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PROFICIENCY TEST « RAEMA »

SCHEME Gel RAEMA N° 82 A
(1st JUNE 2026)
GENERAL REPORT

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Table of contents

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1. GENERAL DATA

1.1. PARTICIPATING LABORATORIES

151 laboratories participated in the 82Ath Gel scheme on 1st June 2026 (J0).
We received **150** answers (99.3%).

1.2. DELIVERY TIME OF THE PARCEL

Delivery time	J0	J0+1	J0+2	J0+3	J0+4	J0+7	J0+8	J0+9
Nb of laboratories	2	106	27	9	1	2	1	2

1.3. INFORMATIONS ABOUT SAMPLE

1.3.1. NATURE

- one sample included a strain of *Lactobacillus plantarum* at a concentration level of 1.10^6 cfu/g ;
- one sample included a strain of *Pseudomonas sp.* at a concentration level of $1,5.10^3$ cfu/g ;
- one sample included a strain of *Bacillus cereus* at a concentration level of 2.10^3 cfu/g ;
- one sample included a strain of *Penicillium* at a concentration level of 4.10^2 cfu/g and a strain of *Rhodotorula rubra* at a concentration level of 1.10^4 cfu/g ;

1.3.2. SIZE

Samples were composed of a gel and distributed in bottles containing 50 grammes.

1.3.3. HOMOGENEITY AND STABILITY TEST OF THE CONTAMINATION

A check of the contamination's homogeneity was realized on 10 samples per numeration in duplicate for all flora.
The contamination's stability was checked by enumeration of all flora on 4 June (J0+3), 8 June (J0+7) and 15 June 2026 (J0+14).
These checks were realized by an external provider accredited by Cofrac for *Bacillus cereus,* lactic bacteria (*Lactobacillus plantarum*) and Yeast/Moulds (*Penicillium* and *Rhodotorula rubra*). The check of *Pseudomonas* was realized by the same provider but not covered by Cofrac accreditation.
Homogeneity of samples has been validated.
Stability of samples has been validated except for Moulds. 17 laboratories have analyzed this parameter during the 2nd week and are affected by this stability problem, they have been warned. An analysis of impact has been done; due to the absence of impact on the uncertainty of the assigned value and considering laboratories performances, this impact is low.

1.3.4 FLORA FOR ENUMERATION

Enumeration of the following flora was proposed:
- lactic acid bacteria
- *Pseudomonas*
- *Bacillus cereus*
- Yeast - Moulds analyzed together
- Yeast
- Moulds

1.4. EXECUTION OF ANALYZES

1.4.1 PRESERVATION TEMPERATURE OF SAMPLES BEFORE ANALYSIS

149 laboratories (99.3%) specified it.
The average temperature is **4.8°C** with a standard deviation of 3.5°C. The minimum temperature indicated is 2.0°C and the maximum one is 26.1°C.

Remark: Please note that samples must be conserved at 5±3°C on receipt, before analysis. They should not be frozen.

2. EXPLOITATION OF ANALYSIS REPORT

2.1. SIZE OF TEST SAMPLE

149 laboratories (99.3%) specified it.
The average size is **14.4 g** with a standard deviation of 6.5 g. The data 1.351 g given by one laboratory was not taken into account for this calculation. The minimum size indicated is 10.0 g and the maximum one is 26.6 g.

2.2. PREPARATION OF THE INITIAL SUSPENSION

149 laboratories (99.3%) specified it.
148 laboratories (98.6%) prepare the initial suspension with adding diluent to gel.
1 laboratory (0.7%) prepares the initial suspension in another way.

2.3. DILUENT USED FOR THE INITIAL SUSPENSION

150 laboratories (100%) specified it.
143 laboratories (95.3%) use Buffered Peptone Water for the initial suspension.
6 laboratories (4.0%) use Peptone salt solution for the initial suspension.
1 laboratory (0.7%) uses another diluent for the initial suspension.

2.4. HOMOGENIZATION TECHNIQUE

150 laboratories (100%) specified it.
145 laboratories (96.7%) homogenize their sampling with a StomacherND.
3 laboratories (2.0%) used a Vortex mixer.
2 laboratories (1.3%) used a manual homogenization.

The average duration is **2.3 min** with a standard deviation of 1.0 min. The data 10, 15, 20, 30 and 35 min given by 7 laboratories were not taken into account for this calculation. The minimum duration indicated is 0.5 min and the maximum one is 6.0 min.

2.5. LACTIC ACID BACTERIA

110 laboratories performed the enumeration.

TIME / SENDING SAMPLES - BEGINNING OF ANALYZES

110 laboratories specified it.

Analysis time	J0+1	J0+2	J0+3	J0+4	J0+7	J0+8	J0+9	J0+10	J0+11
Nb of laboratories	19	34	11	10	17	13	1	2	3

RESUSCITATION'S CONDITIONS

11 laboratories specified a duration of 0 min (or did not specify it) for the resuscitation step, they are not taken into account for the calculation.

- DURATION

99 laboratories specified it.

The average duration is **19.0 min** with a standard deviation of 12.7 min. The minimum duration indicated is 1.0 min and the maximum one is 60.0 min.

- TEMPERATURE

99 laboratories specified it.

The average temperature is **21.7°C** with a standard deviation of 5.0°C. The data 100°C given by one laboratory was not taken into account for this calculation. The minimum temperature indicated is 4.0°C and the maximum one is 47.0°C.

Method	Nb laboratories
ISO / NF EN ISO 15214	72
NM ISO 15214	14
AFNOR 3M 01/19-11/17	8
TEMPO LAB	8
Internal method	4
Other	4

Culture medium	Nb laboratories
MRS pH 5.7	86
Neogen® Petrifilm®	8
TEMPO LAB	8
MRS pH 6.4	8

Preparation	Nb laboratories
Home made	29
Ready to use not pre-poured	58
Ready to use, plate, film, card	22

Plating method	Nb laboratories
Surface (agar plate, film)	19
Pour	80
Transfer Tempo filler ®	8

Incubation temperature	Nb laboratories
30°C	109
37°C	1

Incubation duration	Nb laboratories
69 – 72 h	90
42 – 48 h	20

2.6. PSEUDOMONAS

73 laboratories performed the enumeration.

TIME / SENDING SAMPLES - BEGINNING OF ANALYZES

73 laboratories specified it.

Analysis time	J0+1	J0+2	J0+3	J0+4	J0+7	J0+8	J0+9	J0+10	J0+18
Nb of laboratories	14	27	7	4	8	9	2	1	1

RESUSCITATION'S CONDITIONS

9 laboratories specified a duration of 0 min (or did not specify it) for the resuscitation step, they are not taken into account for the calculation.

- DURATION

64 laboratories specified it.

The average duration is **18.6 min** with a standard deviation of 11.4 min. The minimum duration indicated is 1.0 min and the maximum one is 60.0 min.

- TEMPERATURE

64 laboratories specified it.

The average temperature is **22.1°C** with a standard deviation of 5.5°C. The data 100°C given by one laboratory was not taken into account for this calculation. The minimum temperature indicated is 8.0°C and the maximum one is 47.0°C.

Method	Nb laboratories
ISO / NF EN ISO 13720	37
AFNOR BKR 23/09-05/15	23
NM ISO 13720	8
Internal method	3
Other	2

Culture medium	Nb laboratories
CFC	47
Rhapsody agar	24
Other	1

Preparation	Nb laboratories
Home made	20
Ready to use not pre-poured	25
Ready to use, plate, film, card	28

Incubation temperature	Nb laboratories
25°C	47
30°C	25
22.5°C	1

Incubation duration	Nb laboratories
44 - 48 h	72
72 h	1

Confirmation test	Nb laboratories
None	30
Oxydase	40
MALDI-TOF mass spectrometry	1

2.7. BACILLUS CEREUS

126 laboratories performed the enumeration.

TIME / SENDING SAMPLES - BEGINNING OF ANALYZES

126 laboratories specified it.

Analysis time	J0+1	J0+2	J0+3	J0+4	J0+7	J0+8	J0+9	J0+10	J0+11
Nb of laboratories	24	39	18	7	17	14	2	3	2

RESUSCITATION'S CONDITIONS

18 laboratories specified a duration of 0 min (or did not specify it) for the resuscitation step, they are not taken into account for the calculation.

- DURATION

108 laboratories specified it.

The average duration is **20.1 min** with a standard deviation of 13.1 min. The minimum duration indicated is 1.0 min and the maximum one is 60.0 min.

- TEMPERATURE

108 laboratories specified it.

The average temperature is **22.2°C** with a standard deviation of 5.3°C. The minimum temperature indicated is 4.0°C and the maximum one is 47.0°C.

Method	Nb laboratories
ISO / NF EN ISO 7932 (+A1)	53
AFNOR BKR 23/06-02/10	27
AFNOR AES 10/10-07/10	21
NM ISO 7932 (+A1)	11
Microval 2014LR47	5
AFNOR BRD 07/26-03/19	5
Internal method	1
Other	1

Culture medium	Nb laboratories
Mossel	62
COMPASS *Bacillus cereus* Agar	29
BACARA	24
TEMPO BC	5
RAPID'B. cereus	5
Other	1

Preparation	Nb laboratories
Home made	24
Ready to use not pre-poured	17
Ready to use, plate, film, card	85

Plating method	Nb laboratories
Surface (agar plate, film)	107
Pour	13
Transfer Tempo filler ®	5

Incubation temperature	Nb laboratories
30°C	126

Incubation duration	Nb laboratories
22 – 25 h	79
42 - 48 h	47

Confirmation test	Nb laboratories
None	71
Biochemical (including hemolysis)	50
MALDI-TOF mass spectrometry	1

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2.8. YEAST / MOULDS

72 laboratories performed the enumeration.

TIME / SENDING SAMPLES - BEGINNING OF ANALYZES

72 laboratories specified it.

Analysis time	J0+1	J0+2	J0+3	J0+4	J0+7	J0+8	J0+9	J+11
Nb of laboratories	10	24	13	9	8	5	2	1

RESUSCITATION'S CONDITIONS

7 laboratories specified a duration of 0 min (or did not specify it) for the resuscitation step, they are not taken into account for the calculation.

- DURATION

65 laboratories specified it.

The average duration is **18.2 min** with a standard deviation of 12.0 min. The minimum duration indicated is 1.0 min and the maximum one is 60.0 min.

- TEMPERATURE

65 laboratories specified it.

The average temperature is **23.0°C** with a standard deviation of 6.4°C. The data 100°C given by one laboratory was not taken into account for this calculation. The minimum temperature indicated is 8.0°C and the maximum one 47.0°C.

Method	Nb laboratories
NF V08-059	39
→ *NM 08.0.123* (1)	7
AFNOR BKR 23/11-12/18	13
ISO / NF ISO 21527-1	4
AFNOR 3M 01/13-07/14	3
AOAC RI 041001	1
NM ISO 21527-1	1
Internal method	1
Other	3

Culture medium	Nb laboratories
YGC	37
Symphony	14
Chloramphenicol glucose agar	9
OGA	4
Neogen® Petrifilm®	3
DRBC	3
TEMPO YM	2

(1) Similar method to NF V08-059 according to ONSSA (Office National de Sécurité Sanitaire des produits Alimentaires).

Preparation	Nb laboratories
Home made	24
Ready to use not pre-poured	39
Ready to use, plate, film, card	9

Plating method	Nb laboratories
Surface (agar plate, film)	23
Pour	47
Transfer Tempo filler ®	1

Incubation temperature	Nb laboratories
25°C	68
22 – 22.5°C	3
30°C	1

Incubation duration	Nb laboratories
112 - 120 h	51
66 - 72 h	17
54 h	3
96 h	1

2.9. YEAST

67 laboratories performed the enumeration.

TIME / SENDING SAMPLES - BEGINNING OF ANALYZES

67 laboratories specified it.

Analysis time	J0+1	J0+2	J0+3	J0+4	J0+7	J0+8	J0+10	J0+11
Nb of laboratories	10	16	7	17	6	2	2	1

RESUSCITATION'S CONDITIONS

7 laboratories specified a duration of 0 min (or did not specify it) for the resuscitation step, they are not taken into account for the calculation.

- DURATION

60 laboratories specified it.

The average duration is **21.6 min** with a standard deviation of 12.8 min. The minimum duration indicated is 1.0 min and the maximum one is 60.0 min.

- TEMPERATURE

60 laboratories specified it.

The average temperature is **21.6°C** with a standard deviation of 2.8°C. The minimum temperature indicated is 18.0°C and the maximum one is 37.0°C.

Method	Nb laboratories
NF V08-059	30
→ *NM 08.0.123* [(1)]	14
AFNOR BKR 23/11-12/18	10
AFNOR 3M 01/13-07/14	4
ISO / NF EN ISO 21527-1	4
NM ISO 21527-1	1
Other	4

Culture medium	Nb laboratories
YGC	32
Symphony	11
Chloramphenicol glucose agar	11
Neogen® Petrifilm®	4
OGA	3
DRBC	3
Other	3

[(1)] *Similar method to NF V08-059 according to ONSSA (Office National de Sécurité Sanitaire des produits Alimentaires).*

Preparation	Nb laboratories
Home made	21
Ready to use not pre-poured	36
Ready to use, plate, film, card	10

Plating method	Nb laboratories
Surface (agar plate, film)	20
Pour	42

Incubation temperature	Nb laboratories
25°C	65
20-22.5°C	2

Incubation duration	Nb laboratories
120 h	48
70 – 72 h	16
96 h	2
54 h	1

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2.10. MOULDS

67 laboratories performed the enumeration.

TIME / SENDING SAMPLES - BEGINNING OF ANALYZES

67 laboratories specified it.

Analysis time	J0+1	J0+2	J0+3	J0+4	J0+7	J0+8	J0+10	J0+11
Nb of laboratories	10	16	7	17	6	8	2	1

RESUSCITATION'S CONDITIONS

7 laboratories specified a duration of 0 min (or did not specify it) for the resuscitation step, they are not taken into account for the calculation.

- DURATION

60 laboratories specified it.

The average duration is **21.6 min** with a standard deviation of 12.8 min. The minimum duration indicated is 1.0 min and the maximum one is 60.0 min.

- TEMPERATURE

60 laboratories specified it.

The average temperature is **21.6°C** with a standard deviation of 2.8°C. The minimum temperature indicated is 18.0°C and the maximum one is 37.0°C.

Method	Nb laboratories
NF V08-059	30
→ *NM 08.0.123* [(1)]	14
AFNOR BKR 23/11-12/18	10
AFNOR 3M 01/13-07/14	4
ISO / NF EN ISO 21527-1	4
NM ISO 21527-1	1
Other	4

Culture medium	Nb laboratories
YGC	32
Symphony	11
Chloramphenicol glucose agar	11
Neogen® Petrifilm®	4
OGA	3
DRBC	3
Other	3

[(1)] *Similar method to NF V08-059 according to ONSSA (Office National de Sécurité Sanitaire des produits Alimentaires).*

Preparation	Nb laboratories
Home made	21
Ready to use not pre-poured	36
Ready to use, plate, film, card	10

Plating method	Nb laboratories
Surface (agar plate, film)	20
Pour	42

Incubation temperature	Nb laboratories
25°C	65
20-22.5°C	2

Incubation duration	Nb laboratories
120 h	48
70 – 72 h	16
96 h	2
54 h	1

3. ASSESSMENT OF PERFORMANCE (INDIVIDUEL REPORTS)

Performance is assessed on **trueness**.
The assigned value of the contamination used to assess the trueness is the consensual value obtained with the results of all the participants. This value is obtained by a robust estimation method in order to eliminate influence of aberrant results. However, some results are excluded of the statistical analysis. That is the case when laboratories do not give result for the contaminated unit, when results are “less than cfu/g“, when samples are analyzed after the deadline (time of receipt > 4 days after sending or time of analysis >10 days after sending) or when this information is not specified.

A statistical analysis has also been done to highlight potential relations between techniques used (preservation temperature, preparation of initial suspension and homogenization technique, resuscitation conditions, method used, media used, manufacturers of media, preparation mode, plating method, incubation conditions) and results obtained. We need to clarify that this statistical link is not involved in a cause - effect relationship. Indeed, this link may be due to a not documented factor.

When a significant statistical link is identified between use of a technique and the obtained results, the assessment of performance is done considering the influence of one or several factors involved if their effect translates into a contamination’s difference higher than 0.15 log cfu/g for non-selective media or higher than 0.30 log cfu/g for selective media (these limits match with productivity limits of culture media usually recommended in the standard NF EN ISO 11133).

TRUENESS
The trueness reflects the closeness of your results to the contamination’s assigned value of samples. It has been evaluated for all enumerated flora.
Your result m_i is compared to the contamination’s assigned value, m_{pt}, obtained with algorithm A from the standard NF ISO 13528 applied to all laboratories results included in the statistical analysis.
When groups are constituted, each one is characterized by its own contamination’s assigned value.
The assigned value uncertainty is calculated with the following formula :

$$u(Xpt) = 1{,}25 \times \frac{\sigma pt}{\sqrt{p}}$$

with σ_{pt}, robust standard deviation (standard deviation for proficiency assessment) and p, number of laboratories.

A z score is then calculated with the following formula : $z = \frac{m - m_{pt}}{\sigma_{pt}}$, where σ_{pt} is the standard deviation for proficiency assessment (robust estimation of the standard deviation obtained by participants).

Z-score values are proposed with 3 significant figures.

The standard NF ISO 13528 specifies that:
- |z| ≤ 2,0 is considered as satisfactory (acceptable),
- 2,0 < |z| < 3,0 is considered as a warning signal (questionable),
- |z| ≥ 3,0 is considered as an action signal (or unacceptable).

INDIVIDUAL REPORTS – FOR EACH CRITERIA YOU FIND THE FOLLOWING INFORMATIONS

- your results in logarithm base 10 (-1 when the answer is < limit and NaN when there is no answer),
- histogram for the studied parameter (results of laboratories) with an asterisk indicating the location of your result,
- when necessary, your group in relation to the technique used,
- z score,
- number of laboratories which made analysis (and belonging to your group),
- number of laboratories included in the statistical analysis,
- assigned value of the contamination and standard deviation for proficiency assessment,
- number of laboratories with a satisfactory signal,
- number of laboratories with a warning signal,
- number of laboratories with an action signal.

3.1. LACTIC ACID BACTERIA

None significant effect of the analysis technique has been highlighted.

Lactic acid bacteria	
Number of laboratories included in the statistical analysis	102
Assigned value of the contamination (log cfu/g)	6.136
Uncertainty of assigned value (log cfu/g)	0.0248
Standard deviation for proficiency assessment (log cfu/g)	0.2007
Range of expected satisfactory values (log cfu/g)	[5.734 ; 6.537]

3.2. PSEUDOMONAS

None significant effect of the analysis technique has been highlighted.

Pseudomonas	
Number of laboratories included in the statistical analysis	67
Assigned value of the contamination (log cfu/g)	3.123
Uncertainty of assigned value (log cfu/g)	0.0723
Standard deviation for proficiency assessment (log cfu/g)	0.4735
Range of expected satisfactory values (log cfu/g)	[2.176 ; 4.070]

3.3. BACILLUS CEREUS

None significant effect of the analysis technique has been highlighted.

Bacillus cereus	
Number of laboratories included in the statistical analysis	119
Assigned value of the contamination (log cfu/g)	3.369
Uncertainty of assigned value (log cfu/g)	0.0237
Standard deviation for proficiency assessment (log cfu/g)	0.2072
Range of expected satisfactory values (log cfu/g)	[2.954 ; 3.783]

3.4. YEAST / MOULDS

None significant effect of the analysis technique has been highlighted.

Yeast - Moulds	
Number of laboratories included in the statistical analysis	67
Assigned value of the contamination (log cfu/g)	4.058
Uncertainty of assigned value (log cfu/g)	0.0590
Standard deviation for proficiency assessment (log cfu/g)	0.3864
Range of expected satisfactory values (log cfu/g)	[3.285 ; 4.831]

3.5. YEAST

None significant effect of the analysis technique has been highlighted.

Yeast	
Number of laboratories included in the statistical analysis	63
Assigned value of the contamination (log cfu/g)	4.057
Uncertainty of assigned value (log cfu/g)	0.0943
Standard deviation for proficiency assessment (log cfu/g)	0.5989
Range of expected satisfactory values (log cfu/g)	[2.859 ; 5.254]

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3.6. MOULDS

None significant effect of the analysis technique has been highlighted.

Moulds	
Number of laboratories included in the statistical analysis	63
Assigned value of the contamination (log cfu/g)	2.629
Uncertainty of assigned value (log cfu/g)	0.0487
Standard deviation for proficiency assessment (log cfu/g)	0.3090
Range of expected satisfactory values (log cfu/g)	[2.011 ; 3.247]

Comment : We specify that the stability criterion is unsatisfactory for Moulds enumeration. 17 laboratories have analyzed this parameter during the 2nd week and are affected by this stability problem, they have been warned in their individual report.

3.7. EVOLUTION OF PERFORMANCE

You will find, at the end of the individual report, graphs representing evolution of your performance on different tests since the 62A scheme.