INŠTITUT ZA MLEKARSTVO IN PROBIOTIKE
INSTITUTE OF DAIRY SCIENCE & PROBIOTICS

PROFICIENCY TESTING

Somatic cell count

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: 7270-0326 for parameter SOMATIC CELL COUNT in milk and they are presented in the form of tables and graphs.

Table 1: Used statistics

$\boldsymbol{mean = \frac{\sum x_n}{N}}$	$povp$ = average sample value x_n = value of sample n N = number of samples
$\boldsymbol{diff = \bar{x}_n - ref}$	$diff$ = deviation of sample value from reference value $\bar{x}_n$ = avrage sample value ref = robust average sample value
$\boldsymbol{Z - value = \frac{\bar{x}_n - ref}{S}}$	$\bar{x}_n$ = average sample value ref = robust average sample value S = standard deviation of robust average sample value (*ref*)
	|Z| ≤ 2,00 satisfactory
	2,00 < |Z| < 3,00 questionable
	|Z| ≥ 3,00 unsatisfactory
$\boldsymbol{d = \frac{\sum(\bar{x}_n - ref)}{N}}$	d = average of deviations x_n = value of sample n N = number of samples ref = robust average sample value
$\boldsymbol{Sd = \sqrt{\frac{\sum(\bar{x}_n - ref)^2}{N}}}$	Sd = standard deviation of deviations x_n = value of sample n N = number of samples ref = robust average sample value
$\boldsymbol{ref}$	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 (a=0,05)

Responsible for sample preparation and statistical analysis of results:

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Table 2: Outliers detection according to Grubbs method (a = 0,05)

	Vzorec					
Laboratorij	1	2	3	4	5	n
1						0
2						0
3						0
4						0
5						0
6						0
7						2
8						0
9						0
n	0	0	0	2	0	

Legend:
n = number of outliers

Table 3: Repeatability (somatic cells×1000/ml

	Sample (r)						
Laboratory	**1**	**2**	**3**	**4**	**5**	N	Sr
1	12	32	13	2	14	5	10
2	6	15	11	8	5	5	4
3	0	16	14	1	3	5	7
4	5	9	7	13	14	5	3
5	7	38	4	5	5	5	13
6	0	0	4	0	0	5	2
7	3	10	2	10	8	5	3
8	2	21	3	3	13	5	7
9	1	1	1	1	1	5	0
N	9	9	9	9	9		
Sr	4	13	5	5	6		

Legend:
r = repetability; absolute diffrerence between two measurments of the same sample
N = number of measurments
Sr = standard deviation of repeatability

Tabela 4: Repeatability (S_r) and reproducibility (S_R) (ISO 5725-2:2003)

	Sample				
	1	2	3	4	5
Mean (SCCx1000/ml)	261	949	390	164	1490
S_r (SCCx1000/ml)	4	14	6	4	6
S_r, %	1	1	1	3	0
S_R (SCCx1000/ml)	8	25	14	7	54
S_R, %	3	3	4	4	4

Limits (ISO 13366-2/IDF148-2:2006)*:*

	Range (SCC×1000/ml)				
	150	**300**	**450**	**750**	**1.500**
S_r (SCC×1000/ml):	25	42	50	63	126
S_r, %	6	5	4	3	3
S_R (SCC×1000/ml):	38	67	88	126	252
S_R, %	9	8	7	6	6

Table 5: Accuracy (SCC×1000/ml)

Laboratory	Sample	1	2	3	4	5	d %	Sd %
1	Mean	264,0	917,0	391,5	171,0	1457,0		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	4,9	-26,2	2,6	9,2	-20,8		
	d %	1,9	-2,8	0,7	5,7	-1,4	0,8	3,3
	Z-value	0,50	-0,81	0,19	1,03	-0,31		

Laboratory	Sample	1	2	3	4	5	d	Sd
2	Mean	251,0	947,5	399,5	160,0	1523,5		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	-8,1	4,3	10,6	-1,8	45,7		
	d %	-3,1	0,5	2,7	-1,1	3,1	0,4	2,6
	Z-value	-0,84	0,13	0,76	-0,21	0,67		

Laboratory	Sample	1	2	3	4	5	d	Sd
3	Mean	264,0	958,0	391,0	165,5	1521,5		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	4,9	14,8	2,1	3,7	43,7		
	d %	1,9	1,6	0,5	2,3	3,0	1,8	0,9
	Z-value	0,50	0,46	0,15	0,41	0,64		

Laboratory	Sample	1	2	3	4	5	d	Sd
4	Mean	265,5	987,5	393,5	160,5	1581,0		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	6,4	44,3	4,6	-1,3	103,2		
	d %	2,5	4,7	1,2	-0,8	7,0	2,9	3,0
	Z-value	0,65	1,38	0,33	-0,15	1,51		

Laboratory	Sample	1	2	3	4	5	d	Sd
5	Mean	260,5	940,0	385,0	175,5	1470,5		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	1,4	-3,2	-3,9	13,7	-7,3		
	d %	0,5	-0,3	-1,0	8,4	-0,5	1,4	4,0
	Z-value	0,14	-0,10	-0,28	1,54	-0,11		

Laboratory	Sample	1	2	3	4	5	d	Sd
6	Mean	258,0	938,0	402,0	158,0	1458,0		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	-1,1	-5,2	13,1	-3,8	-19,8		
	d %	-0,4	-0,5	3,4	-2,4	-1,3	-0,3	2,2
	Z-value	-0,12	-0,16	0,94	-0,43	-0,29		

To be continued…

…continued

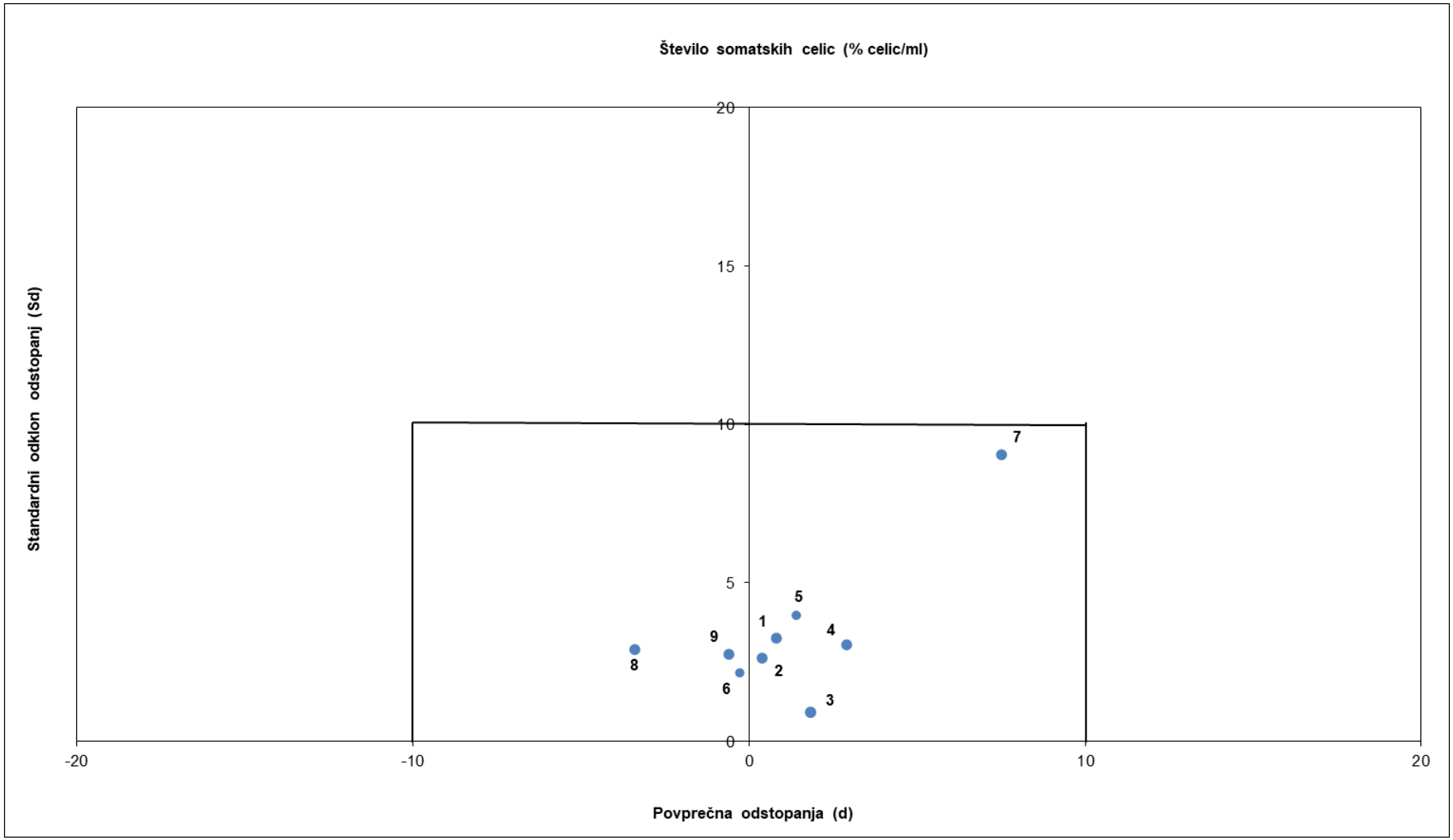
Laboratory	Sample	1	2	3	4	5	d	Sd
7	Mean	272,5	974,0	397,0	200,0	1530,0		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	13,4	30,8	8,1	38,2	52,2		
	d %	5,2	3,3	2,1	23,6	3,5	7,5	9,0
	Z-value	1,37	0,96	0,58	4,30	0,77		

Laboratory	Sample	1	2	3	4	5	d	Sd
8	Mean	250,0	921,5	356,5	158,5	1465,5		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	-9,1	-21,7	-32,4	-3,3	-12,3		
	d %	-3,5	-2,3	-8,3	-2,1	-0,8	-3,4	2,9
	Z-value	-0,94	-0,67	-2,33	-0,38	-0,18		

Laboratory	Sample	1	2	3	4	5	d	Sd
9	Mean	261,5	953,5	393,5	160,5	1399,5		
	REF	259,1	943,2	388,9	161,9	1477,8		
	S	9,7	32,2	13,9	8,9	68,1		
	d (mean - REF)	2,4	10,3	4,6	-1,3	-78,3		
	d %	0,9	1,1	1,2	-0,8	-5,3	-0,6	2,8
	Z-value	0,24	0,32	0,33	-0,15	-1,15		

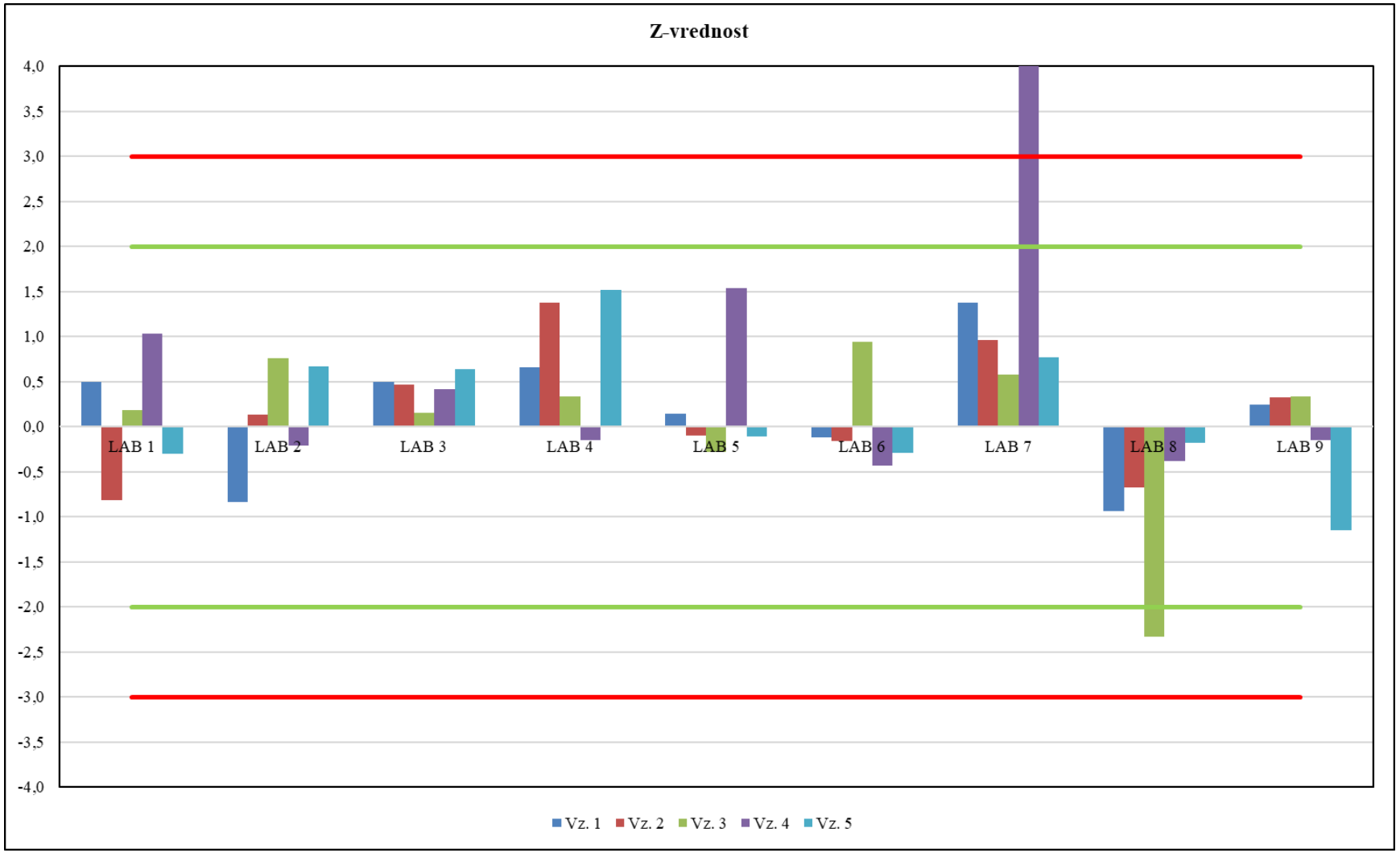
Limits: d = ± 10 % cells/ml Sd = 10 % cells/ml

Figure 1: Accuracy (see Table 5)



Limits d = ± 10 % cells/ml, Sd = 10 % cells/ml

Figure 2: Z-value (see Table 5)



Limits: $|Z| \leq 2{,}00$ *satisfactoy* $2{,}00 < |Z| < 3{,}00$ *questionable* $|Z| \geq 3{,}00$ *unsatisfactory*