



INŠTITUT ZA MLEKARSTVO IN PROBIOTIKE
INSTITUTE OF DAIRY SCIENCE & PROBIOTICS

PROFICIENCY TESTING

**Total bacterial count –
Instrumental method IBC/ml**

MARCH

2026

Dear Sir/Madam!

Thank you for participating in the proficiency testing MARCH 2026. Participating in the proficiency testing will allow you to evaluate the performance of your work and obtain data for maintaining the quality system in your laboratory. Based on the independent results in this report, you can monitor, evaluate and ultimately improve your processes.

This report includes results of samples with serial number: 7268-0326 for parameter TOTAL BACTERIAL COUNT in milk with instrumental method (IBC/ml) and they are presented in the form of tables and graphs.

Table 1: Used statistics

$mean = \frac{\sum x_n}{N}$	<i>mean</i> = average sample value x_n = value of sample n N = number of samples
$diff = \bar{x}_n - REF$	<i>diff</i> = deviation of sample value from reference value \bar{x}_n = average sample value <i>REF</i> = robust average sample value
$Z - value = \frac{\bar{x}_n - REF}{S}$	\bar{x}_n = average sample value <i>REF</i> = robust average sample value S = standard deviation of robust average sample value (<i>ref</i>)
	$ Z \leq 2,00$ satisfactory
	$2,00 < Z < 3,00$ questionable
	$ Z \geq 3,00$ unsatisfactory
$d = \frac{\sum(\bar{x}_n - REF)}{N}$	d = average of deviations x_n = value of sample n N = number of samples <i>REF</i> = robust average sample value
$Sd = \sqrt{\frac{\sum(\bar{x}_n - REF)^2}{N}}$	Sd = standard deviation of deviations x_n = value of sample n N = number of samples <i>REF</i> = robust average sample value
<i>REF</i>	Value <i>REF</i> represents robust average of each sample and it is calculated according ISO 13528 (Algorithm A) from results of all participating laboratories after excluding outliers according to Grubbs method ($\alpha=0,05$)

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Table 2: Outliers detection according to Grubbs method ($\alpha = 0,05$)

Laboratory	Sample					n
	1	2	3	4	5	
1						0
2						0
3						0
4						0
5						0
6						0
7						0
8						0
9						0
n	0	0	0	0	0	0

Legend:

n = number of outliers

Table 3: Repeatability (log IBC/ml)

Laboratory	Sample (Sr)						
	1	2	3	4	5	A	B
1	0,02	0,01	0,01	0,02	0,02	0,02	0,01
2	0,02	0,01	0,01	0,02	0,04	0,01	0,01
3	0,01	0,01	0,01	0,01	0,03	0,01	0,01
4	0,02	0,02	0,03	0,02	0,04	0,03	0,02
5	0,03	0,01	0,01	0,01	0,02	0,01	0,01
6	0,01	0,01	0,02	0,02	0,04	0,01	0,01
7	0,01	0,01	0,00	0,01	0,01	0,01	0,01
8	0,01	0,02	0,01	0,01	0,03	0,01	0,01
9	0,02	0,01	0,01	0,01	0,02	0,02	0,01

Legend:

Sr = Standard deviation of repeatability (log IBC/ml)

Note:

Repeatability values for Bactocount instruments were calculated after recalculation of the returned results using a factor of 1,229251571 (IBC Bactocount / Bactoscan FC ratio).

Limits: according to the instructions of the instrument manufacturer

FOSS BactoScan FC+

Range (x1000 IBC/ml)	Sr (log IBC/ml)	Sample
10 – 50	0,07	/
51 – 200	0,05	1, 5, A
> 200	0,04	2, 3, 4, B
Total range	0,05	

Bentley Bactocount IBC

Range (x 1000 IBC/ml)	Sr (log IBC/ml)	Sample
10 – 50	0,07	/
51 – 100	0,06	5
101 – 300	0,05	1, 2, A
> 300	0,03	3, 4, B

Table 4: Accuracy (log IBC/ml)

LAB 1	1	2	3	4	5	STD A	STD B
Mean	5,196	5,411	5,939	5,489	4,761	168	415
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	-0,168	-0,200	-0,277	-0,253	-0,040		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	-1,63	-1,85	-1,96	-2,13	-0,90		
REFCert						167 ± 10 %	407 ± 10 %
Mean×100/REFCert (%)						101	102

LAB 2	1	2	3	4	5	STD A	STD B
Mean	5,270	5,515	6,080	5,628	4,772	176	427
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	-0,094	-0,096	-0,136	-0,115	-0,029		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	-0,91	-0,89	-0,96	-0,97	-0,64		
REFCert						167 ± 10 %	407 ± 10 %
Mean×100/REFCert (%)						106	105

LAB 3	1	2	3	4	5	STD A	STD B
Mean	5,701	5,975	6,584	6,090	4,961	219	488
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	0,337	0,364	0,368	0,348	0,160		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	3,26	3,37	2,60	2,93	3,57		
REFCert						205 ± 10 %	501 ± 10 %
Mean×100/REFCert (%)						107	97

LAB 4	1	2	3	4	5	STD A	STD B
Mean	5,345	5,618	6,169	5,731	4,837	183	416
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	-0,020	0,007	-0,047	-0,011	0,036		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	-0,19	0,06	-0,33	-0,09	0,81		
REFCert						167 ± 10 %	407 ± 10 %
Mean×100/REFCert (%)						110	102

LAB 5	1	2	3	4	5	STD A	STD B
Mean	5,448	5,680	6,337	5,856	4,783	182	479
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	0,084	0,069	0,121	0,114	-0,018		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	0,81	0,64	0,86	0,96	-0,40		
REFCert						167 ± 10 %	407 ± 10 %
Mean×100/REFCert (%)						109	118

LAB 6	1	2	3	4	5	STD A	STD B
Mean	5,240	5,471	6,065	5,575	4,728	169	409
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	-0,124	-0,140	-0,151	-0,168	-0,073		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	-1,20	-1,30	-1,06	-1,41	-1,63		
REFCert						167 ± 10 %	407 ± 10 %
Mean×100/REFCert (%)						101	101

To be continued...

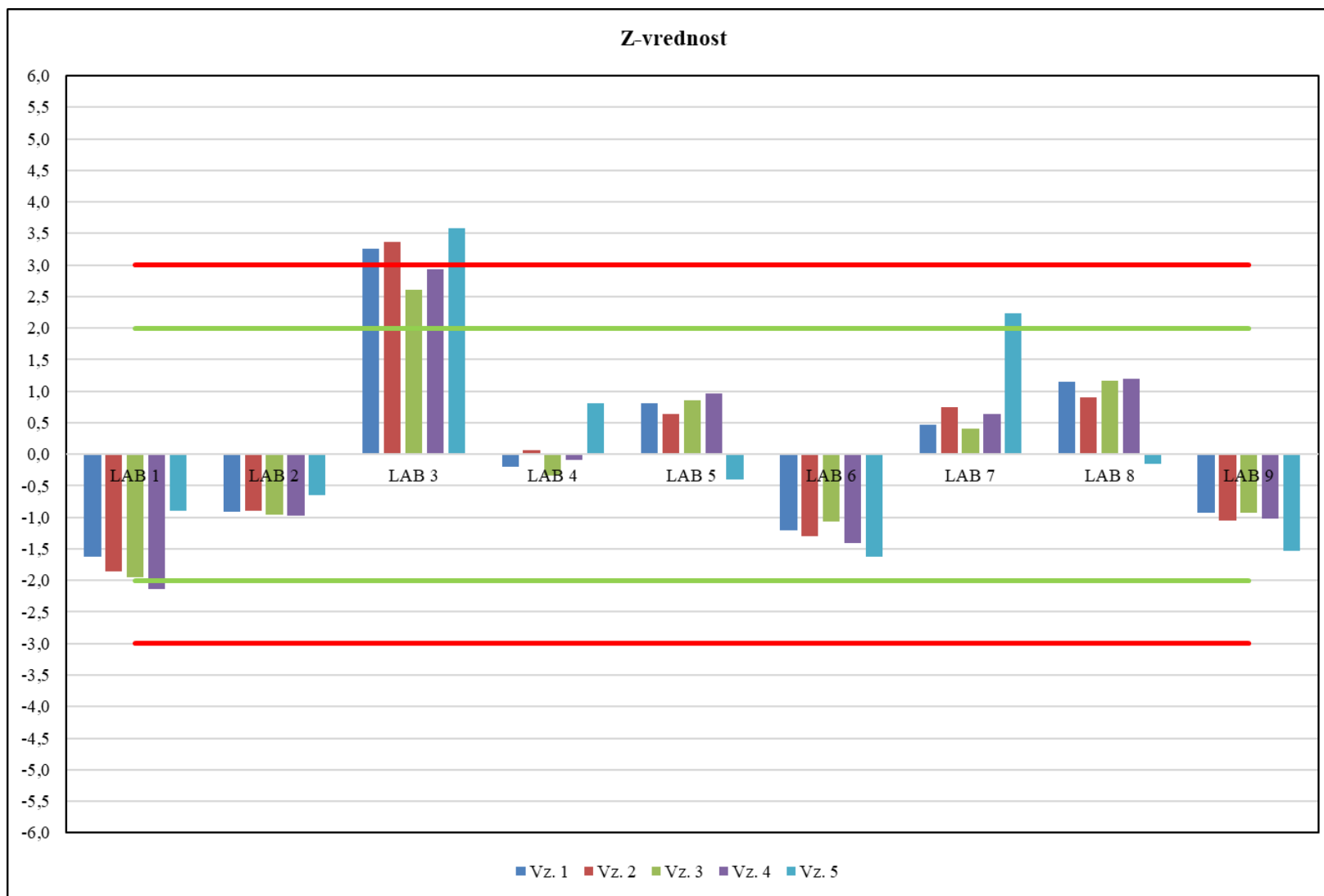
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LAB 7	1	2	3	4	5	STD A	STD B
Mean	5,413	5,693	6,274	5,818	4,901	145	189
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	0,048	0,081	0,058	0,075	0,100		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	0,47	0,75	0,41	0,63	2,24		
REFCert						167 ± 10 %	407 ± 10 %
Mean×100/REFCert (%)						87	46

LAB 8	1	2	3	4	5	STD A	STD B
Mean	5,484	5,709	6,381	5,884	4,794	183	437
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	0,119	0,098	0,165	0,141	-0,007		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	1,15	0,91	1,17	1,19	-0,15		
REFCert						167 ± 10 %	407 ± 10 %
Mean×100/REFCert (%)						110	107

LAB 9	1	2	3	4	5	STD A	STD B
Mean	5,269	5,498	6,084	5,622	4,732	163	400
REF	5,365	5,611	6,216	5,743	4,801		
diff (mean-REF)	-0,095	-0,113	-0,132	-0,121	-0,069		
S	0,103	0,108	0,142	0,119	0,045		
Z-value	-0,92	-1,05	-0,93	-1,02	-1,54		
REFCert						167 ± 10 %	407 ± 10 %
Mean×100/REFCert (%)						98	98

Graph 1: Z-value (see Table 4)



Limits: $|Z| \leq 2,00$ satisfactory $2,00 < |Z| < 3,00$ questionable $|Z| \geq 3,00$ unsatisfactory