

THE IMPORTANCE OF *TRICHINELLA* PROFICIENCY TESTS IN FOOD SAFETY IN SERBIA

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Trichinellosis is a serious zoonotic disease (caused by parasitic nematodes of the genus *Trichinella*) and represents public health issue.

People acquire trichinellosis by consuming raw or undercooked meat infected with the *Trichinella* larvae.

The gold standard in meat inspection for the presence of *Trichinella* larvae is the use of the artificial digestion method.

For the prevention of human infection and for international trade purposes there are regulations for the inspection of meat as well as for quality control.



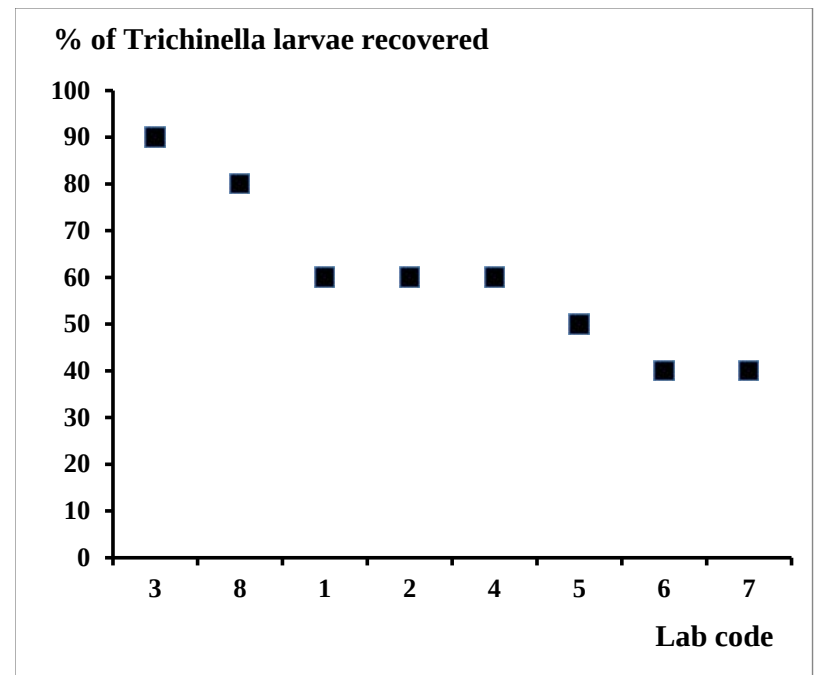
In Serbia, to detect the presence of *Trichinella* spp. larvae, meat examination by the magnetic stirrer method (MSM) (in slaughterhouses) or by both the MSM and trichinoscopy for testing the meat from domestic pigs is mandatory. For testing wild boar meat, only the MSM is allowed.

In 2022 Serbian *Trichinella* legislation was changed and now all laboratories which control meat for the presence of *Trichinella* larvae need to participate in PT.

First *Trichinella* PT in Serbia 2017.

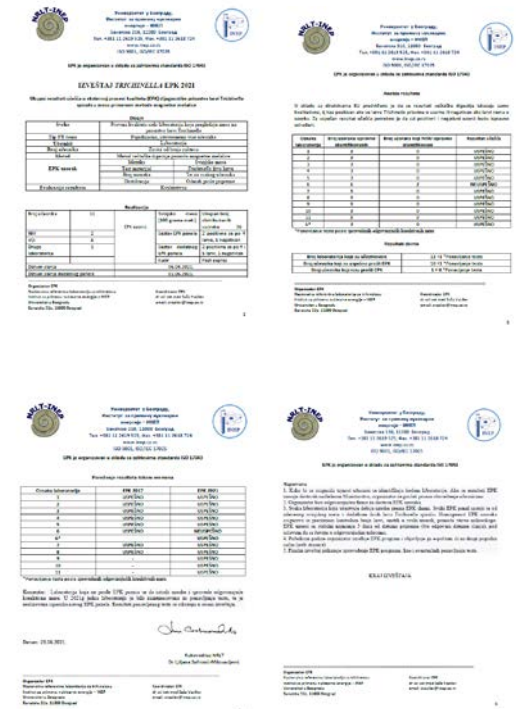
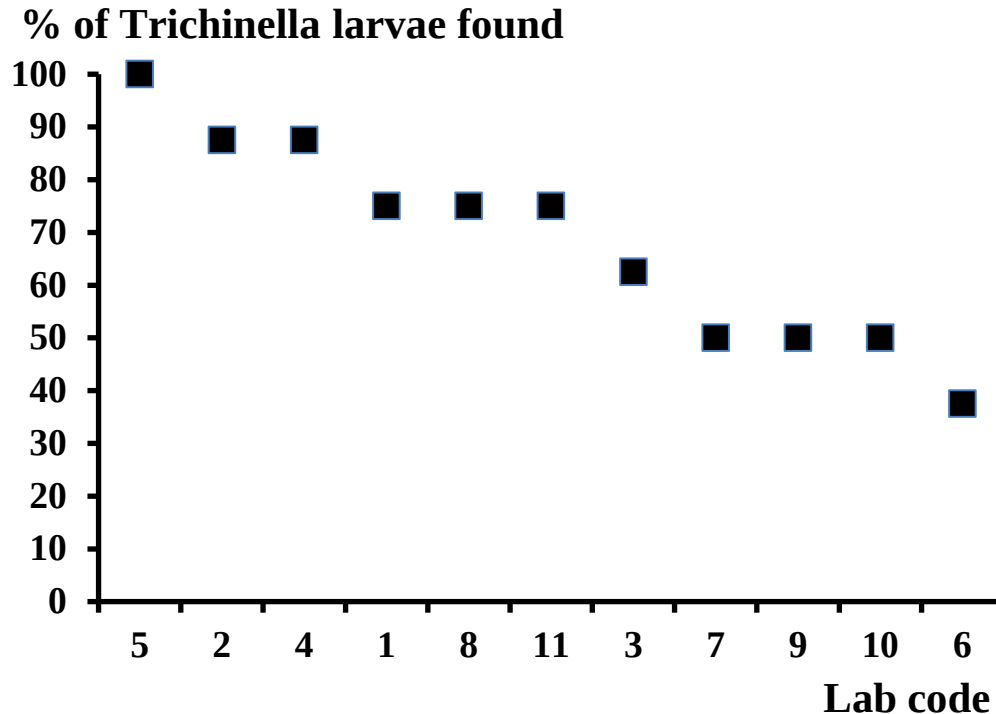
Vasilev et al. 2019. First Serbian external quality assessment to detect *Trichinella* larvae in meat by the Magnetic Stirrer Method. **Veterinarski glasnik**, 73, 2, 168-177

<https://doi.org/10.2298/VETGL181220006V>



Trichinella PT 2021

Picture 1. Trichinella EQA 2021. Final evaluation



Vasilev S., et all. 2021. Serbian external quality assessment for Trichinella detection in meat in 2021 compared to 2017. Scientific Journal "**Meat Technology**", 62 (2), 140-147. doi.org/10.18485/meattech.2021.62.2.7

***TRICHINELLA* PT 2022**

Export slaughterhouses

Ознака лабораторије	Број узорака исправно идентификованих	Број узорака који НИСУ исправно идентификовани	Резултат учешћа
15	3	0	УСПЕШНО
16	3	0	УСПЕШНО
17	2	1	НЕУСПЕШНО
18	3	0	УСПЕШНО
17*	3	0	УСПЕШНО

***Понављање теста после спроведених корективних мера**

TRICHINELLA PT 2022

Dizajn

Svrha	Provera kvaliteta rada laboratorija koje pregledaju meso na prisustvo larvi Trichinella	
Tip sheme	Pojedinačno, istovremeno više učesnika	
Učesnici	Laboratorije	
Broj učesnika	Zavisi od broja zahteva	
Metod	Metod veštačke digestije pomoću magnetne mešalice	
EPK uzorak	Matriks	Svinjsko meso
	Test materijal	<i>Trichinella</i> žive larve
	Broj uzoraka	Tri za svakog učesnika
	Distribucija	Odmah posle pripreme
Evaluacija rezultata	Kvalitativna	

Realizacija

Broj učesnika	15	EPK uzorci	Svinjsko meso (100 grama svaki)	48	
FVM, NIV	2		Sastav EPK panela	1 pozitivan sa	
VSI	8			4 larvi, 2 negativna	
Druge laboratorije	5			Sastav dodatnog EPK panela	2 pozitivna sa 12 i 9 larvi, 1 negativan
				Kurir	Post expres
Datum slanja		13.03.2023.			
Datum slanja dodatnog panela		28.03.2023.			

Sasa Vasilev, Laurentiu Mihai Ciupescu, Nikolay Lalkovski,
Davor Balic, Dragan Vasilev, Gianluca Marucci.

**Trichinella proficiency testing in Southeastern European
countries.**

Veterinary Parasitology, Volume 320, 2023, 109982.
ISSN 0304-4017,
<https://doi.org/10.1016/j.vetpar.2023.109982>.

TRICHINELLA PT 2024

Dizajn

Svrha	Provera kvaliteta rada laboratorija koje pregledaju meso na prisustvo larvi Trichinella	
Tim sheme	Pojedinačno, istovremeno više učesnika	
Učesnici	Laboratorije	
Broj učesnika	Zavisi od broja zahteva	
Metod	Metod veštačke digestije pomoću magnetne mešalice	
EPK uzorak	Matriks	Svinjsko meso
	Test materijal	Trichinella žive larve
	Broj uzoraka	Tri za svakog učesnika
	Distribucija	Odmah posle pripreme
Evaluacija rezultata	Kvalitativna	

Realizacija

Broj učesnika	18	EPK uzorci	Svinjsko meso (100 grama svaki)	57
FVM, NIV	2		Sastav EPK panela	2 pozitivna sa po 5 larvi, 1 negativan
VSI	5		Sastav dodatnog EPK panela	1 pozitivan sa 15 larvi, 2 negativna
Druge laboratorije	11		Kurir	Post expres
Datum slanja		20.03.2024.		
Datum slanja dodatnog panela		15.04.2024.		

Oznaka laboratorije	Broj uzoraka ispravno identifikovanih	Broj uzoraka koji NISU ispravno identifikovani	Rezultat učešća
1	3	0	USPEŠNO
3	3	0	USPEŠNO
5	3	0	USPEŠNO
7	3	0	USPEŠNO
10	3	0	USPEŠNO
12	3	0	USPEŠNO
14	3	0	USPEŠNO
16	2	1	NEUSPEŠNO
20	2	1	NEUSPEŠNO
21	3	0	USPEŠNO
22	2	1	NEUSPEŠNO
23	3	0	USPEŠNO
24	3	0	USPEŠNO
25	1	2	NEUSPEŠNO
26	1	2	NEUSPEŠNO
27	3	0	USPEŠNO
102	3	0	USPEŠNO
103	1	2	NEUSPEŠNO
16*	3	0	USPEŠNO
20*	3	0	USPEŠNO
22*	3	0	USPEŠNO
25*	3	0	USPEŠNO
26*	3	0	USPEŠNO
103*	3	0	USPEŠNO

*Ponavljanje testa posle sprovedenih odgovarajućih korektivnih mera

Oznaka laboratorije	EPK 2017	EPK 2021	EPK 2022	EPK 2023	EPK 2024
1	USPEŠNO	USPEŠNO	-	USPEŠNO	USPEŠNO
2	USPEŠNO	USPEŠNO	-	USPEŠNO	-
3	USPEŠNO	USPEŠNO	-	USPEŠNO	USPEŠNO
4	USPEŠNO	USPEŠNO	-	USPEŠNO	-
5	USPEŠNO	USPEŠNO	-	USPEŠNO	USPEŠNO
6	USPEŠNO	NEUSPEŠNO *	-	-	-
7	USPEŠNO	USPEŠNO	-	USPEŠNO	USPEŠNO
8	USPEŠNO	USPEŠNO	-	-	-
9	-	USPEŠNO	-	USPEŠNO	-
10	-	USPEŠNO	-	USPEŠNO	USPEŠNO
11	-	USPEŠNO	-	-	-
12	-	-	-	NEUSPEŠNO *	USPEŠNO
13	-	-	-	-	-
14	-	-	-	USPEŠNO	USPEŠNO
15	-	-	USPEŠNO	-	-
16	-	-	USPEŠNO	USPEŠNO	NEUSPEŠNO *
17	-	-	NEUSPEŠNO *	-	-
18	-	-	USPEŠNO	-	-
19	-	-	-	USPEŠNO	-
20	-	-	-	USPEŠNO	NEUSPEŠNO *
21	-	-	-	-	USPEŠNO
22	-	-	-	-	NEUSPEŠNO *
23	-	-	-	-	USPEŠNO
24	-	-	-	-	USPEŠNO
25	-	-	-	-	NEUSPEŠNO *
26	-	-	-	-	NEUSPEŠNO *
27					USPEŠNO
101	-	-	-	USPEŠNO	-
102	-	-	-	USPEŠNO	USPEŠNO
103	-	-	-	-	NEUSPEŠNO *

„-“ laboratorija nije učestvovala; *Uspešno ponavljanje testa posle sprovedenih odgovarajućih korektivnih mera

**How to prepare good quality samples for the
Trichinella PT panel for the compression method?**

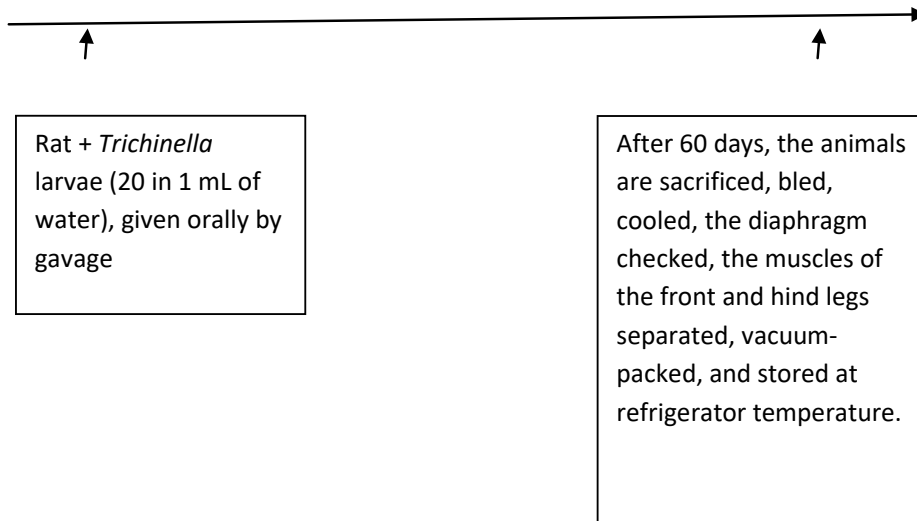
Number of *Trichinella* larvae per gram of muscle tissue (mean $\pm$ standard deviation for three muscles excised from three Wistar rats), two months after peroral infection with different infectious doses (numbers) of *Trichinella* larvae

Muscle type	Infectious dose per rat (number of larvae given by gavage per rat)					
	200	150	100	50	20	10
Thigh	162.5 $\pm$ 60	115.5 $\pm$ 13	58.5 $\pm$ 46	40.0 $\pm$ 28	6.7 $\pm$ 1	ND
Shoulder	277.5 $\pm$ 46	159.0 $\pm$ 4	132.5 $\pm$ 4	137.0 $\pm$ 14	10.0 $\pm$ 3	ND
Masseter	447.5 $\pm$ 117	209.0 $\pm$ 67	95.0 $\pm$ 13	146.5 $\pm$ 38	13.6 $\pm$ 1	ND

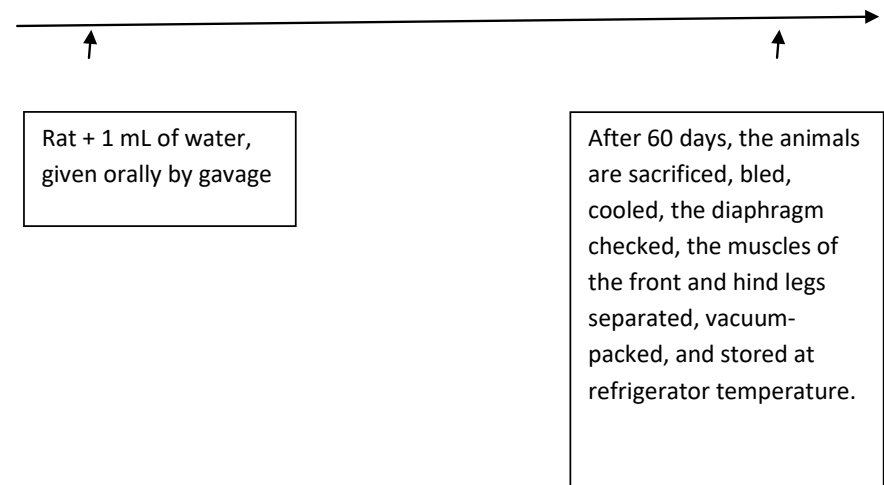
The number of larvae per g of muscle tissue (LPG) found after examining muscle material from three Wistar rats by the compression method; All samples were examined by three different, experienced analysts. ND, no larvae detected.

Preparation of samples for the *Trichinella* PT panel for the compression method

A) Positive sample (containing *Trichinella* larvae)



B) Negative sample (which does not contain *Trichinella* larvae)



Validation of samples for the PT panel

20 positive samples + 4

10 negative samples + 2

TRICHINELLA PT – compression method 2025

Table 3

Overall results of the first Serbian *Trichinella* proficiency test for the compression method, provided by the Serbian National Reference Laboratory for *Trichinella*.

Participant code	Sample code	Trichinella status of the sample	Participant's report of the <i>Trichinella</i> status of the sample	Reported number of <i>Trichinella</i> larvae in sample	Evaluation by the PT provider of participant's use of the compression method
K11	4798	Negative	Negative	0	Successful
	8410	Positive	Positive	58	
	2965	Positive	Positive	64	
K12	1382	Negative	Negative	0	Successful
	9198	Positive	Positive	24	
	7022	Positive	Positive	172	
K13	3249	Negative	Negative	0	Successful
	9206	Positive	Positive	70	
	4272	Positive	Positive	93	
K14	3038	Negative	Negative	0	Successful
	9202	Positive	Positive	41	
	3038	Positive	Positive	48	
K15	5375	Negative	Negative	0	Successful
	1241	positive	Positive	34	
	5834	positive	Positive	26	
K16	5813	Negative	Negative	0	Successful
	8759	positive	Positive	69	
	7628	positive	Positive	44	
K17	3330	Negative	Negative	0	Successful
	9678	positive	Positive	10	
	9439	positive	Positive	24	
K18	8863	Negative	Negative	0	Successful
	4609	positive	Positive	62	
	8545	positive	Positive	142	
K19	8118	Negative	Negative	0	Successful
	5990	positive	Positive	47	
	9251	positive	Positive	139	
K20	4176	Negative	Negative	0	Successful
	1238	positive	Positive	162	
	4968	positive	Positive	78	
K21	9196	Negative	Negative	0	Successful
	2081	positive	Positive	27	
	3237	positive	Positive	11	
K22	3956	Negative	Negative	0	Successful
	5757	positive	Positive	40	
	1311	positive	Positive	20	



Trichinella meat inspection by the compression method - First proficiency test

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Conclusions



European and our own experience shows that training, equipment in accordance with regulations, use of reference materials, internal controls, regular participation in proficiency tests leads to better laboratory results over time and better consumer protection.

Control of *Trichinella* testing QA system in veterinary subjects and regular participation in proficiency tests are essential for ensuring safe food for consumers.

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