



INŠTITUT ZA MLEKARSTVO IN PROBIOTIKE
INSTITUTE OF DAIRY SCIENCE & PROBIOTICS

PROFICIENCY TESTING

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

NOVEMBER

2025

Dear Sir/Madam!

Thank you for participating in the proficiency testing NOVEMBER 2025. 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: 5348-1125 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

$mean = \frac{\sum x_n}{N}$	$mean$ = average sample value x_n = value of sample n N = number of samples
$diff = \bar{x}_n - REF$	$diff$ = deviation of sample value from reference value $\bar{x}_n$ = average sample value REF = robust average sample value
$Z - value = \frac{\bar{x}_n - REF}{S}$	$\bar{x}_n$ = average sample value REF = robust average sample value S = standard deviation of robust average sample value (ref)
	$ 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 REF = 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 REF = robust average sample value
REF	Value REF 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
n	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	0,03	0,03	0,04	0,01	0,01	0,01	0,01
2	0,02	0,05	0,03	0,02	0,03	0,02	0,01
3	0,04	0,05	0,06	0,05	0,01	0,02	0,02
4	0,03	0,02	0,03	0,01	0,02	0,02	0,01
5	0,02	0,01	0,03	0,01	0,01	0,02	0,01
6	0,03	0,01	0,04	0,02	0,01	0,02	0,01
7	0,04	0,02	0,03	0,01	0,01	0,02	0,01
8	0,02	0,01	0,03	0,02	0,02	0,01	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 1,23090176 (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, 2, 3 A
> 200	0,04	4, 5, 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	1, 3
101 – 300	0,05	4, A
> 300	0,03	2, 5, B

Table 4: Accuracy (log IBC/ml)

LAB 1	1	2	3	4	5	STD A	STD B
Mean	4,882	5,224	4,610	5,327	5,945	150	420
REF	4,958	5,604	4,725	5,456	6,082		
diff (mean-REF)	-0,076	-0,381	-0,116	-0,130	-0,138		
S	0,050	0,075	0,043	0,043	0,054		
Z-value	-1,53	-5,08	-2,72	-2,98	-2,56		
REFCert						155 ± 10 %	440 ± 10 %
Mean×100/REFCert (%)						96	95

LAB 2	1	2	3	4	5	STD A	STD B
Mean	4,980	5,437	4,730	5,481	6,121	161	450
REF	4,958	5,604	4,725	5,456	6,082		
diff (mean-REF)	0,022	-0,167	0,005	0,025	0,039		
S	0,050	0,075	0,043	0,043	0,054		
Z-value	0,44	-2,23	0,12	0,56	0,73		
REFCert						155 ± 10 %	440 ± 10 %
Mean×100/REFCert (%)						104	102

LAB 3	1	2	3	4	5	STD A	STD B
Mean	5,064	5,638	4,820	5,598	6,264	182	466
REF	4,958	5,604	4,725	5,456	6,082		
diff (mean-REF)	0,105	0,033	0,095	0,141	0,182		
S	0,050	0,075	0,043	0,043	0,054		
Z-value	2,13	0,45	2,23	3,25	3,39		
REFCert						191 ± 10 %	541 ± 10 %
Mean×100/REFCert (%)						96	86

LAB 4	1	2	3	4	5	STD A	STD B
Mean	4,898	5,552	4,724	5,459	6,037	185	532
REF	4,958	5,604	4,725	5,456	6,082		
diff (mean-REF)	-0,060	-0,052	-0,001	0,003	-0,045		
S	0,050	0,075	0,043	0,043	0,054		
Z-value	-1,22	-0,69	-0,03	0,07	-0,84		
REFCert						155 ± 10 %	440 ± 10 %
Mean×100/REFCert (%)						119	121

LAB 5	1	2	3	4	5	STD A	STD B
Mean	4,940	5,657	4,693	5,419	6,073	172	529
REF	4,958	5,604	4,725	5,456	6,082		
diff (mean-REF)	-0,018	0,053	-0,033	-0,037	-0,009		
S	0,050	0,075	0,043	0,043	0,054		
Z-value	-0,37	0,70	-0,77	-0,85	-0,18		
REFCert						155 ± 10 %	440 ± 10 %
Mean×100/REFCert (%)						111	120

LAB 6	1	2	3	4	5	STD A	STD B
Mean	4,942	5,675	4,701	5,398	6,017	162	473
REF	4,958	5,604	4,725	5,456	6,082		
diff (mean-REF)	-0,017	0,071	-0,024	-0,058	-0,066		
S	0,050	0,075	0,043	0,043	0,054		
Z-value	-0,33	0,95	-0,57	-1,33	-1,22		
REFCert						155 ± 10 %	440 ± 10 %
Mean×100/REFCert (%)						105	107

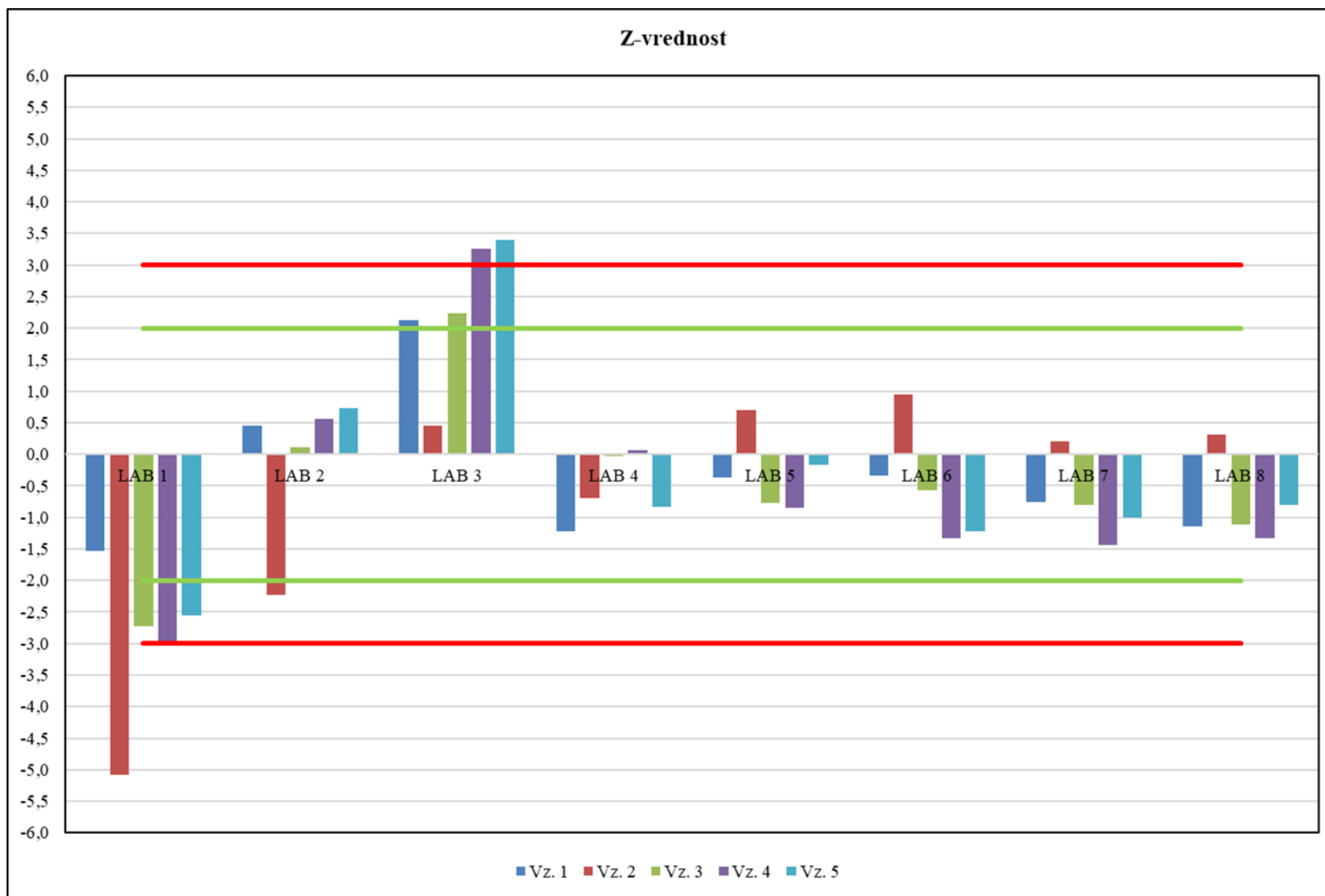
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LAB 7	1	2	3	4	5	STD A	STD B
Mean	4,921	5,620	4,691	5,394	6,028	177	506
REF	4,958	5,604	4,725	5,456	6,082		
diff (mean-REF)	-0,038	0,015	-0,034	-0,062	-0,054		
S	0,050	0,075	0,043	0,043	0,054		
Z-value	-0,76	0,20	-0,80	-1,43	-1,00		
REFCert						155 ± 10 %	440 ± 10 %
Mean×100/REFCert (%)						114	115

LAB 8	1	2	3	4	5	STD A	STD B
Mean	4,902	5,627	4,678	5,398	6,039	162	469
REF	4,958	5,604	4,725	5,456	6,082		
diff (mean-REF)	-0,056	0,023	-0,048	-0,058	-0,043		
S	0,050	0,075	0,043	0,043	0,054		
Z-value	-1,14	0,31	-1,12	-1,33	-0,80		
REFCert						155 ± 10 %	440 ± 10 %
Mean×100/REFCert (%)						105	107

Graph 1: Z-value (see Table 4)



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