



**EXPERTISE AND SERVICE PROVISION  
QUALITY OF LABORATORIES**

**EXTERNAL QUALITY ASSESSMENT  
IN VETERINARY DIAGNOSIS**

**DEFINITIVE GLOBAL REPORT  
Proficiency Testing in Veterinary Diagnosis  
Bovine Tuberculosis  
SURVEY 2020/11  
Corrected Version**

**Sciensano/PT VET Bovine Tuberculosis/1-E-CV**

Expertise and service provision  
Quality of laboratories  
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|                                      |                  |         |                            |      |              |

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**In the corrected version, the BELAC logo was removed since the parameter was not in the scope yet.**

**Authorization to release the report:**

By Bernard China, scheme coordinator, on  
**14/06/2021.**

*Bernard China*



All the reports are also available on our webpage:

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

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## **Introduction**

This survey was dedicated to the detection of specific antibodies to Mycobacterium tuberculosis complex in serum and to the detection of gamma-interferon in bovine serum by ELISA.

## **The samples**

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

### **1.Serology**

5 (250 µl) serum samples were used: PT2020TUBSERPS3, PT2020TUBSERPS2, PT2020TUBSERNS1, PT2020TUBSERPS1, PT2020TUBSERNS2.

#### **Homogeneity**

The homogeneity of the samples were tested by the NRL before the survey using ELISA.  
The samples were considered as homogeneous.

#### **Target Values**

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

PT2020TUBSERNS1 and PT2020TUBSERNS2 are negative.

PT2020TUBSERPS3, PT2020TUBSERPS2, PT2020TUBSERPS1 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**

4 laboratories participated to the Brucella serology survey:  
Sciensano ; Arsia, DGZ, Lavetan.

### Randomisation and panel composition

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

|                     | <b>Group 1<br/>97504 and 97508</b> | <b>Group 2<br/>97507 and 97509.</b> |
|---------------------|------------------------------------|-------------------------------------|
| <b>Sample Order</b> |                                    |                                     |
| BTSER2001           | PT2020TUBSERNS1                    | PT2020TUBSERPS3                     |
| BTSER2002           | PT2020TUBSERNS1                    | PT2020TUBSERPS3                     |
| BTSER2003           | PT2020TUBSERNS2                    | PT2020TUBSERPS1                     |
| BTSER2004           | PT2020TUBSERNS1                    | PT2020TUBSERPS2                     |
| BTSER2005           | PT2020TUBSERNS1                    | PT2020TUBSERPS3                     |
| BTSER2006           | PT2020TUBSERNS2                    | PT2020TUBSERPS3                     |
| BTSER2007           | PT2020TUBSERNS2                    | PT2020TUBSERPS2                     |
| BTSER2008           | PT2020TUBSERNS2                    | PT2020TUBSERPS3                     |
| BTSER2009           | PT2020TUBSERPS1                    | PT2020TUBSERPS3                     |
| BTSER2010           | PT2020TUBSERPS2                    | PT2020TUBSERPS2                     |
| BTSER2011           | PT2020TUBSERPS3                    | PT2020TUBSERPS1                     |
| BTSER2012           | PT2020TUBSERPS3                    | PT2020TUBSERPS1                     |
| BTSER2013           | PT2020TUBSERPS2                    | PT2020TUBSERNS2                     |
| BTSER2014           | PT2020TUBSERPS2                    | PT2020TUBSERNS2                     |
| BTSER2015           | PT2020TUBSERPS3                    | PT2020TUBSERNS1                     |
| BTSER2016           | PT2020TUBSERPS3                    | PT2020TUBSERNS1                     |
| BTSER2017           | PT2020TUBSERPS1                    | PT2020TUBSERNS2                     |
| BTSER2018           | PT2020TUBSERPS1                    | PT2020TUBSERNS2                     |
| BTSER2019           | PT2020TUBSERPS3                    | PT2020TUBSERNS1                     |
| BTSER2020           | PT2020TUBSERPS3                    | PT2020TUBSERNS1                     |

The panel was constituted of 20 samples of 0.25 ml

## **2. Gamma Interferon**

### Homogeneity

5 different samples were used: PT2020TUBIFNgPS1, PT2020TUBIFNgPS2, PT2020TUBIFNgPS3, PT2020TUBIFNgNS1, PT2020TUBIFNgNS2

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.

PT2020TUBIFNgNS1, PT2020TUBIFNgNS2 are considered as negative.

PT2020TUBIFNgPS1, PT2020TUBIFNgPS2, PT2020TUBIFNgPS3 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 gamma interferon detection: Sciensano, Arisia (Ciney), DGZ (Torhout), and Lavetan.

## Randomisation and panel composition

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

| Laboratory        | Group 1<br>97504 and 97508 | Group 2<br>97507 and 97509 |
|-------------------|----------------------------|----------------------------|
| Sample Order      |                            |                            |
| <b>BTIFNg2001</b> | PT2020TUBIFNgNS1           | PT2020TUBIFNgPS1           |
| <b>BTIFNg2002</b> | PT2020TUBIFNgNS2           | PT2020TUBIFNgPS1           |
| <b>BTIFNg2003</b> | PT2020TUBIFNgNS1           | PT2020TUBIFNgPS1           |
| <b>BTIFNg2004</b> | PT2020TUBIFNgNS2           | PT2020TUBIFNgPS1           |
| <b>BTIFNg2005</b> | PT2020TUBIFNgNS1           | PT2020TUBIFNgPS2           |
| <b>BTIFNg2006</b> | PT2020TUBIFNgNS2           | PT2020TUBIFNgPS3           |
| <b>BTIFNg2007</b> | PT2020TUBIFNgNS2           | PT2020TUBIFNgPS2           |
| <b>BTIFNg2008</b> | PT2020TUBIFNgPS1           | PT2020TUBIFNgPS3           |
| <b>BTIFNg2009</b> | PT2020TUBIFNgPS2           | PT2020TUBIFNgPS2           |
| <b>BTIFNg2010</b> | PT2020TUBIFNgPS1           | PT2020TUBIFNgPS3           |
| <b>BTIFNg2011</b> | PT2020TUBIFNgPS2           | PT2020TUBIFNgPS2           |
| <b>BTIFNg2012</b> | PT2020TUBIFNgPS1           | PT2020TUBIFNgPS3           |
| <b>BTIFNg2013</b> | PT2020TUBIFNgPS2           | PT2020TUBIFNgPS2           |
| <b>BTIFNg2014</b> | PT2020TUBIFNgPS1           | PT2020TUBIFNgNS1           |
| <b>BTIFNg2015</b> | PT2020TUBIFNgPS2           | PT2020TUBIFNgNS2           |
| <b>BTIFNg2016</b> | PT2020TUBIFNgPS3           | PT2020TUBIFNgNS1           |
| <b>BTIFNg2017</b> | PT2020TUBIFNgPS3           | PT2020TUBIFNgNS2           |
| <b>BTIFNg2018</b> | PT2020TUBIFNgPS3           | PT2020TUBIFNgNS1           |
| <b>BTIFNg2019</b> | PT2020TUBIFNgPS3           | PT2020TUBIFNgNS2           |
| <b>BTIFNg2020</b> | PT2020TUBIFNgPS2           | PT2020TUBIFNgNS2           |

The panel consisted of 10 organ samples of 250 µl.

## **Survey Timeline**

Transfer of the samples from NRL to QL: 15/10/2020

Randomization of the samples by QL: 16/10/2020

Sending samples to participants: The samples were sent on dry ice. 19/10/2020

Deadline for the results encoding: 20/11/2020

Preliminary report: 25/11/2020

**Global report (first version): 29/01/2021**

## **Results**

### **1.Serology**

The panel consisted in 20 Serum samples: 12 positive samples and 8 negative samples.

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

4 laboratories encoded results.

Table R1. Results per sample

| Sample ID       | Expected result | Number of repetitions (total results) | Observed result     |
|-----------------|-----------------|---------------------------------------|---------------------|
| PT2020TUBSERNS1 | Negative        | 4 (16)                                | 16 negative results |
| PT2020TUBSERNS2 | Negative        | 4(16)                                 | 16 negative results |
| PT2020TUBSERPS1 | Positive        | 3 (12)                                | 12 Positive results |
| PT2020TUBSERPS2 | Positive        | 3 (12)                                | 12 Positive results |
| PT2020TUBSERPS3 | Positive        | 6 (24)                                | 24 positive results |

Globally, on 80 encoded results, 100% were considered as correct.

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

All the 4 participants used the same method: IDEXX M. tuberculosis Ab test

#### **1.3.Conclusion**

All the participants encoded correct results and used the same method.

## **2. Gamma Interferon**

The panel consisted of 20 serum samples: 7 negative and 13 positive samples.

### **2.1. Results per sample**

4 laboratories encoded results.

Table R3. Result per sample

| Sample           | Expected result | Number of repetition<br>(number of results) | Observed result     |
|------------------|-----------------|---------------------------------------------|---------------------|
| PT2020TUBIFNgNS1 | Negative        | 3 (12)                                      | 12 negative results |
| PT2020TUBIFNgNS2 | Negative        | 4 (16)                                      | 16 negative results |
| PT2020TUBIFNgPS1 | Positive        | 4 (16)                                      | 16 positive results |
| PT2020TUBIFNgPS2 | Positive        | 5 (20)                                      | 20 positive results |
| PT2020TUBIFNgPS3 | Positive        | 4 (16)                                      | 16 positive results |

On the 80 encoded results, 100% were correct.

### **2.2. Used methods**

All participants used the same method: IDVET-IDSCREEN Ruminant IFN-g

### **2.3. Conclusion**

All the participants gave correct results.

## **ANNEXES**

### **Annex 1. Quantitative data for Bovine tuberculosis survey**

#### 1. Serology

Sample PT2020TUBSERNS1

Table A1. Quantitative normalized values (%)

| Lab           | L97504                        | L97507  | L97508 | L97509 |
|---------------|-------------------------------|---------|--------|--------|
| <b>Method</b> | IDEXX M. tuberculosis Ab test |         |        |        |
| R1            | -0,07                         | -5,769  | -0,107 | -0,107 |
| R2            | -0,04                         | -13,462 | -0,105 | -0,107 |
| R3            | -0,03                         | -9,615  | -0,085 | -0,097 |
| R4            | -0,05                         | -9,615  | -0,087 | -0,076 |
| <b>Mean</b>   | -0,05                         | -9,62   | -0,10  | -0,10  |
| <b>SD</b>     | 0,017                         | 3,140   | 0,012  | 0,015  |
| <b>CV</b>     | -36,0%                        | -32,7%  | -12,1% | -15,1% |

Rn= repetition n

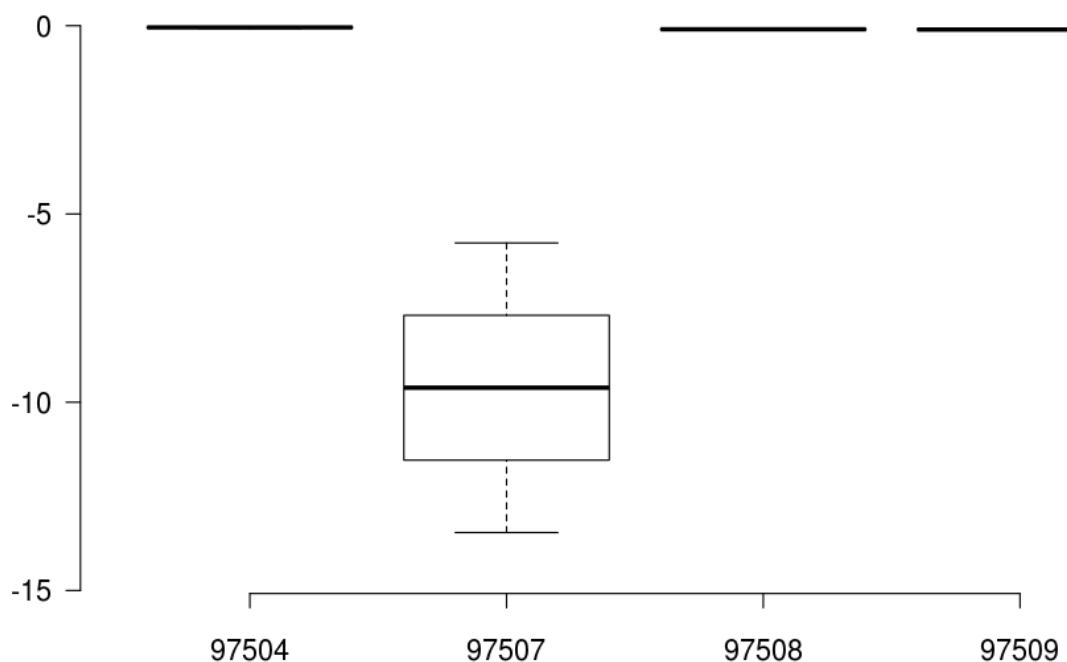


Figure A1. Boxplot dispersion of the results per participant for the sample NS1

Table A2. Quantitative normalized values

| Lab    | L97504                        | L97507  | L97508 | L97509 |
|--------|-------------------------------|---------|--------|--------|
| Method | IDEXX M. tuberculosis Ab test |         |        |        |
| R1     | -0,12                         | -9,615  | -0,080 | -0,053 |
| R2     | -0,12                         | -9,615  | -0,045 | -0,046 |
| R3     | -0,13                         | -11,538 | -0,109 | -0,097 |
| R4     | -0,02                         | -7,692  | -0,066 | -0,042 |
| Mean   | -0,10                         | -9,62   | -0,08  | -0,06  |
| SD     | 0,052                         | 1,570   | 0,027  | 0,025  |
| CV     | -53,2%                        | -16,3%  | -35,8% | -42,7% |

Rn: repetition n

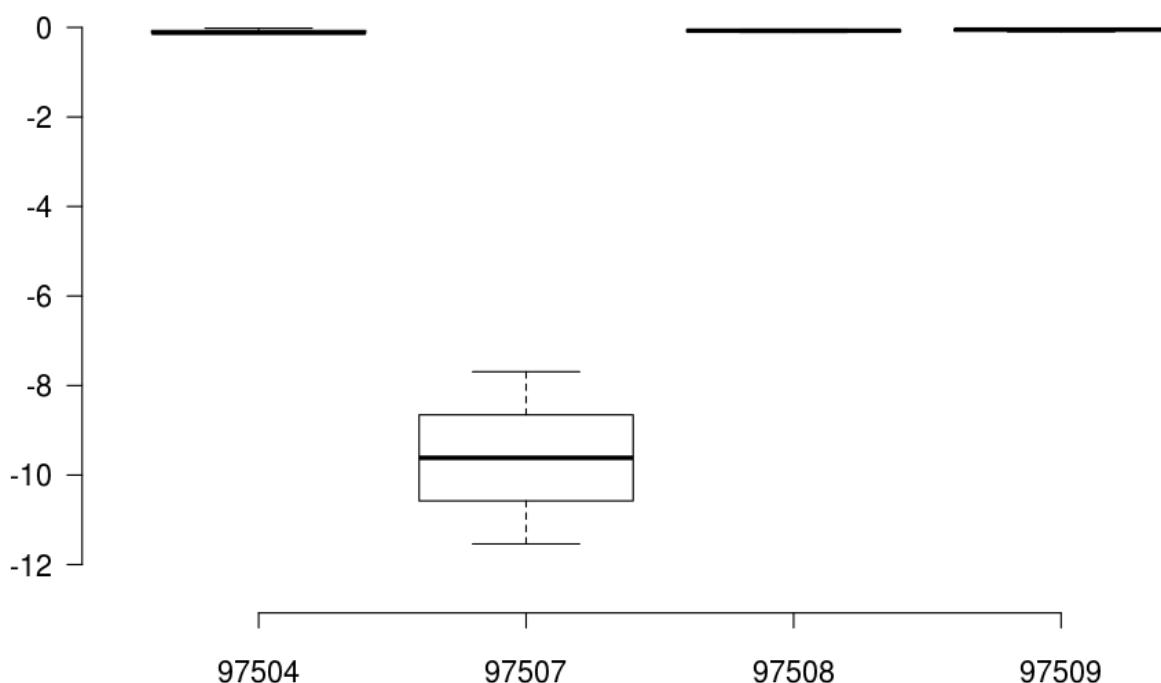


Figure A2. Boxplot dispersion of the results per participant for the sample NS2

Table A3. Quantitative normalized values (%)

| Lab    | L97504                        | L97507  | L97508 | L97509 |
|--------|-------------------------------|---------|--------|--------|
| Method | IDEXX M. tuberculosis Ab test |         |        |        |
| R1     | 0,95                          | 107,692 | 0,720  | 1,343  |
| R2     | 1,16                          | 107,692 | 0,737  | 1,048  |
| R3     | 1,12                          | 107,692 | 0,813  | 1,414  |
| Mean   | 1,08                          | 107,69  | 0,76   | 1,27   |
| SD     | 0,112                         | 0,000   | 0,050  | 0,194  |
| CV     | 10,4%                         | 0,0%    | 6,5%   | 15,3%  |

Rn: repetition n

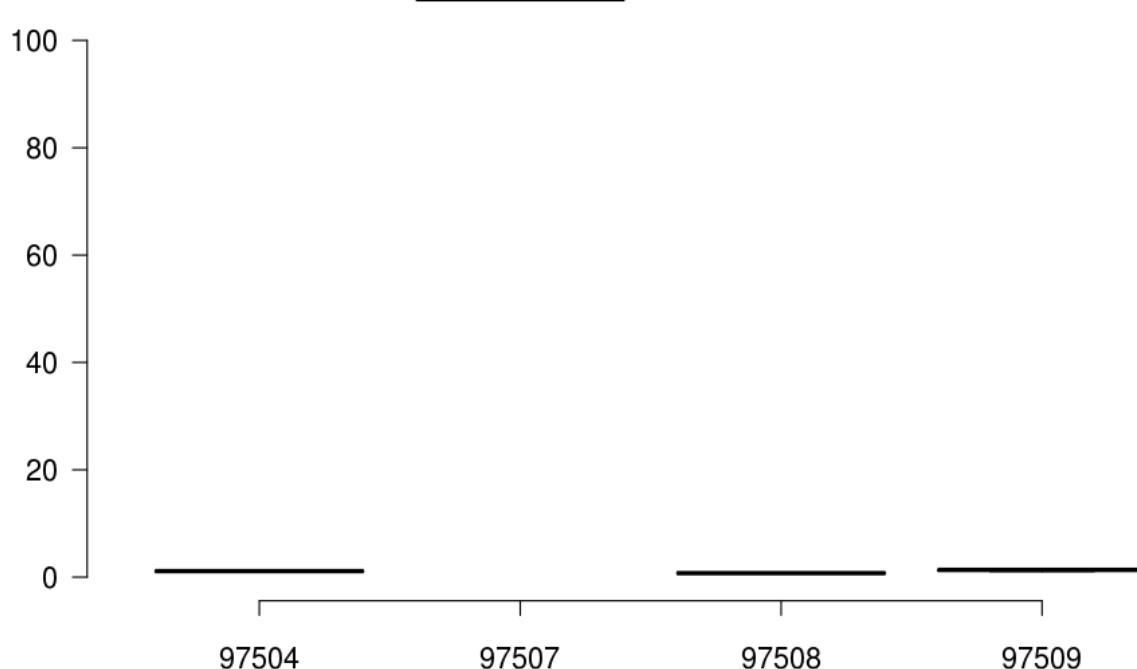


Figure A3. Boxplot dispersion of the results per participant for the sample PS1

Table A4. Quantitative normalized values (%)

| Lab    | L97504                        | L97507  | L97508 | L97509 |
|--------|-------------------------------|---------|--------|--------|
| Method | IDEXX M. tuberculosis Ab test |         |        |        |
| R1     | 1,98                          | 275,000 | 1,856  | 3,278  |
| R2     | 2,18                          | 255,769 | 2,107  | 2,986  |
| R3     | 2,18                          | 242,308 | 2,019  | 3,482  |
| Mean   | 2,11                          | 257,69  | 1,99   | 3,25   |
| SD     | 0,115                         | 16,431  | 0,127  | 0,249  |
| CV     | 5,5%                          | 6,4%    | 6,4%   | 7,7%   |

Rn: repetition n

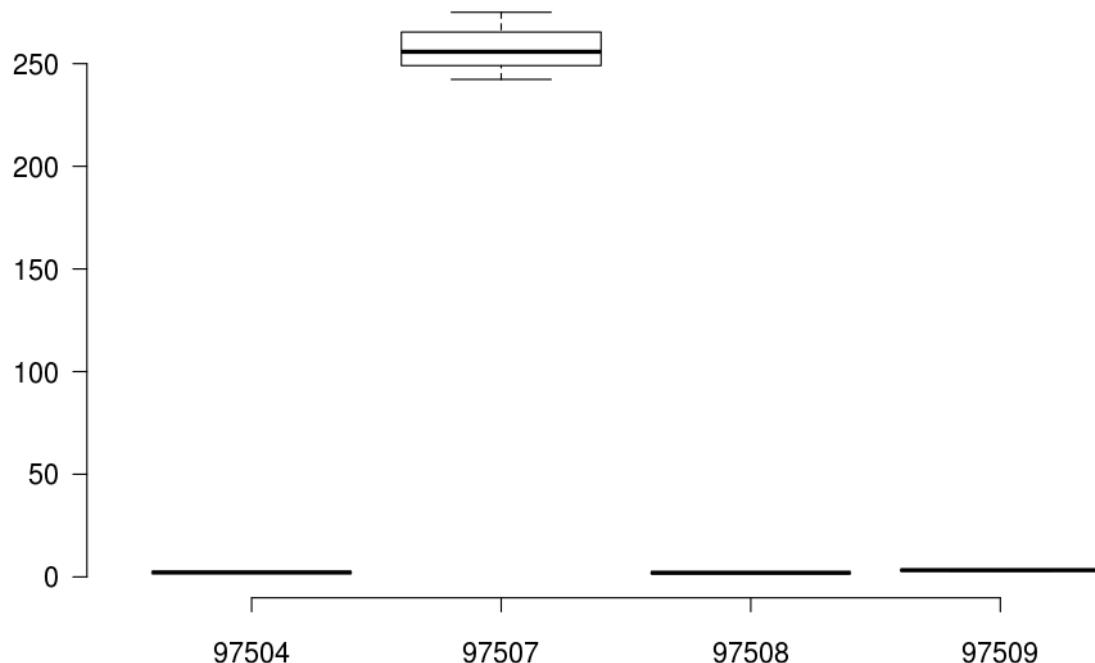


Figure A4. Boxplot dispersion of the results per participant for the sample PS2

Table A5. Quantitative normalized values

| Lab    | L97504                        | L97507 | L97508 | L97509 |
|--------|-------------------------------|--------|--------|--------|
| Method | IDEXX M. tuberculosis Ab test |        |        |        |
| R1     | 0,30                          | 46,154 | 0,308  | 0,711  |
| R2     | 0,33                          | 55,769 | 0,322  | 0,728  |
| R3     | 0,22                          | 53,846 | 0,314  | 0,528  |
| R4     | 0,30                          | 67,308 | 0,475  | 0,752  |
| R5     | 0,31                          | 50,000 | 0,338  | 0,538  |
| R6     | 0,59                          | 55,769 | 0,396  | 0,555  |
| Mean   | 0,34                          | 54,81  | 0,36   | 0,64   |
| SD     | 0,13                          | 7,17   | 0,07   | 0,11   |
| CV     | 37,3%                         | 13,1%  | 18,2%  | 16,6%  |

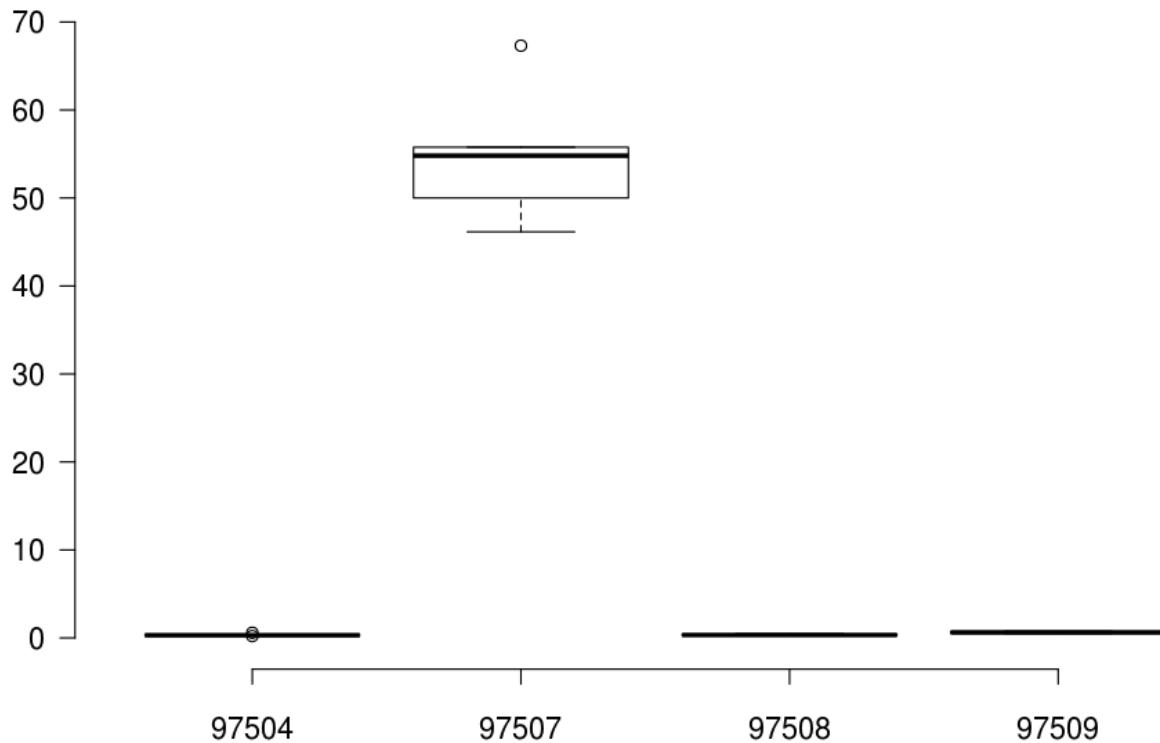


Figure A5. Boxplot dispersion of the results per participant for the sample PS3

## 2. Gamma Interferon

Sample PT2020TUBIFNgNS1

Table A6. Quantitative normalized values

| Lab    | L97504                        | L97507 | L97508 | L97509 |
|--------|-------------------------------|--------|--------|--------|
| Method | IDVET-IDSCREEN Ruminant IFN-g |        |        |        |
| R1     | 9,00                          | 16,95  | 9,71   | 4,05   |
| R2     | 15,00                         | 18,64  | 11,02  | 3,64   |
| R3     | 11,00                         | 22,03  | 11,12  | 4,05   |
| Mean   | 11,67                         | 19,21  | 10,62  | 3,91   |
| SD     | 3,06                          | 2,59   | 0,79   | 0,24   |
| CV     | 26,2%                         | 13,5%  | 7,4%   | 6,1%   |

Rn=repetition n

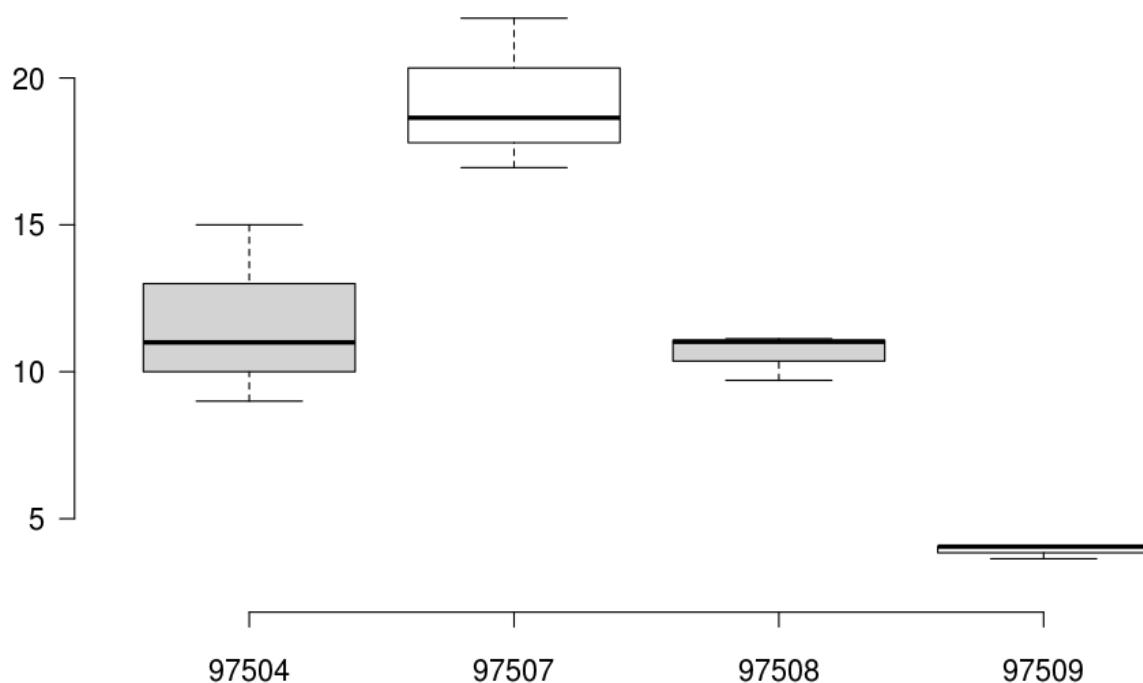


Figure A6. Boxplot dispersion of the results per participant for the sample gNS1

Table A7. Quantitative normalized values

| Lab    | L97504                        | L97507 | L97508 | L97509 |
|--------|-------------------------------|--------|--------|--------|
| Method | IDVET-IDSCREEN Ruminant IFN-g |        |        |        |
| R1     | 11,00                         | 18,64  | 10,52  | 3,77   |
| R2     | 8,00                          | 22,03  | 15,47  | 3,36   |
| R3     | 9,00                          | 18,64  | 9,20   | 4,87   |
| R4     | 9,00                          | 20,34  | 9,10   | 5,42   |
| Mean   | 9,25                          | 19,92  | 11,07  | 4,36   |
| SD     | 1,26                          | 1,62   | 3,00   | 0,95   |
| CV     | 13,6%                         | 8,1%   | 27,1%  | 21,9%  |

Rn=repetition n

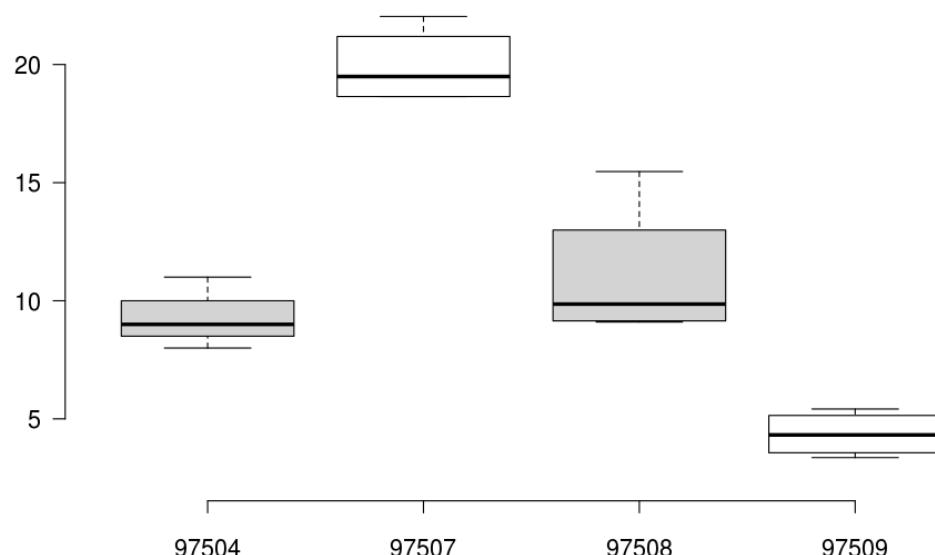


Figure A7. Boxplot dispersion of the results per participant for the sample gNS2

Table A8. Quantitative normalized values

| Lab    | L97504                        | L97507 | L97508 | L97509 |
|--------|-------------------------------|--------|--------|--------|
| Method | IDVET-IDSCREEN Ruminant IFN-g |        |        |        |
| R1     | 129,00                        | 176,27 | 126,59 | 137,65 |
| R2     | 122,00                        | 171,19 | 128,11 | 131,03 |
| R3     | 123,00                        | 166,10 | 130,64 | 143,69 |
| R4     | 131,00                        | 164,41 | 123,66 | 127,23 |
| Mean   | 126,25                        | 169,49 | 127,25 | 134,90 |
| SD     | 4,43                          | 5,36   | 2,92   | 7,27   |
| CV     | 3,5%                          | 3,2%   | 2,3%   | 5,4%   |

Rn=repetition n

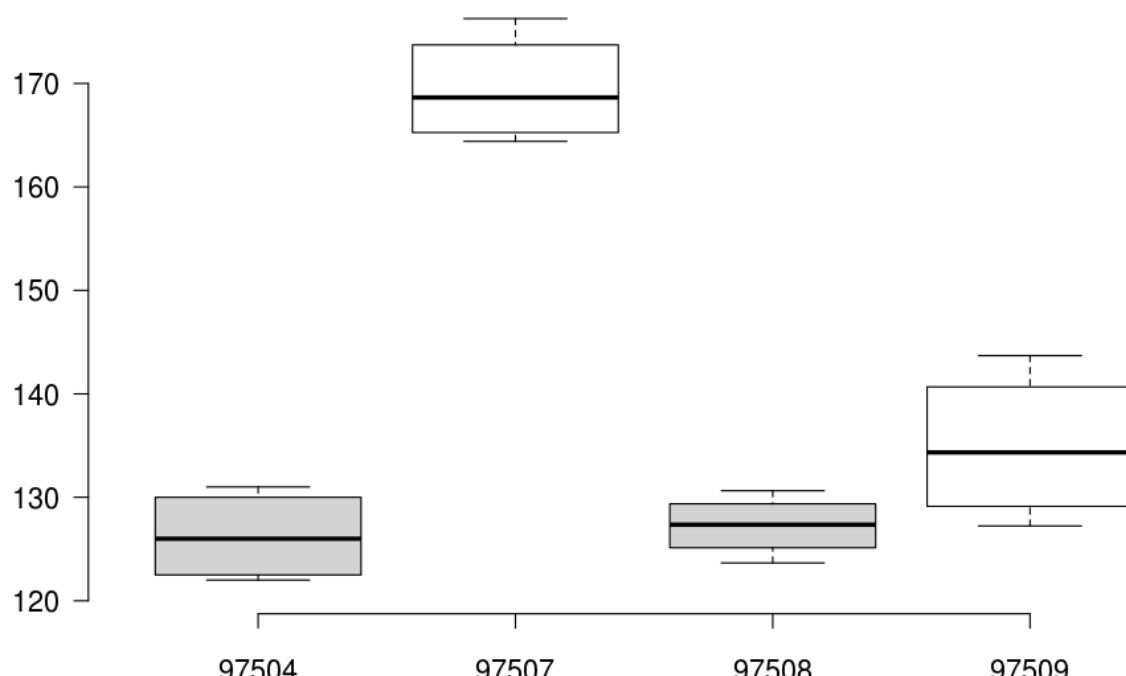


Figure A8. Boxplot dispersion of the results per participant for the sample gPS1

Table A9. Quantitative normalized values

| Lab    | L97504                        | L97507 | L97508 | L97509 |
|--------|-------------------------------|--------|--------|--------|
| Method | IDVET-IDSCREEN Ruminant IFN-g |        |        |        |
| R1     | 72,00                         | 76,27  | 62,69  | 63,44  |
| R2     | 68,00                         | 83,05  | 65,22  | 60,43  |
| R3     | 69,00                         | 89,83  | 67,85  | 56,31  |
| R4     | 62,00                         | 84,75  | 60,36  | 65,09  |
| R5     | 62,00                         | 81,36  | 62,39  | 59,60  |
| Mean   | 66,60                         | 83,05  | 63,70  | 60,97  |
| SD     | 4,19                          | 5,60   | 3,23   | 3,86   |
| CV     | 6,3%                          | 6,7%   | 5,1%   | 6,3%   |

Rn=repetition n

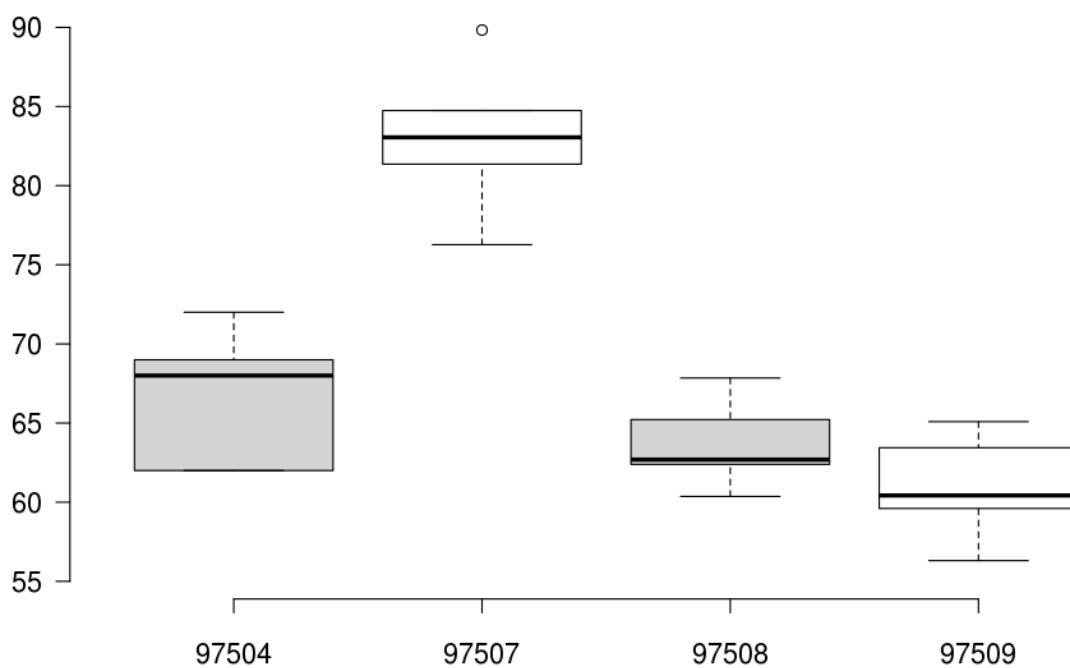


Figure A9. Boxplot dispersion of the results per participant for the sample gPS2

Table A10. Quantitative normalized values

| Lab    | L97504                        | L97507 | L97508 | L97509 |
|--------|-------------------------------|--------|--------|--------|
| Method | IDVET-IDSCREEN Ruminant IFN-g |        |        |        |
| R1     | 46,00                         | 66,10  | 47,02  | 48,63  |
| R2     | 54,00                         | 71,19  | 47,32  | 43,69  |
| R3     | 56,00                         | 69,49  | 46,01  | 43,42  |
| R4     | 46,00                         | 66,10  | 46,92  | 43,42  |
| Mean   | 50,50                         | 68,22  | 46,82  | 44,79  |
| SD     | 5,26                          | 2,54   | 0,57   | 2,56   |
| CV     | 10,4%                         | 3,7%   | 1,2%   | 5,7%   |

Rn=repetition n

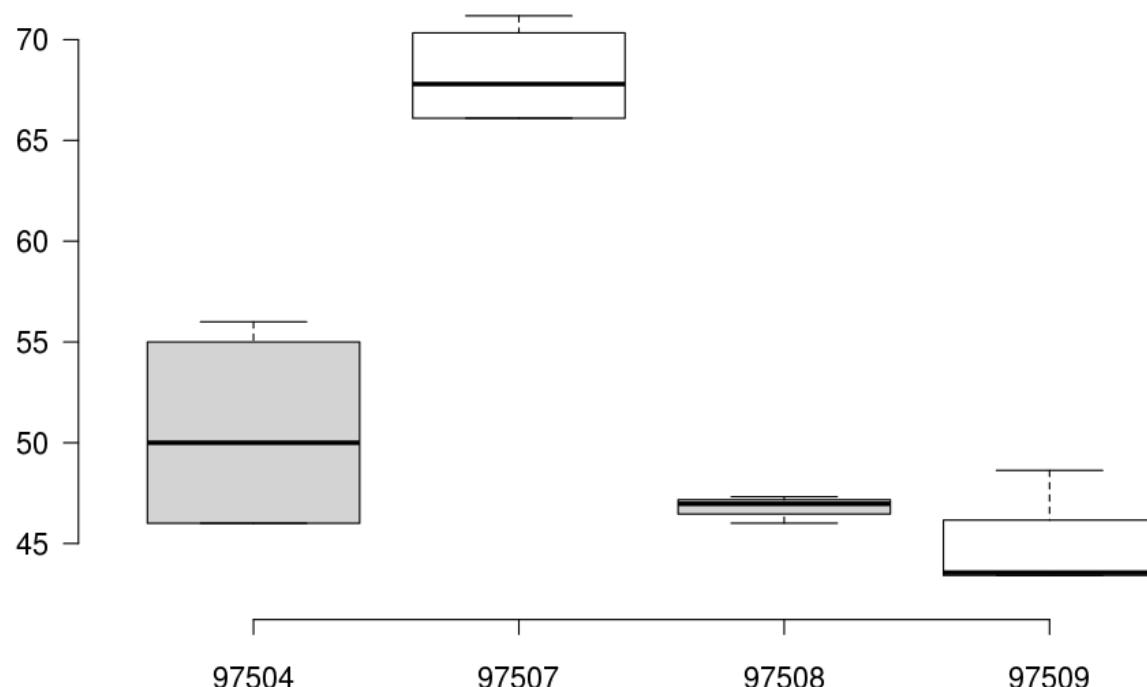


Figure A10. Boxplot dispersion of the results per participant for the sample gPS3

## **Annex 2: additional information**

### **PRELIMINARY REPORT**

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

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

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

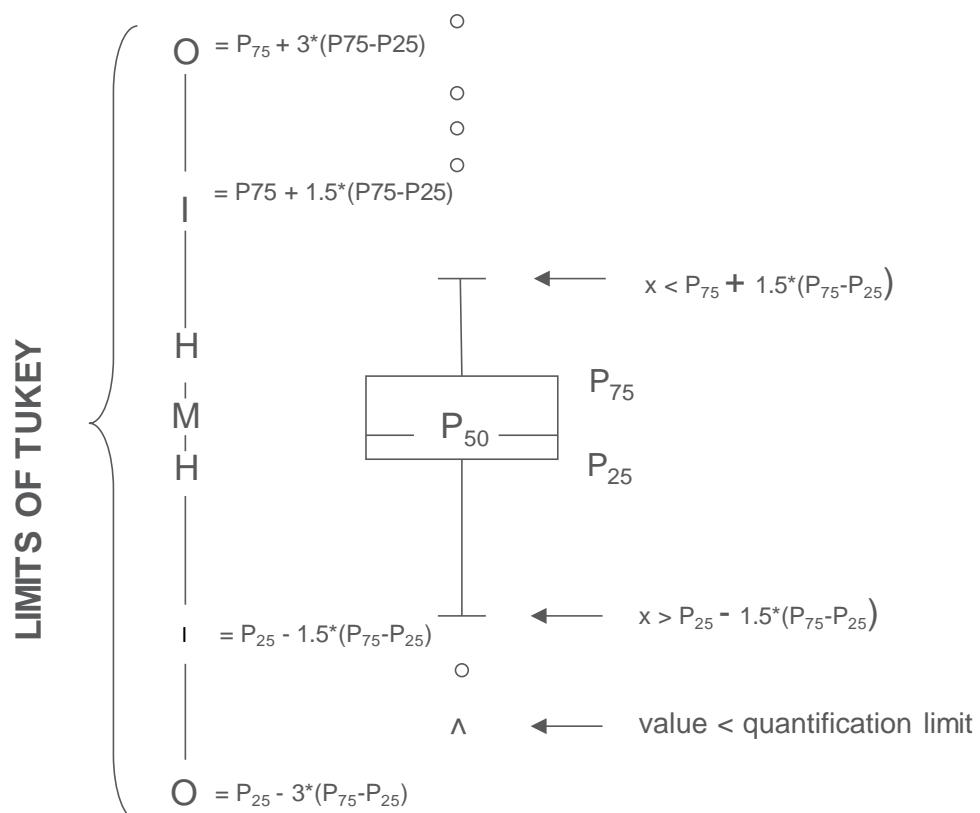
The link is:

[https://www.wiv-isb.be/QML/activities/external\\_quality/calendar/calender\\_PT%20VET/\\_fr/Calendrier\\_2020-PT%20VET%202.htm](https://www.wiv-isb.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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END

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