, according to Zimmermann, 1983).
Everywhere in the world, 14 slides / samples from the diaphragm are considered to be an optimal amount. However, if we start from the beginning, (1) The detection of the larvae 17th day post infestation-using trichinoscopy is a problem, because in that period the capsid of the already infective larvae is still not visible. Therefore, there is always a danger (since the larva is infective), especially in mild infestations (one larva in 14 slides) to miss the diagnosis. From this reason, Zimmermann (1983) presents that a great disadvantage of the trichinoscopy method is the difficulty to detect infective, uncapsulized larvae and those, which are not spiraled. Having in mind that the capside wall is not visible until the 4th week post infestation, there is a period of more than 10 days when the larvae are infective, but are not visible using microscopic examination. (2) The sample size of approximately 0.200 g (14 slides) does not enable detection of infestations with less than 1 LPG, even such infestations are recognized in only 20% of the cases (Gorgevic M., 1989, 1991). In many countries where this method have been used, there are evidences of misdiagnosed infested pigs which have been a source of human trichinosis (Zimmermann, 1967).
The method of trichinelloscopy/compression using 14 slides has fulfilled the requirements to be applied at the slaughtering line for pigs. However, if one considers that the method can be applied only at delimited number of samples (750-1050) per examiner per day, it will result in significant increase of the price per kilo.
b) The method used was artificial digestion of the pork meat in pooled samples, using magnetic shaker and sedimentation of the larvae (Stomacher). Examination of meat using artificial digestion is a diagnostic sequrity measure for pooled samples.
Using digestion with stomacher (100 pigs, 1 g from each) a single person can examine 200 pigs per hour. Kohler (1979) has presented a fast method of digestion for pooled samples, by using a magnetic shaker (100 pigs, 1 g from each) which took 78 minutes.
Today, the European Commission (EC) has registered 6 methods for artificial digestion from pooled samples for examination of pork meat on trichinosis (EU Directive, 83/91 EEC; 84/319 EEC).
In the scientific and professional societies, there are still discussions about the diagnostic sensitivity of the method of artificial digestion in diagnosing of trichinosis. It is considered that the proscribed amount of 1 g per carcass is not enough to detect all infestations of 1 LPG and that its effectiveness in infestations of 1-3 LPG is approximately 43%. Therefore, many authors recommend the increase of the proscribed amount to 3 or 5 g per carcass (Gorgevic M., 1989; Gamble R., 1996).

Results and discussion:
Table 1: Average number of T. spiralis in 1 g of muscle tissue of the diaphragm using 4 methods.

	Trichinelloscopy (0.200 g)	Magnetic shaker method (1 g)	Stomacher method		Trichinelloscopy (0.200 g)	Magnetic shaker method (1 g)	Stomacher method
base of the diaphragm root	2	28	18		10.5	12	11
middle part of the diaphragm root	5	22	50				
top of the diaphragm root	4	35	48		13	11.5	10
costal part of the diaphragm	3	58	35		10.5	10	9.5
thoracic part of the diaphragm	2	22	40		8	8.5	9.7



Graph 1: Detection of the trichina larvae in the muscle tissue of the diaphragm, using 3 different methods, 27th day post infestation. B=base of the diaphragm root, S=middle part of the diaphragm root, V=top of the diaphragm root, R=costal part of the diaphragm, G=thoraxic part of the diaphragm.



Graph 2: Average number of trichina larvae in the muscle tissue of the diaphragm, using 3 different methods, 47th day post infestation. B=base of the diaphragm root, V=top of the diaphragm root, R=costal part of the diaphragm, G=thoraxic part of the diaphragm.

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