

EXPERTISE AND SERVICE PROVISION
QUALITY OF LABORATORIES

EXTERNAL QUALITY ASSESSMENT
IN VETERINARY DIAGNOSIS

DEFINITIVE GLOBAL REPORT

**Proficiency Testing in Veterinary Diagnosis
Brucella
Serology
SURVEY 2021/3**

Sciensano/PT VET Brucella/2-E

Expertise and service provision
Quality of laboratories
J. Wytsmanstreet, 14
1050 Bruxelles | Belgique

www.sciensano.be

COMMITTEE OF EXPERTS

Sciensano			
Secretariat		PHONE:	02/642.55.22
		FAX:	02/642.56.45
Name scheme coordinator	Bernard China	PHONE:	02 642 53 85
		e-mail:	Bernard.China@sciensano.be
Name alternate scheme coordinator	Arnaud Capron	PHONE:	
		e-mail:	Arnaud.Capron@sciensano.be
Experts	Institute		
Marcella Mori	Sciensano		
David Fretin	Sciensano		
Sylvie Marche	Sciensano		

A preliminary version of this report was submitted to the National reference laboratory: 13//08/2021

Authorization to release the report: By Bernard China, scheme coordinator, on 30/08/2021.

All the reports are also available on our webpage:

https://www.wiv-isp.be/QML/activities/PT%20VET/fr/originaux/rapports_annee.htm
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Introduction

This survey was dedicated to the detection of antibodies specific to Brucella spp in bovine sera using ELISA, Slow Agglutination (Wright's sero-agglutination) (SAW) or Rose Bengal Test (RBT) methods.

The samples

The samples were prepared by the National Reference Laboratory, bacteriology, Infectious diseases in animals Directorate, Sciensano. The samples consisted of lyophilized sera samples. The samples must be reconstituted with 1 mL water and kept at room temperature until analysis.

Homogeneity

For Brucella serology, 6 different samples were used:
PT2021BRUSERNS1, PT2021BRUSERNS2, PT2021BRUSERNS3, PT2021BRUSERPS1,
PT2021BRUSERPS2, PT2021BRUSERPS3

The homogeneity of the samples was tested in triplicate for each method by the NRL before the survey. The samples were considered as homogeneous.

Target Values

The target value was determined by the NRL based on the homogeneity tests.

Sample	Target value	Repetition
PT2021BRUSERNS1	Negative	3
PT2021BRUSERNS2	Negative	2
PT2021BRUSERNS3	Negative	2
PT2021BRUSERPS1	Positive	5
PT2021BRUSERPS2	Positive	4
PT2021BRUSERPS3	Positive	4

Stability

The stability was determined by comparison of the pre-survey results with the results obtained by the NRL during and after the survey. The samples were considered as stable.

The participants

5 laboratories participated to this survey:
Sciensano, Arsia, DGZ, LMVE (Luxembourg), Anses (Maisons-Alfort, France)t

Method	Number of participants
SAW-EDTA	4
ELISA (Ab)	4
RBT	5

Randomisation and panel composition

Since a specific number has been assigned to each laboratory, the randomisation has been performed as follows:

Laboratory	97504	97507	97508	97516	97517
Sample ID					
BRUSER21-1	PT2021BRUSERPS1	PT2021BRUSERNS3	PT2021BRUSERPS1	PT2021BRUSERNS1	PT2021BRUSERNS2
BRUSER21-2	PT2021BRUSERPS1	PT2021BRUSERPS3	PT2021BRUSERNS1	PT2021BRUSERNS1	PT2021BRUSERPS2
BRUSER21-3	PT2021BRUSERPS3	PT2021BRUSERPS2	PT2021BRUSERPS3	PT2021BRUSERNS2	PT2021BRUSERPS1
BRUSER21-4	PT2021BRUSERNS1	PT2021BRUSERPS1	PT2021BRUSERNS1	PT2021BRUSERPS1	PT2021BRUSERNS1
BRUSER21-5	PT2021BRUSERNS1	PT2021BRUSERNS1	PT2021BRUSERPS1	PT2021BRUSERNS3	PT2021BRUSERPS3
BRUSER21-6	PT2021BRUSERNS3	PT2021BRUSERPS2	PT2021BRUSERPS3	PT2021BRUSERPS2	PT2021BRUSERPS3
BRUSER21-7	PT2021BRUSERPS3	PT2021BRUSERPS1	PT2021BRUSERNS3	PT2021BRUSERNS3	PT2021BRUSERPS1
BRUSER21-8	PT2021BRUSERNS3	PT2021BRUSERNS1	PT2021BRUSERNS3	PT2021BRUSERPS1	PT2021BRUSERNS3
BRUSER21-9	PT2021BRUSERNS2	PT2021BRUSERPS1	PT2021BRUSERNS2	PT2021BRUSERPS3	PT2021BRUSERPS2
BRUSER21-10	PT2021BRUSERPS3	PT2021BRUSERNS3	PT2021BRUSERNS1	PT2021BRUSERPS2	PT2021BRUSERPS3
BRUSER21-11	PT2021BRUSERPS1	PT2021BRUSERPS2	PT2021BRUSERPS1	PT2021BRUSERNS1	PT2021BRUSERNS3
BRUSER21-12	PT2021BRUSERPS2	PT2021BRUSERNS2	PT2021BRUSERNS2	PT2021BRUSERPS2	PT2021BRUSERPS2
BRUSER21-13	PT2021BRUSERPS2	PT2021BRUSERPS1	PT2021BRUSERPS3	PT2021BRUSERPS1	PT2021BRUSERNS1
BRUSER21-14	PT2021BRUSERPS3	PT2021BRUSERNS2	PT2021BRUSERPS2	PT2021BRUSERPS3	PT2021BRUSERPS3
BRUSER21-15	PT2021BRUSERPS1	PT2021BRUSERPS3	PT2021BRUSERPS2	PT2021BRUSERPS3	PT2021BRUSERPS1
BRUSER21-16	PT2021BRUSERNS1	PT2021BRUSERPS1	PT2021BRUSERPS3	PT2021BRUSERPS2	PT2021BRUSERPS1
BRUSER21-17	PT2021BRUSERPS3	PT2021BRUSERNS1	PT2021BRUSERPS1	PT2021BRUSERPS1	PT2021BRUSERNS2
BRUSER21-18	PT2021BRUSERNS2	PT2021BRUSERPS2	PT2021BRUSERPS2	PT2021BRUSERPS1	PT2021BRUSERPS1
BRUSER21-19	PT2021BRUSERPS1	PT2021BRUSERPS3	PT2021BRUSERPS2	PT2021BRUSERPS3	PT2021BRUSERNS1
BRUSER21-20	PT2021BRUSERPS2	PT2021BRUSERPS3	PT2021BRUSERPS1	PT2021BRUSERNS2	PT2021BRUSERPS2

The panel was constituted of 20 samples of lyophilised sera.

Survey Timeline

Transfer of the samples from NRL to QL: 01/04/2021

Randomization of the samples by QL: 08/04/2021

sending samples to participants: 13/04/2021. The samples were sent at room temperature.

Deadline for the results encoding: 30/04/2021

Preliminary report: 28/05/2021

Results

The panel consisted of 13 positive and 7 negative samples. The same samples were analyzed using different methods.

1. ELISA

1.1. Results per sample

4 laboratories encoded results giving 4 datasets (80 results).

Table R1. Results per sample

Sample	Target value	Repetition	Encoded results
PT2021BRUSERNS1	Negative	3	12 negative results
PT2021BRUSERNS2	Negative	2	8 negative results
PT2021BRUSERNS3	Negative	2	8 negative results
PT2021BRUSERPS1	Positive	5	20 positive results
PT2021BRUSERPS2	Positive	4	16 positive results
PT2021BRUSERPS3	positive	4	16 positive results

100% of the encoded results were correct.

1.2. Used methods

Table R2. Results per method

Method	N
ELISA Home made	1
Brucellosis Antibody Test Kit IDEXX	1
Synbiotics/Zoetis - SERELISA Brucella OCB Ab Mono Indirect	2
Total	4

1.3. Conclusion

All the participants gave correct results independently of the used kit.

2. Rose Bengal Test (RBT)

2.1. Results per sample

5 laboratories encoded results. 100 results were encoded.

Table R3. Result per sample

Sample	Target value	Repetition	Encoded results
PT2021BRUSERNS1	Negative	3	15 negative results
PT2021BRUSERNS2	Negative	2	10 negative results
PT2021BRUSERNS3	Negative	2	10 negative results
PT2021BRUSERPS1	Positive	5	25 positive results
PT2021BRUSERPS2	Positive	4	20 positive results
PT2021BRUSERPS3	positive	4	20 positive results

100 % of the encoded results were correct.

2.2. Used methods

All the participants used the IDEXX Rose Bengal antigen kit.

The batch numbers were: 427 (Two participants), 330, 433 and 451.

2.3. Conclusion

All the encoded results were correct independently of the used kit batch.

3. Slow agglutination (SAW).

3.1.Result par sample

4 participants encoded results. 80 results were encoded

Table R4. Results par sample

Sample	Target value	Repetition	Encoded results
PT2021BRUSERNS1	Negative	3	12 negative results
PT2021BRUSERNS2	Negative	2	8 negative results
PT2021BRUSERNS3	Negative	2	8 negative results
PT2021BRUSERPS1	Positive	5	20 positive results
PT2021BRUSERPS2	Positive	4	16 positive results
PT2021BRUSERPS3	positive	4	16 positive results

100% of the encoded results were correct.

3.2.Used methods

3 participants used the Zoetis (Synbiotics) Brucella antigen (Batch antigen 18ZBAI003 or 19ZBAI004) and one used the Idexx Brucella antigen (batch 421).

3.3.Conclusion.

All the encoded results were correct independently of the antigen source.

Annex 1. Quantitative results (not under accreditation)

A1.1. SAW

	Labo	97504	97507	97508	97517
	Antigen (batch)	Zoetis (18ZBAI003)	Zoetis (19ZBAI004)	Zoetis (19ZBAI004)	IDEXX (421)
Sample	Repetition	Titer	Titer	Titer	Titer
PT2021BRUSERPS1	5	50-50-50-50-50	50-50-50-50-50	50-50-50-50-50	30-30-30-50-50
PT2021BRUSERPS2	4	>100->100->100->100	>100->100->100->100	>100->100->100->100	>100->100->100->100
PT2021BRUSERPS3	4	>100->100->100->100	>100->100->100->100	>100->100->100->100	>100->100-50-50

A.1.2. ELISA

Sample PT2021BRUSERNS1

parameters	97504	97507	97508	97517
Rep1 (OD)	0,025	0,064	0,091	0,085
Rep2 (OD)	0,014	0,064	0,113	0,063
Rep3 (OD)	0,017	0,087	0,081	0,096
Mean	0,019	0,072	0,095	0,081
SD	0,006	0,013	0,016	0,017
CV (%)	30,462	18,529	17,232	20,884

Repx= repetition x

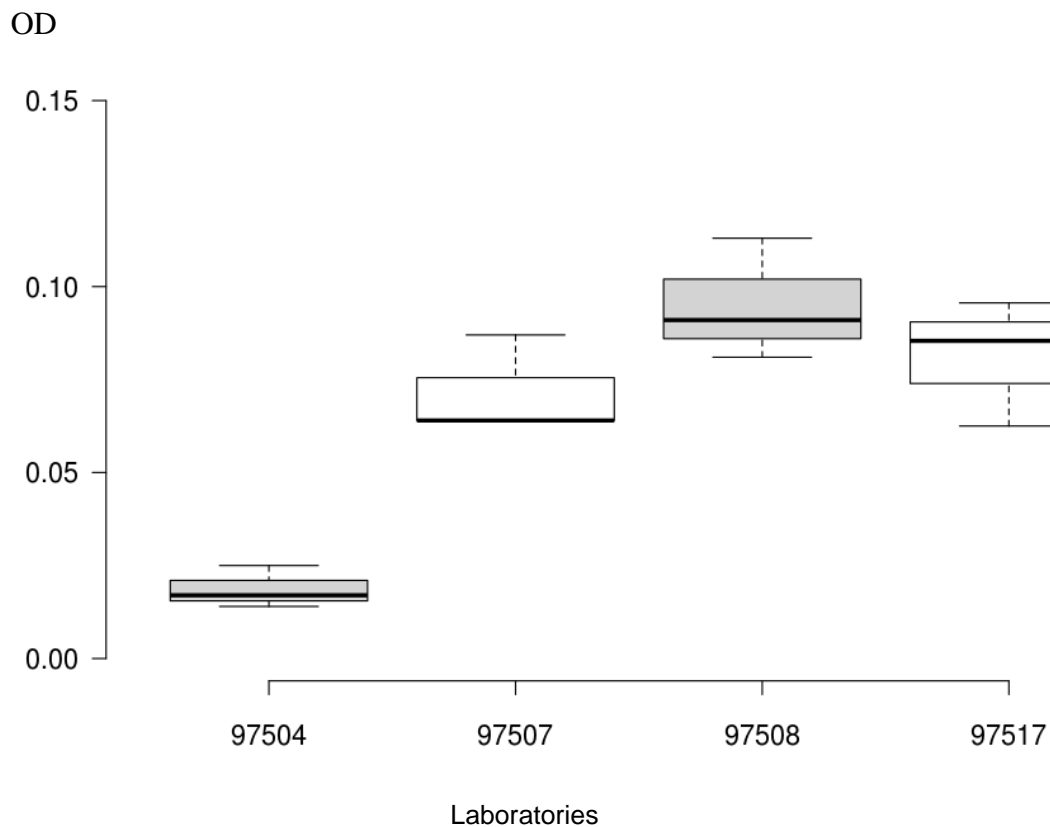
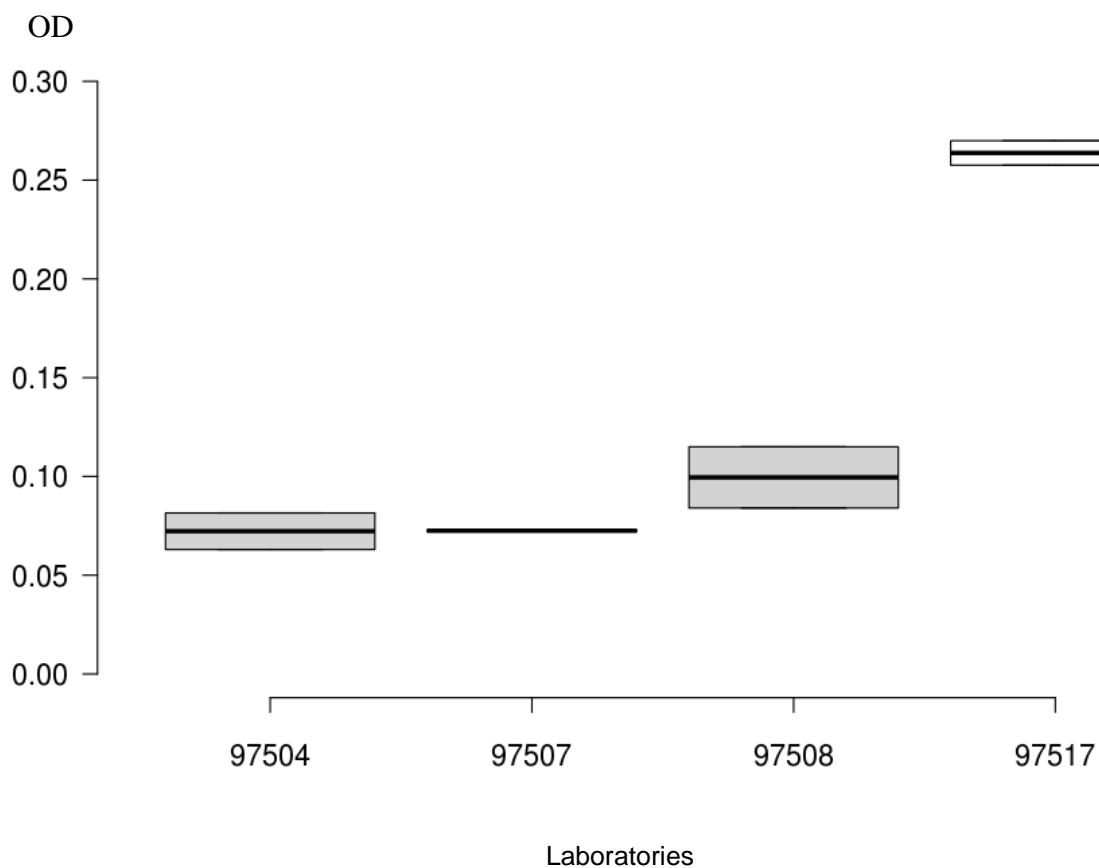


Figure A1. Distribution of OD values per laboratory

Sample PT2021BRUSERNS2

	97504	97507	97508	97517
Rep1 (OD)	0,082	0,072	0,084	0,270
Rep2 (OD)	0,063	0,073	0,115	0,258
Mean	0,072	0,073	0,100	0,264
SD	0,013	0,001	0,022	0,009
CV (%)	18,106	18,106	18,106	18,106



Sample PT2021BRUSERNS3

	97504	97507	97508	97517
Rep1 (OD)	0,061	0,067	0,084	0,232
Rep2 (OD)	0,044	0,070	0,079	0,350
Mean	0,053	0,069	0,082	0,291
SD	0,012	0,002	0,004	0,084
CV (%)	22,897	3,097	4,338	28,712

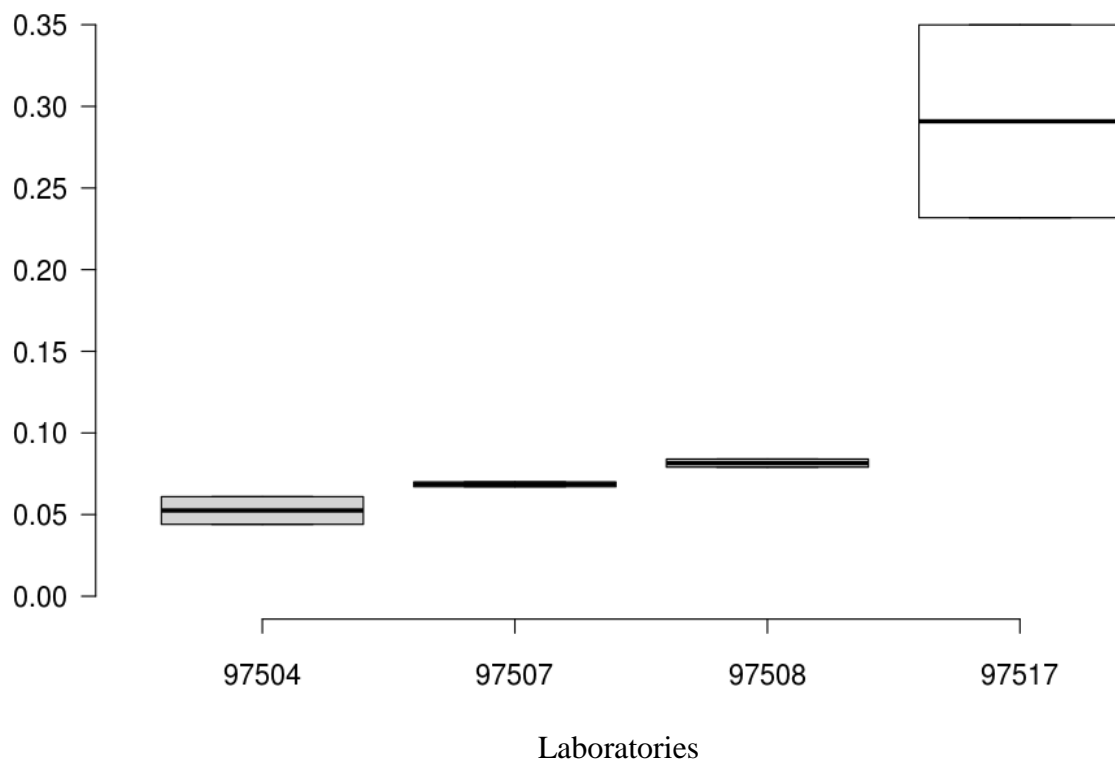


Figure A3. Distribution of OD values per laboratory

Sample PT2021BRUSERPS1

	97504	97507	97508	97517
Rep1 (OD)	2,8	3,291	3,375	2,755
Rep2 (OD)	2,839	3,311	3,594	2,602
Rep3 (OD)	2,8545	3,323	3,557	2,491
Rep4 (OD)	2,815	3,240	3,399	2,380
Rep5 (OD)	2,898	3,302	3,574	2,530
Mean	2,8413	3,293	3,500	2,552
SD	0,038	0,032	0,104	0,139
CV (%)	1,339	0,974	2,976	5,457

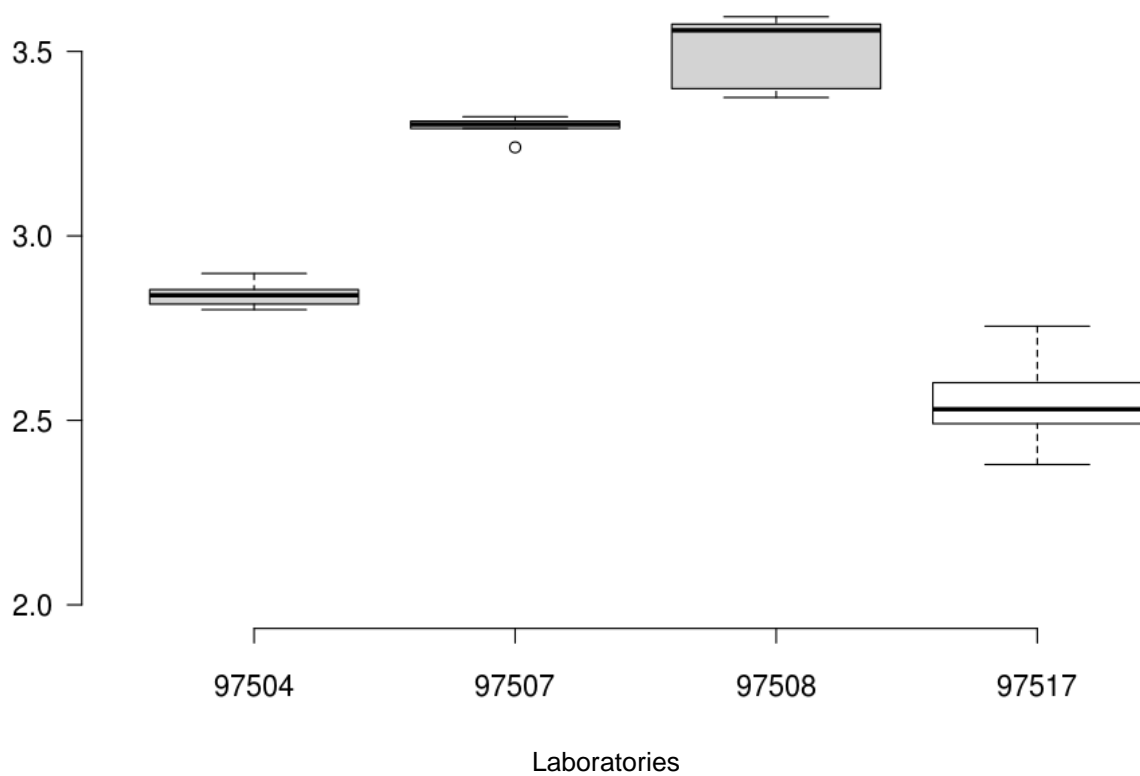


Figure A4. Distribution of OD values per laboratory

Sample PT2021BRUSERPS2

parameter	97504	97507	97508	97517
Rep1 (OD)	2,0075	1,690	1,142	2,311
Rep2 (OD)	2,000	1,125	1,059	2,087
Rep3 (OD)	2,163	1,579	1,119	2,181
Rep4 (OD)	2,045	1,638	1,197	2,190
mean	2,054	1,508	1,129	2,192
SD	0,0756	0,259	0,0571	0,092
CV (%)	3,680	17,197	5,059	4,203

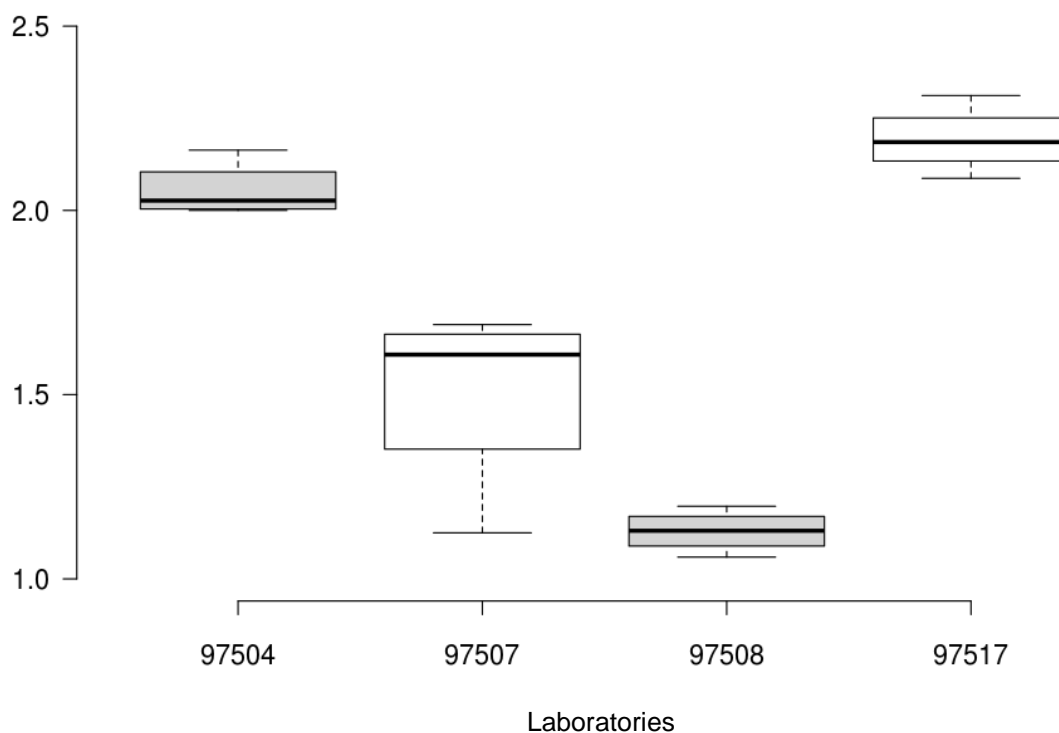


Figure A5. Distribution of OD values per laboratory

Sample PT2021BRUSERPS3

parameter	97504	97507	97508	97517
Rep1 (OD)	2,989	3,264	3,358	2,725
Rep2 (OD)	3,031	3,184	3,436	2,650
Rep3 (OD)	3,020	3,321	3,528	2,683
Rep4 (OD)	2,985	3,295	3,301	2,590
mean	3,006	3,266	3,406	2,662
SD	0,023	0,059	0,099	0,057
CV (%)	0,756	1,820	2,892	2,134

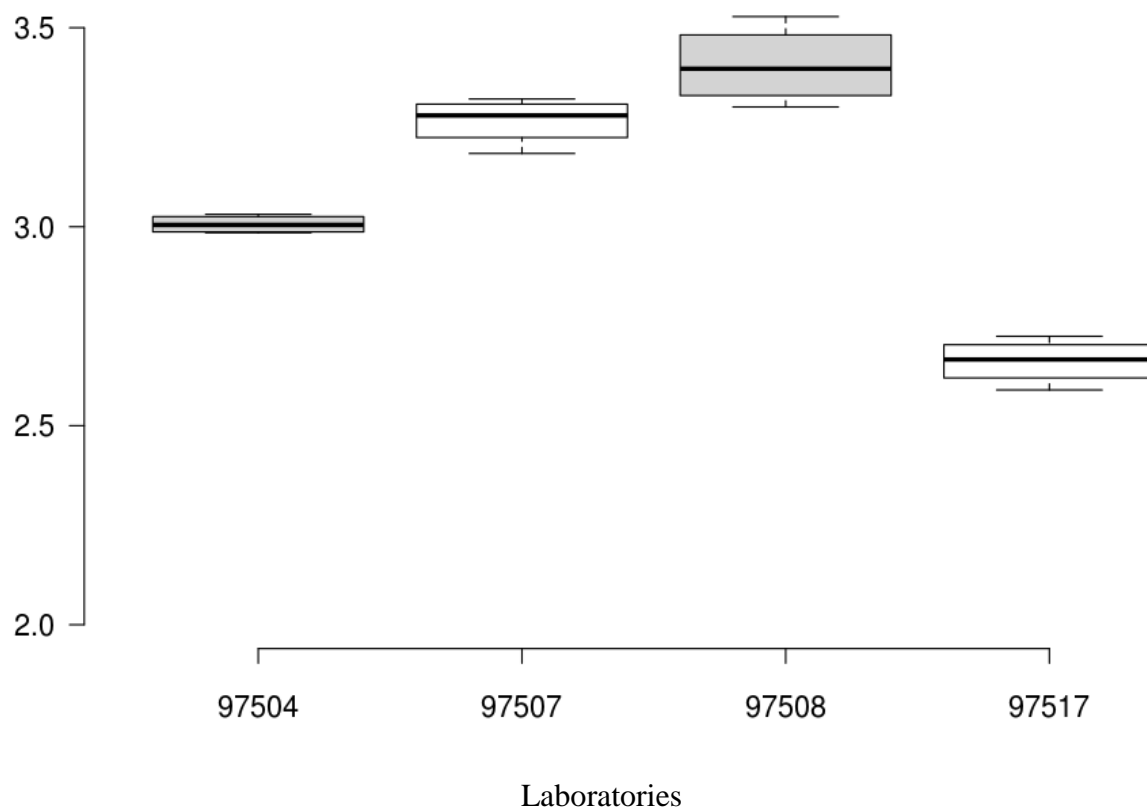


Figure A6. Distribution of OD values per laboratory

Annex 2 : additional information

PRELIMINARY REPORT

The preliminary report of this survey is available on our website via the following link:

https://www.wiv-isp.be/QML/activities/PT%20VET/fr/originaux/rapports_annee.htm

The calendar for Proficiency Testing in Veterinary diagnosis is available on our website:

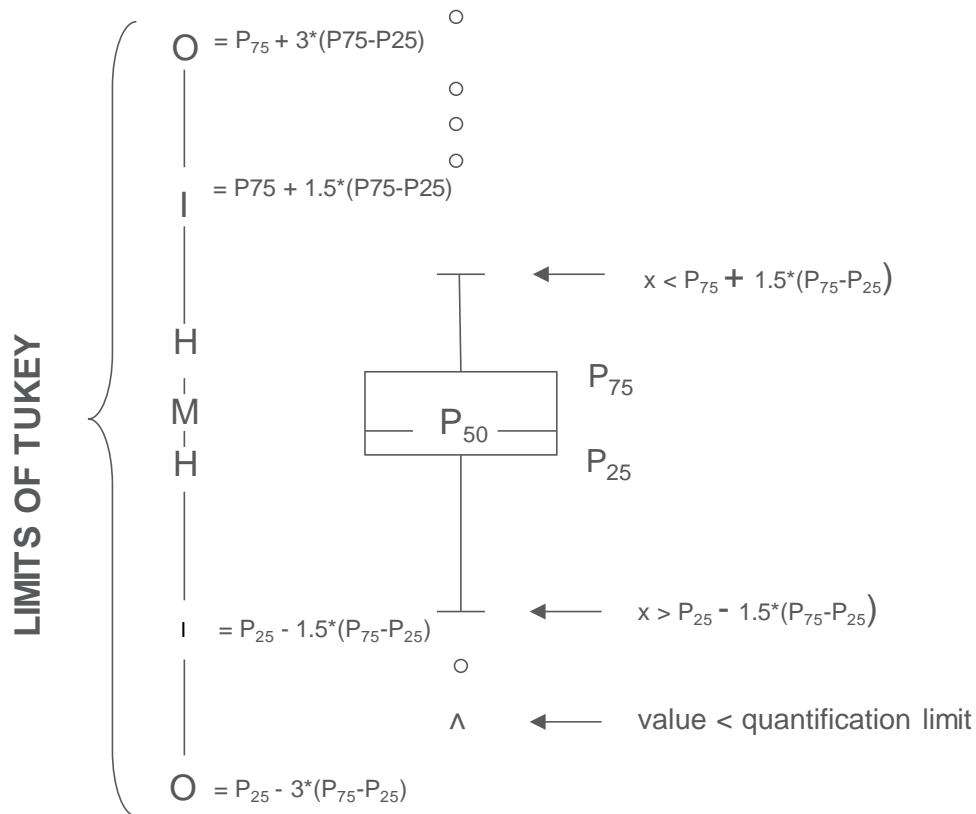
The link is:

https://www.wiv-isp.be/QML/activities/external_quality/calendar/calender_PT%20VET/fr/Calendrier_2021-PT%20VET.htm

Graphical representation

Besides the tables with the results a "Box and whisker" plot is added. It contains the following elements for the methods with at least 6 participants:

- a rectangle ranging from percentile 25 (P_{25}) to percentile 75 (P_{75})
- a central line representing the median of the results (P_{50})
- a lower limit showing the smallest value $x > P_{25} - 1.5 * (P_{75} - P_{25})$
- an upper limit representing the largest value $x < P_{75} + 1.5 * (P_{75} - P_{25})$
- all points outside this interval are represented by a dot.



Corresponding limits in case of normal distribution

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