

EXPERTISE AND SERVICE PROVISION  
QUALITY OF LABORATORIES

EXTERNAL QUALITY ASSESSMENT  
IN VETERINARY DIAGNOSIS

**DEFINITIVE GLOBAL REPORT**

**Proficiency Testing in Veterinary Diagnosis**

**Brucella**

**SURVEY 2020/9**

**Sciensano/PT VET Brucella/1-E**

Expertise and service provision  
Quality of laboratories  
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<b>Authorization to release the report:</b>	By Bernard China, scheme coordinator, on 20/01/2020.
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*Bernard China* 

All the reports are also available on our webpage:

[https://www.wiv-isp.be/QML/activities/PT%20VET/fr/originaux/rapports\\_annee.htm](https://www.wiv-isp.be/QML/activities/PT%20VET/fr/originaux/rapports_annee.htm)  
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## **Introduction**

This survey was dedicated to isolate *Brucella* spp. from organs using culture methods and to detect specific antibodies in milk.

## **The samples**

The samples were prepared by the National Reference Laboratory, Veterinary Bacteriology, Infectious diseases in animals Directorate, Sciensano.

### **1.Serology**

6 (0.5 mL) milk samples were used:

PT2020BRUSERNM1, PT2020BRUSERNM2, PT2020BRUSERPM1, PT2020BRUSERPM2, PT2020BRUSERPM3 and PT2020BRUSERPM4.

#### **Homogeneity**

The homogeneity of the samples were tested in triplicate by the NRL before the survey using Idexx ELISA.

The samples were considered as homogeneous.

#### **Target Values**

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

PT2020BRUSERNM1, PT2020BRUSERNM2 are negative.

PT2020BRUSERPM1, PT2020BRUSERPM2, PT2020BRUSERPM3 and PT2020BRUSERPM4 are positive.

#### **Stability**

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

#### **The participants**

5 laboratories participated to the Brucella serology survey:

Sciensano ; Arsia (Ciney) , LMVE (Luxemburg), MCC-Vlaanderen, Anses (Maison-Alfort).

## Randomisation and panel composition

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

	<b>Group 1 97504 and 97516</b>	<b>Group 2 97507, 97511 and 97517.</b>
<b>Sample Order</b>		
<b>BRUSER2001</b>	PT2020BRUSERNM1	PT2020BRUSERPM1
<b>BRUSER2002</b>	PT2020BRUSERNM2	PT2020BRUSERPM1
<b>BRUSER2003</b>	PT2020BRUSERNM1	PT2020BRUSERPM1
<b>BRUSER2004</b>	PT2020BRUSERNM2	PT2020BRUSERPM2
<b>BRUSER2005</b>	PT2020BRUSERNM1	PT2020BRUSERPM3
<b>BRUSER2006</b>	PT2020BRUSERNM1	PT2020BRUSERPM2
<b>BRUSER2007</b>	PT2020BRUSERPM1	PT2020BRUSERPM3
<b>BRUSER2008</b>	PT2020BRUSERPM2	PT2020BRUSERPM2
<b>BRUSER2009</b>	PT2020BRUSERPM2	PT2020BRUSERPM3
<b>BRUSER2010</b>	PT2020BRUSERPM1	PT2020BRUSERPM2
<b>BRUSER2011</b>	PT2020BRUSERPM2	PT2020BRUSERPM3
<b>BRUSER2012</b>	PT2020BRUSERPM1	PT2020BRUSERPM2
<b>BRUSER2013</b>	PT2020BRUSERPM3	PT2020BRUSERPM4
<b>BRUSER2014</b>	PT2020BRUSERPM2	PT2020BRUSERPM4
<b>BRUSER2015</b>	PT2020BRUSERPM3	PT2020BRUSERNM1
<b>BRUSER2016</b>	PT2020BRUSERPM2	PT2020BRUSERNM1
<b>BRUSER2017</b>	PT2020BRUSERPM3	PT2020BRUSERNM2
<b>BRUSER2018</b>	PT2020BRUSERPM4	PT2020BRUSERNM1
<b>BRUSER2019</b>	PT2020BRUSERPM3	PT2020BRUSERNM2
<b>BRUSER2020</b>	PT2020BRUSERPM4	PT2020BRUSERNM1

The panel was constituted of 20 samples of 0.5 ml

## **2. Bacteriology**

### Homogeneity

10 different samples were used:

PT2020BRUBACNO1, PT2020BRUBACNO2, PT2020BRUBACNO3, PT2020BRUBACNO4, PT2020BRUBACNO5, PT2020BRUBACPO1, PT2020BRUBACPO2, PT2020BRUBACPO3, PT2020BRUBACPO4 and PT2020BRUBACPO5.

The samples were to be manipulated in a L3 laboratory.

The homogeneity of the samples were tested by the NRL on replicates of each sample. The samples were considered as homogeneous.

### Target values

The target values were determined by the NRL using the homogeneity results.

PT2020BRUBACNO1, PT2020BRUBACNO2, PT2020BRUBACNO3, PT2020BRUBACNO4 and PT2020BRUBACNO5 are considered as negative. PT2020BRUBACPO1, PT2020BRUBACPO2, PT2020BRUBACPO3, PT2020BRUBACPO4 and PT2020BRUBACPO5 are considered as positive.

### Stability

The samples were tested before, during and after the survey. The results were compared and the samples were considered as stable.

### The participants

4 laboratories participated to the Bacteriology of *Brucella*: Sciensano, Arsia (Ciney), DGZ (Torhout), and Anses (France).

### Randomisation and panel composition

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

Laboratory	Group 1 97504 and 97508	Group 2 97507 and 97517
Sample Order		
BRUBAC2001	PT2020BRUBACNO1	PT2020BRUBACPO1
BRUBAC2002	PT2020BRUBACNO2	PT2020BRUBACPO2
BRUBAC2003	PT2020BRUBACNO3	PT2020BRUBACPO3
BRUBAC2004	PT2020BRUBACNO4	PT2020BRUBACPO4
BRUBAC2005	PT2020BRUBACNO5	PT2020BRUBACPO5
BRUBAC2006	PT2020BRUBACPO1	PT2020BRUBACNO2
BRUBAC2007	PT2020BRUBACPO2	PT2020BRUBACNO3
BRUBAC2008	PT2020BRUBACPO3	PT2020BRUBACNO5
BRUBAC2009	PT2020BRUBACPO4	PT2020BRUBACNO4
BRUBAC2010	PT2020BRUBACPO5	PT2020BRUBACNO1

The panel consisted of 10 organ samples of 500 µl.

### **Survey Timeline**

Transfer of the samples from NRL to QL: 24/09/2020 (serology only)

Randomization of the samples by QL: 28/09/2020 (Serology) and 05/10/2020 (Bacteriology)

Sending samples to participants: 05/10/2020. The samples were sent on dry ice.

Deadline for the results encoding: 29/10/2020

Preliminary report: 09/11/2020

## **Results**

### **1.Serology**

The panel consisted in 20 milk samples: 14 positive samples and 6 negative samples.

#### **1.1.Results per sample**

5 laboratories encoded results.

Table R1. Results per sample

<b>Sample ID</b>	<b>Expected result</b>	<b>Number of repetitions (total results)</b>	<b>Observed result</b>
<b>PT2020BRUSERNM1</b>	Negative	4 (20)	20 negative results
<b>PT2020BRUSERNM2</b>	Negative	2 (10)	10 negative results
<b>PT2020BRUSERPM1</b>	Positive	3 (15)	15 Positive results
<b>PT2020BRUSERPM2</b>	Positive	5 (25)	25 Positive results
<b>PT2020BRUSERPM3</b>	Positive	4 (20)	20 positive results
<b>PT2020BRUSERPM4</b>	Positive	2 (10)	9 positive results 1 doubtful result (NI)

Globally, on 100 encoded results, 99 were considered as correct.

For sample PM4, one laboratory considered one of the replicate as doubtful and one as positive.

#### **1.2.Used methods**

All the 5 participants used the same method: IDEXX Brucellosis Milk Ab Test

#### **1.3.Conclusion**

4 out of 5 participants encoded correct results.

One laboratory encoded one doubtful result for a positive sample. Interestingly, this sample was present in duplicate and the laboratory answered once positive and once doubtful. This participant encoded globally less positive values than the other laboratories using the same method.

## 2. Bacteriology

The panel consisted of 10 organ samples spiked with *Brucella* spp. (*B. abortus* bv3, *B. suis* bv2), *Ochrobactrum* sp and other contaminant bacteria as follows:

1. PT2020BRUBACNO1 : no spiking
2. PT2020BRUBACNO2 : bacterial contaminant N°1
3. PT2020BRUBACNO3: bacterial contaminant N°2
4. PT2020BRUBACNO4 : *Ochrobactrum* sp
5. PT2020BRUBACNO5 : *Ochrobactrum* sp+ bacterial contaminant N°1+ bacterial contaminant N°2
6. PT2020BRUBACPO1 : *B. abortus* bv 3
7. PT2020BRUBACPO2 : *B. suis* bv 2
8. PT2020BRUBACPO3 : *B. abortus* bv 3 + bacterial contaminant N°1
9. PT2020BRUBACPO4 : *B. abortus* bv 3 + bacterial contaminant N°2
10. PT2020BRUBACPO5 : *B. abortus* bv 3 + *Ochrobactrum* sp

In total were 5 positive and 5 negative samples.

### 2.1. Results per sample

4 laboratories encoded results.

Table R3. Result per sample

Sample	Expected result	Number of repetition (number of results)	Observed result
PT2020BRUBACNO1	Negative	1 (4)	4 negative results
PT2020BRUBACNO2	Negative	1 (4)	4 negative results
PT2020BRUBACNO3	Negative	1 (4)	4 negative results
PT2020BRUBACNO4	Negative	1 (4)	4 negative results
PT2020BRUBACNO5	Negative	1 (4)	4 negative results
PT2020BRUBACPO1	Positive	1 (4)	4 positive results
PT2020BRUBACPO2	Positive	1 (4)	4 positive results
PT2020BRUBACPO3	Positive	1 (4)	4 positive results
PT2020BRUBACPO4	Positive	1 (4)	4 positive results
PT2020BRUBACPO5	Positive	1 (4)	4 positive results

On the 40 encoded results, 100% were correct.

### 2.2. Used methods

All participants used their own instructions.

#### 2.2. Conclusion

All the participants gave correct results.



## ANNEXES

### Annex 1. Quantitative data for *Brucella* serology (not under accreditation)

SAMPLE PT2020BRUSERBNM1

Table A1. Quantitative normalized values (%)

Lab	L97504	L97507	L97511	L97516	L97517
<b>Method</b>	IDEXX Brucellosis Milk Ab Test				
<b>R1</b>	-1.95	1.14	-1.51	-1.46	-0.34
<b>R2</b>	-1.95	0.63	-0.84	-2.09	-0.40
<b>R3</b>	-1.77	2.75	-1.51	0.49	-0.56
<b>R4</b>	-1.77	1.90	1.90	-0.07	-0.67
<b>Mean</b>	-1.86	1.61	-0.49	-0.78	-0.49
<b>SD</b>	0.10	0.92	1.63	1.19	0.15
<b>CV</b>	-5.50%	57.41%	-331.53%	-152.65%	-30.42%

Rn= repetition n

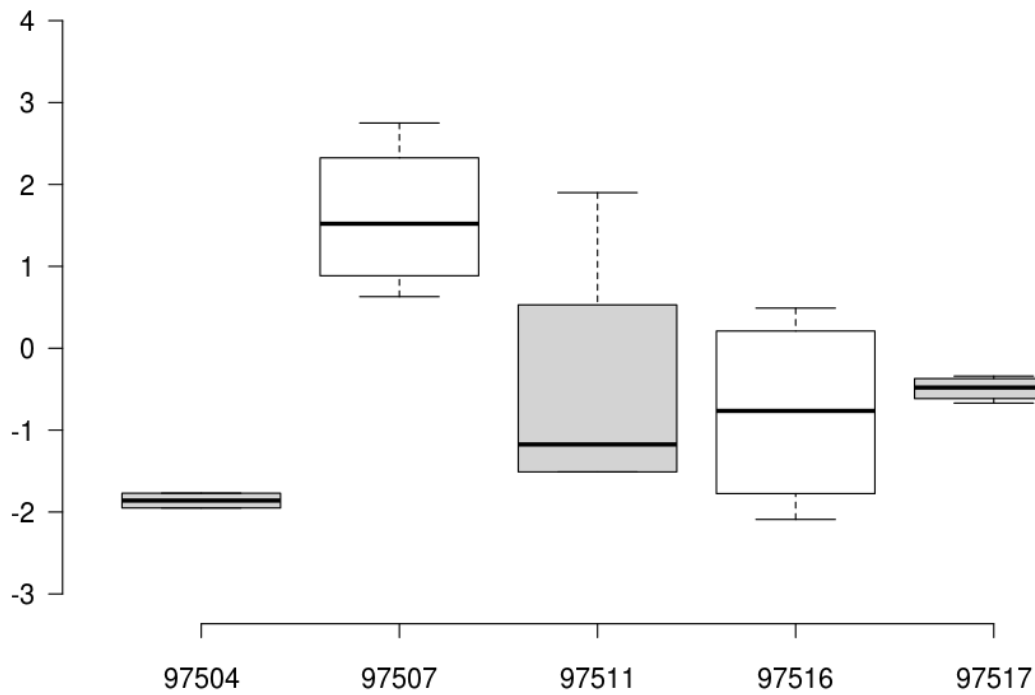


Figure A1. Boxplot dispersion of the results per participant for the sample NM1

Table A2. Quantitative normalized values

Lab	L97504	L97507	L97511	L97516	L97517
<b>Method</b>	IDEXX Brucellosis Milk Ab Test				
<b>R1</b>	-1.42	1.99	-0.97	-2.02	-0.48
<b>R2</b>	-1.68	1.82	-1.18	2.71	-0.05
<b>Mean</b>	-1.55	1.90	-1.08	0.35	-0.27
<b>SD</b>	0.19	0.12	0.14	3.34	0.30
<b>CV</b>	-12.12%	6.29%	-13.26%	961.67%	-113.60%

Rn: repetition n

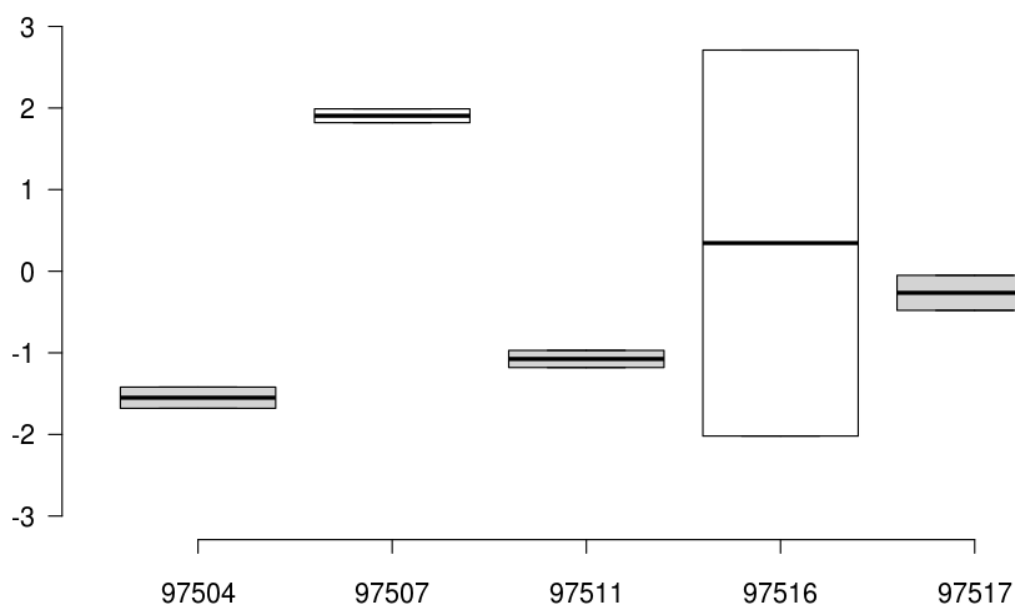


Figure A2. Boxplot dispersion of the results per participant for the sample NM2

Table A3. Quantitative normalized values (%)

Lab	L97504	L97507	L97511	L97516	L97517
<b>Method</b>	IDEXX Brucellosis Milk Ab Test				
<b>R1</b>	100.22	141.18	104.71	74.48	115.89
<b>R2</b>	108.73	125.20	98.32	75.31	108.77
<b>R3</b>	118.03	114.71	93.14	77.47	112.97
<b>Mean</b>	108.99	127.03	98.72	75.75	112.54
<b>SD</b>	8.91	13.33	5.79	1.54	3.58
<b>CV</b>	8.17%	10.49%	5.87%	2.04%	3.18%

Rn: repetition n

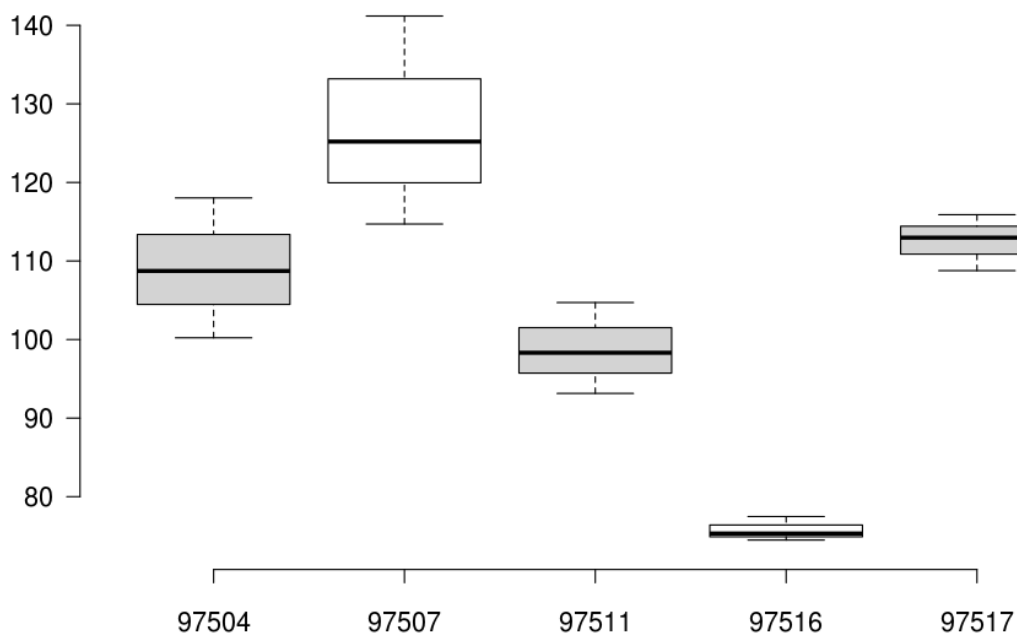


Figure A3. Boxplot dispersion of the results per participant for the sample PM1

Table A4. Quantitative normalized values (%)

Lab	L97504	L97507	L97511	L97516	L97517
<b>Method</b>	IDEXX Brucellosis Milk Ab Test				
<b>R1</b>	194.15	196.32	153.11	144.58	188.25
<b>R2</b>	192.65	190.40	148.27	140.13	177.84
<b>R3</b>	195.21	190.99	147.39	159.74	179.51
<b>R4</b>	201.15	192.18	144.91	128.09	183.08
<b>R5</b>	196.19	202.83	142.35	145.41	181.98
<b>Mean</b>	195.87	194.55	147.21	143.59	182.13
<b>SD</b>	3.23	5.18	4.03	11.37	3.99
<b>CV</b>	1.65%	2.66%	2.74%	7.92%	2.19%

Rn : repetition n

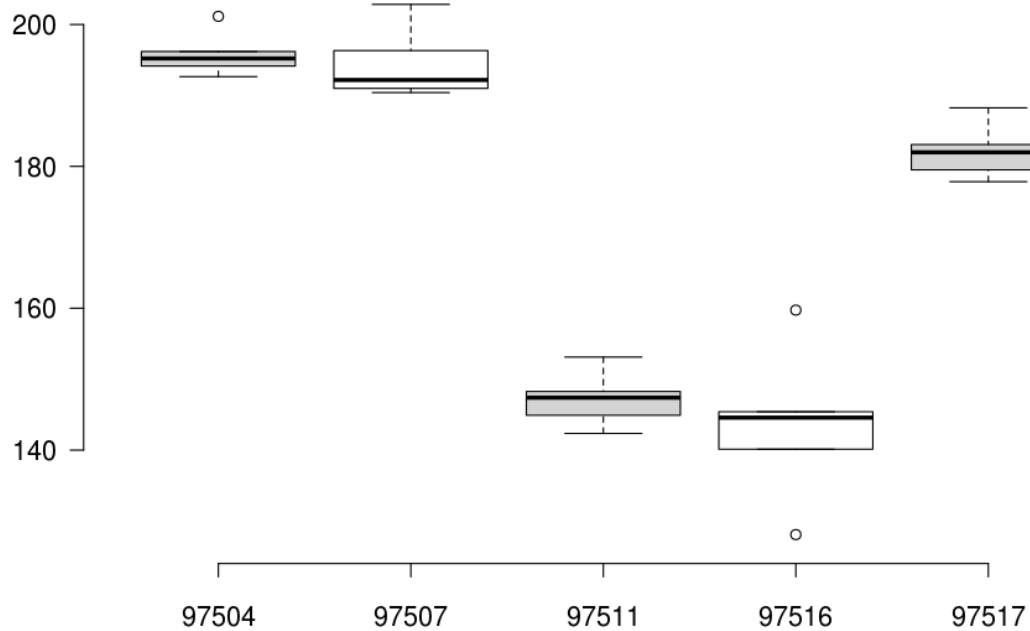


Figure A4. Boxplot dispersion of the results per participant for the sample PM2

Table A5. Quantitative normalized values

Lab	L97504	L97507	L97511	L97516	L97517
<b>Method</b>	IDEXX Brucellosis Milk Ab Test				
<b>R1</b>	98.36	104.48	89.24	71.84	97.58
<b>R2</b>	105.89	122.33	87.56	72.32	96.88
<b>R3</b>	93.49	138.99	85.41	72.46	99.93
<b>R4</b>	106.87	109.30	76.81	72.46	97.12
<b>Mean</b>	101.15	118.77	84.76	72.27	97.88
<b>SD</b>	6.37	15.44	5.53	0.30	1.40
<b>CV</b>	6.30%	13.00%	6.52%	0.41%	1.43%

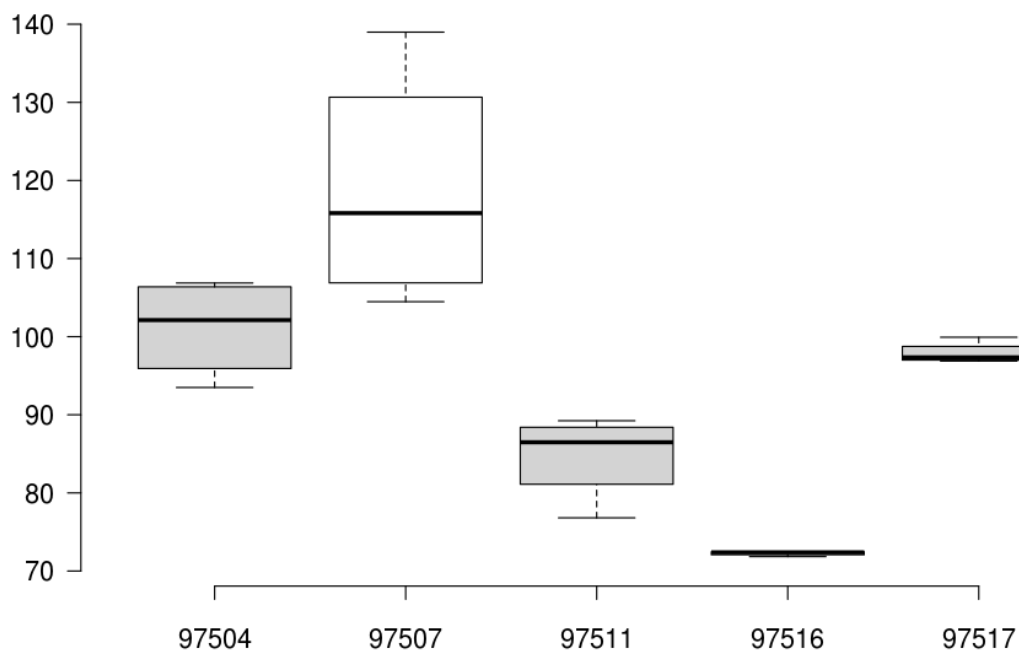


Figure A5. Boxplot dispersion of the results per participant for the sample PM3

Table A6. Quantitative normalized values

Lab	L97504	L97507	L97511	L97516	L97517
<b>Method</b>	IDEXX Brucellosis Milk Ab Test				
<b>R1</b>	61.59	88.33	79.36	58.00	69.51
<b>R2</b>	76.56	77.93	72.10	47.64	74.66
<b>Mean</b>	69.07	83.13	75.73	52.82	72.09
<b>SD</b>	10.59	7.36	5.13	7.33	3.64
<b>CV</b>	15.33%	8.85%	6.78%	13.87%	5.05%

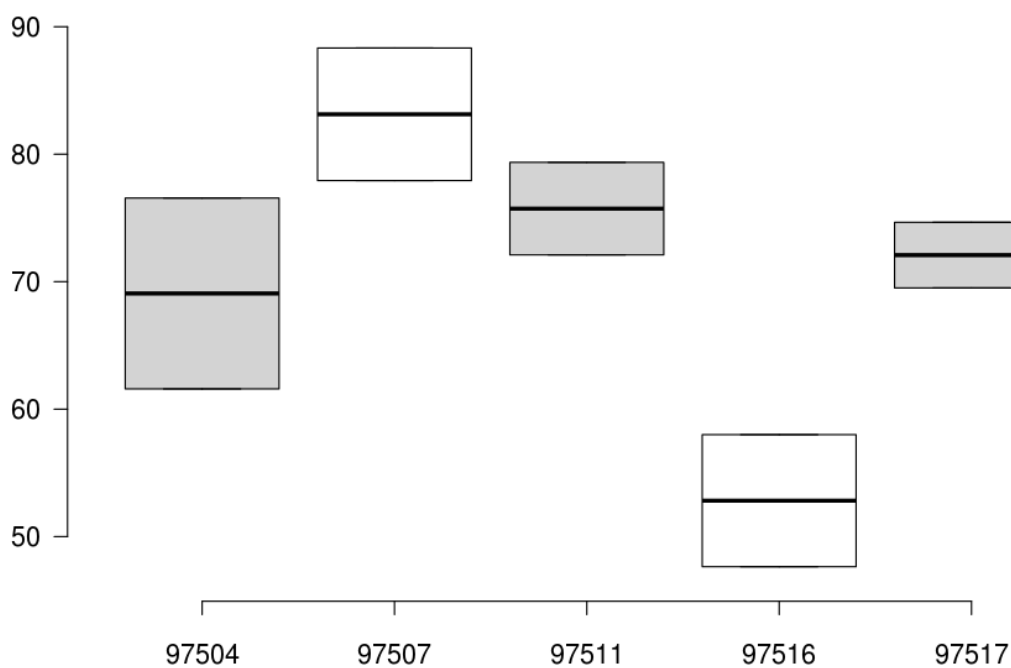


Figure A6. Boxplot dispersion of the results per participant for the sample PM4

### **Annex 3: 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](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:

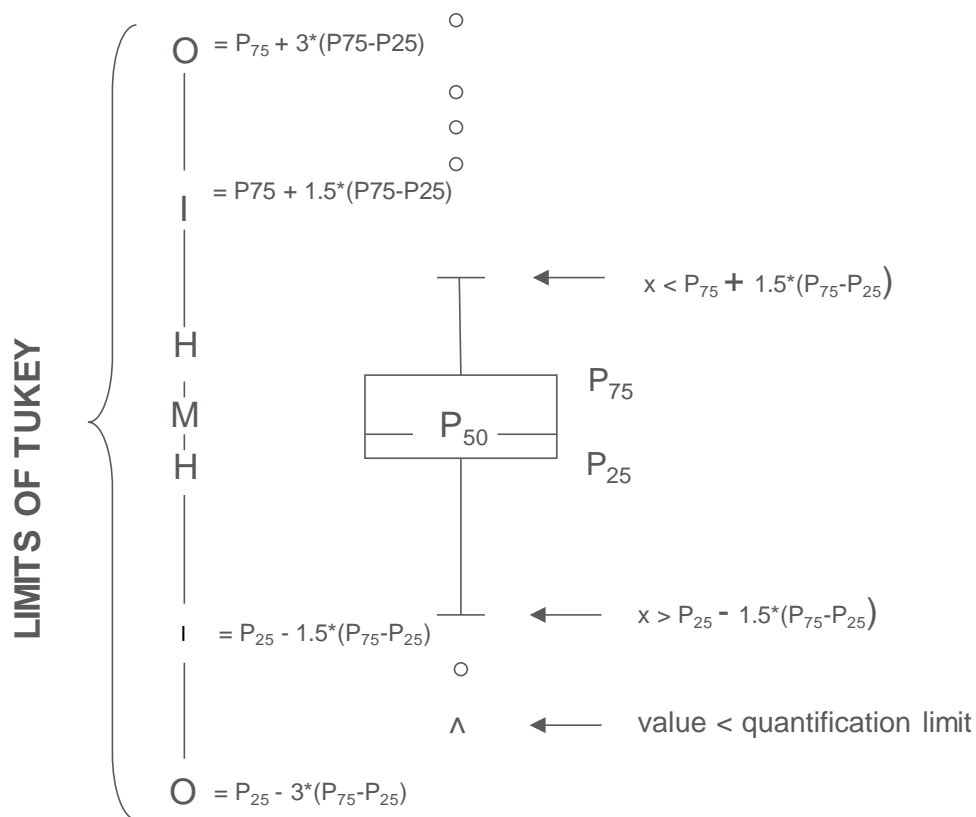
The link is:

[https://www.wiv-isp.be/QML/activities/external\\_quality/calendar/calender\\_PT%20VET/fr/Calendrier\\_2020-PT%20VET%202.htm](https://www.wiv-isp.be/QML/activities/external_quality/calendar/calender_PT%20VET/fr/Calendrier_2020-PT%20VET%202.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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