CERTIFICATION

AOAC Research Institute

Performance Tested Methods[SM]

Certificate No.

100401

The AOAC Research Institute hereby certifies the method known as:

Compact Dry YM

manufactured by

NISSUI Pharmaceutical Co., Ltd.
3-24-6, Ueno
Taito-ku, Tokyo
Japan 110-8736

This method has been evaluated in the AOAC Research Institute *Performance Tested Methods*[SM] Program and found to perform as stated in the applicability of the method. This certificate indicates an AOAC Research Institute Certification Mark License Agreement has been executed which authorizes the manufacturer to display the AOAC Research Institute *Performance Tested Methods*[SM] certification mark on the above-mentioned method for the period below. Renewal may be granted by the Expiration Date under the rules stated in the licensing agreement.

Scott Coates

Scott Coates, Senior Director
Signature for AOAC Research Institute

Issue Date January 10, 2023

Expiration Date December 31, 2023

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METHOD NAME
Compact Dry YM

CATALOG NUMBERS
06746, 06747

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APPLICABILITY OF METHOD
Target organisms – Yeast and mold

Matrixes – (USDA BAM) – fresh apples, frozen blueberries, orange juice, dried banana chips, & fresh grapefruit
MODIFICATION NOVEMBER 2015 – ISO 21527-1:2008, 10 g samples – cooked deli turkey, fresh whole tomatoes, cheese (Wensleydale), sliced white bread, mayonnaise.

Performance claims – The study data detected no statistical difference between the Compact Dry YM method and the reference methods.

REFERENCE METHODS
Original Validation: U.S. Food and Drug Administration (2001) Bacteriological Analytical Manual, 8th Ed., Rev. A, AOAC INTERNATIONAL, Gaithersburg, MD (2)

November 2015 Modification: ISO 21527-1:2008, Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of yeasts and moulds – Part 1: Colony count technique in products with water activity greater than 0.95 (4)

ORIGINAL CERTIFICATION DATE
October 14, 2004

CERTIFICATION RENEWAL RECORD
Renewed annually through December 2023.

METHOD MODIFICATION RECORD
1. **November 2015 Level 2**
2. **December 2018 Level 1**

SUMMARY OF MODIFICATION
1. **Matrix Extension approval.**
2. **Corporate address change.**

Under this AOAC *Performance Tested Methods℠* License Number, 100401 this method is distributed by:
1. **Hardy Diagnostics**
2. **R-Biopharm AG**

Under this AOAC *Performance Tested Methods℠* License Number, 100401 this method is distributed as:
1. **Compact Dry YM**
2. **Compact Dry YM**

PRINCIPLE OF THE METHOD (1)

The test method is enumeration of yeasts and molds in food (fruit).

DISCUSSION OF THE VALIDATION STUDY (1)

In this AOAC Performance Tested Method℠ Internal Laboratory Validation Study, the Compact Dry YM was compared to the BAM method for enumeration of yeast and mold.

As evidenced by attached data of 5 replicates for 3 levels of 5 kinds of fruit (fresh apples, frozen blueberries, orange juice, dried banana chips, and fresh grapefruit; in total n=75) through internal and independent validation study, r^2 as correlation coefficient for both methods was 0.9856 that indicates good correlation in the figure below (Fig.6). Confidence in the data between the three levels is observed when the mean of each of the three groups is plotted and the slope is calculated. The slope is meant very close to 1.0.

Taniwaki et al. [4] compared with the dichloran rose bengal chloramphenicol (DRBC), SimPlate and Petrifilm techniques for yeast and mold enumeration in 14 foods (orange juice, corn meal etc.). In this study, correlation coefficients of DRBC versus SimPlate and Petrifilm for recovering total yeast and mold counts from the composite of 14 foods were 0.6793 and 0.9299, respectively.

For detection of yeasts and molds for fresh apple, the mean for BAM method was higher than that for Compact Dry YM method at the low, medium and high levels of contamination. The one-way ANOVA of the both methods was no significant different.

For detection of yeasts and molds for orange juice, the mean for BAM method was higher than that for Compact Dry YM method at the low, medium and high levels of contamination. The one-way ANOVA of the both methods was no significant different.

For detection of yeasts and molds for frozen blueberries, the mean for BAM method was higher than that for Compact Dry YM method at the low and medium levels of contamination. But the mean for BAM method was lower than that for Compact Dry YM method at the high level of contamination. The one way ANOVA of the both methods was no significant different.

For detection of yeasts and molds for dried banana chips, the mean for BAM method was higher than that for Compact Dry YM method at the low and medium levels of contamination. But the mean for BAM method was lower than that for Compact Dry YM method at the high level of contamination. The one way ANOVA of the both methods was no significant different.

Growth area of Compact Dry YM (diameter of 5 cm) for yeast and mold is smaller than that of petri dish (diameter of 9 cm). The Japan Food Research Laboratories carried out the independent validation study indicate that the counting of yeast colonies for the Compact Dry YM method was difficult, especially at the medium and high levels of contamination. Growth of a large mold colony sometimes overlap each other within growth area, it is necessary to careful to count of the colony at regular intervals in this case for Compact Dry YM.

The Compact Dry YM would also bring advantages in easy to use, saving the preparation time above the agar media, reduced storage space, waste disposal and required incubator space [5]. The long shelf life of the product also has benefits compared to ready prepared agar, which has a limited shelf life and therefore requires more logistical planning.

Overall, the Compact Dry YM would be a very quick and easy screening method for the enumeration of yeast and mold in fruit.

Table 2 Compact Dry YM Inclusivity Study (Yeasts and Molds) (1)

Strain	Test number	Color reaction	Negative
Candida albicans	6	B/ LB	
Candida tropicalis	5	B/G	
Candida glabrata	2	B	
Candida krusei	5	B	
Debaryomyces polymorphus	2	B/G	
Pichia fermentans	2	B	
Rhodotorula glutinis	2	B	
Rhodotorula mucilaginosa	2	B	
Saccharomyces	1	LG	
Torulaspora delbrueckii	2	LG/G	
Zygosaccharomyces rouxii	2	LB/B	
Aspergillus clavatus	2	WB	
Aspergillus nidulans	1	BrG	
Aspergillus niger	1	Bl	
Aspergillus oryzae	2	BrB /W	
Aspergillus parasiticus	2	BrB	
Cladosporium cladosporioides	2	Bl	
Cladosporium herbarum	2	BlB	
Eurotium repens	2	WB	
Fusarium oxysporum	2	WB	
Goetrichum candidum	2	WB	
Monascus purpureus	1	OB	
Penicillium italicum	1	YBrW	
Penicillium roquefortii	1	WB	
Rhizopus stolonifer	2	WB	
Trichoderma viride	2	WB	
Trichothecium roseum	2	WB/ WBO	
Verticillium dahliae	2	WB	
	60		

B:Blue , W:White, G:Green, Br:Brown, Bl:Black, Y:Yellow, O:Orange, L:Light color

Table 4 Compact Dry YM Exclusivity Study (Non-yeast, non-mold microorganisms) (1)

Strain	Test number	Color reaction	Positive
Aeromonas hydrophila	2	-	
Bacillus cereus	2	-	
Citrobacter amalonaticus	1	-	
Citrobacter freundii	1	-	
Citrobacter koseri	2	-	
Edwardsiella tarda	1	-	
Enterobacter aerogenes	1	-	
Enterobacter agglomerans	1	-	
Enterobacter amnigenus	1	-	
Enterobacter asburiae	1	-	
Enterobacter cancerogenus	1	-	
Enterobacter cloacae	1	WB	1
Enterobacter sakazakii	1	-	
Escherichia coli	2	-	
Escherichia coli O157:H7	2	-	
Escherichia coli O111	2	-	
Escherichia fergusonii	2	-	
Escherichia hermanii	1	-	
Hafnia alvei	1	-	
Klebsiella oxytoca	1	-	
Klebsiella ozaenae	1	-	
Klebsiella pneumoniae	2	-	
Klebsiella terrigena	2	-	
Kluyvera ascorbata	2	-	
Lactobacillus lactis	1	-	
Leclercia adecarboxylata	1	-	
Moraxella nonliquefaciens	1	-	
Moraxella ovis	1	-	
Proteus mirabilis	1	-	
Proteus vulgaris	2	-	
Pseudomonas alcalifaciens	2	-	
Pseudomonas aeruginosa	1	W	1
Pseudomonas alcaligenes	1	-	
Pseudomonas diminuta	2	-	
Pseudomonas fluorescens	1	-	
Pseudomonas mendocina	1	-	
Pseudomonas pseudoalcaligenes	1	-	
Pseudomonas putida	1	-	
Pseudomonas stutzeri	1	-	
Pseudomonas vesicularis	1	-	
Rahnella aquatilis	1	-	
Salmonella choleraesuis	2	-	
Salmonella typhimurium	1	-	
Serratia fonticola	1	-	
Serratia liquefaciens	1	B	1
Serratia marcescens	1	-	
Serratia odorifera	1	-	
Shigella flexineri	2	-	
Shigella boydii	1	-	
Staphylococcus aureus	3	-	
Streptococcus agalactiae	1	-	
	68		3

B: Blue, W: White, -: non growth

Table 5. AOAC Method Comparison (Fresh apples) (1)

Yeast/Mold LEVEL		Compact Dry YM		BAM methods	
		cfu/g	log_{10}cfu/g	cfu/g	log_{10}cfu/g
10-100 cfu/g	1	260	2.41	270	2.43
	2	210	2.32	270	2.43
	3	170	2.23	200	2.30
	4	230	2.36	270	2.43
	5	210	2.32	270	2.43
	Mean	216	2.33	256	2.41
	Sr	32.86	0.07	31.3	0.06
	RSDr%	15.21	2.90	12.23	2.42
100-1000 cfu/g	1	3000	3.48	3100	3.49
	2	2600	3.41	3000	3.48
	3	2700	3.43	3100	3.49
	4	3100	3.49	3000	3.48
	5	2600	3.41	2500	3.40
	Mean	2800	3.45	2940	3.47
	Sr	234.52	0.04	251	0.04
	RSDr%	8.38	1.04	8.54	1.13
1000-10000 cfu/g	1	24000	4.38	23000	4.36
	2	24000	4.38	25000	4.40
	3	24000	4.38	24000	4.38
	4	24000	4.38	27000	4.43
	5	22000	4.34	26000	4.41
	Mean	23600	4.37	25000	4.40
	Sr	894.43	0.02	1581.14	0.03
	RSDr%	3.79	0.39	6.32	0.63

Table 7. AOAC CDYM Method Comparison (Frozen blueberries) (1)

Yeast/Mold LEVEL			Compact Dry YM	BAM methods	
		cfu/g	log_{10}cfu/g	cfu/g	log_{10}cfu/g
10-100 cfu/g	1	390	2.59	567	2.75
	2	220	2.34	300	2.48
	3	460	2.66	700	2.85
	4	270	2.43	333	2.52
	5	90	1.95	100	2.00
	Mean	286	2.40	400	2.52
	Sr	145.02	0.28	235.78	0.33
	RSDr%	50.71	11.59	58.95	13.05
100-1000 cfu/g	1	2800	3.45	2800	3.45
	2	2800	3.45	2633	3.42
	3	1300	3.11	1333	3.12
	4	5300	3.72	6433	3.81
	5	3300	3.52	3567	3.55
	Mean	3100	3.45	3353.2	3.47
	Sr	1440.49	0.22	1899.79	0.25
	RSDr%	46.47	6.36	56.66	7.11
1000-10000 cfu/g	1	26000	4.41	24670	4.39
	2	22000	4.34	18670	4.27
	3	22000	4.34	19670	4.29
	4	26000	4.41	25000	4.40
	5	27000	4.43	24000	4.38
	Mean	24600	4.39	22402	4.35
	Sr	2408.32	0.04	2993.27	0.06
	RSDr%	9.79	0.99	13.36	1.38

Table 9. AOAC CDYM Method Comparison (Orange juice) (1)

Yeast/Mold LEVEL		Compact Dry YM		BAM methods	
		cfu/g	log_{10}cfu/g	cfu/g	log_{10}cfu/g
10-100 cfu/g	1	210	2.32	230	2.36
	2	220	2.34	230	2.36
	3	170	2.23	200	2.30
	4	150	2.18	130	2.11
	5	160	2.20	200	2.30
	Mean	182	2.26	198	2.29
	Sr	31.14	0.07	40.87	0.10
	RSDr%	17.11	3.26	20.64	4.45
100-1000 cfu/g	1	1900	3.28	2400	3.38
	2	2100	3.32	2300	3.36
	3	2100	3.32	2100	3.32
	4	2200	3.34	2500	3.40
	5	2100	3.32	2500	3.40
	Mean	2080	3.32	2360	3.37
	Sr	109.54	0.02	167.33	0.03
	RSDr%	5.27	0.71	7.09	0.94
1000-10000 cfu/g	1	20000	4.30	25000	4.40
	2	24000	4.38	25000	4.40
	3	27000	4.43	26000	4.41
	4	24000	4.38	29000	4.46
	5	25000	4.40	25000	4.40
	Mean	24000	4.38	26000	4.41
	Sr	2549.51	0.05	1732.05	0.03
	RSDr%	10.62	1.09	6.66	0.63

Table 11. AOAC CDYM Method Comparison (Dried banana chips) (1)

Yeast/Mold LEVEL		Compact Dry YM		BAM methods	
		cfu/g	log_{10}cfu/g	cfu/g	log_{10}cfu/g
10-100 cfu/g	1	10	1	67	1.83
	2	20	1.30	33	1.52
	3	50	1.70	33	1.52
	4	10	1	33	1.52
	5	30	1.48	33	1.52
	Mean	24	1.30	39.8	1.58
	Sr	16.73	0.30	15.21	0.14
	RSDr%	69.72	23.49	38.20	8.71
100-1000 cfu/g	1	150	2.18	267	2.43
	2	300	2.48	300	2.48
	3	260	2.41	333	2.52
	4	140	2.15	167	2.22
	5	190	2.28	233	2.37
	Mean	208	2.30	260	2.40
	Sr	69.79	0.14	63.95	0.12
	RSDr%	33.55	6.31	24.59	4.84
1000-10000 cfu/g	1	2500	3.40	2033	3.31
	2	2100	3.32	2200	3.34
	3	2000	3.30	1633	3.21
	4	1600	3.20	1667	3.22
	5	1900	3.28	1667	3.22
	Mean	2020	3.30	1840	3.26
	Sr	327.11	0.07	259.59	0.06
	RSDr%	16.19	2.13	14.11	1.83

Table 88. Results from enumeration of yeast and mold levels by the Compact Dry YM method and BAM (grapefruit method comparison) (1)

Sample code	Counts on DRBC (BAM method)		Compact Dry YM method		Difference log between methods
	cfu/g	Log cfu/g	cfu/g	Log cfu/g	
Low level	1.0×10^3	3.00	1.0×10^3	3.00	0
	8.7×10^2	2.94	8.5×10^2	2.93	0.01
	8.0×10^2	2.90	8.2×10^2	2.91	-0.01
	9.7×10^2	2.99	8.7×10^2	2.94	0.05
	8.0×10^2	2.90	8.2×10^2	2.91	-0.01
Medium level	8.5×10^3	3.93	7.8×10^3	3.89	0.04
	8.1×10^3	3.91	7.7×10^3	3.89	0.02
	8.1×10^3	3.91	7.8×10^3	3.89	0.02
	8.1×10^3	3.91	6.4×10^3	3.81	0.10
	8.2×10^3	3.91	8.0×10^3	3.90	0.01
High level	7.8×10^4	4.89	7.1×10^4	4.85	0.04
	8.9×10^4	4.95	7.5×10^4	4.88	0.07
	8.7×10^4	4.94	7.1×10^4	4.85	0.09
	7.4×10^4	4.87	7.1×10^4	4.85	0.02
	7.4×10^4	4.87	7.6×10^4	4.88	-0.01
Uncontaminated	< 100	< 2.00	< 10	< 1.00	-
	< 100	< 2.00	< 10	< 1.00	-
	< 100	< 2.00	< 10	< 1.00	-
	< 100	< 2.00	< 10	< 1.00	-
	< 100	< 2.00	< 10	< 1.00	-

DISCUSSION OF THE MODIFICATION STUDY Approved November 2015 (3)

For this matrix extension study, the Compact Dry YM was compared at 3- and 7-days incubation to ISO 21527-1 and the results from 3 days were compared to the results from 7 days (Tables 1–3). In the single laboratory matrix studies, the low recovery of colonies in the lowest contamination levels created large differences statistically, but these differences are based on 0–5 colonies/plate across five replicates per sample and are thus not practically important. When comparing the results of the Compact Dry YM at 3 days to ISO 21527-1, statistical differences were indicated in contamination Level 3 of deli turkey, Levels 3 and 4 of tomatoes, Levels 4 and 5 of white bread and Level 3 of mayonnaise. For Level 3 of the deli turkey and Level 5 of the white bread, the CIs were just outside of the acceptance range at (-0.563, -0.108) and (-0.598, -0.313) respectively, and the mean differences between the methods was <0.5 $\log_{10}$ CFU/g. For the Compact Dry YM 7 day and ISO results, there was no longer a statistical difference between methods for Level 5 of the sliced bread, and the mean differences between methods for Level 3 of deli turkey, Levels 3 and 4 of tomatoes, Level 4 of white bread and Level 3 of mayonnaise were all now <0.5 $\log_{10}$ CFU/g. Statistical differences between the Compact Dry YM 3 day and 7 day results were indicated for Level 1 of cheese, Level 2 of deli turkey and mayonnaise and Level 4 of sliced white bread and whole tomatoes. For the cheese, turkey and mayonnaise, the differences reflect counts of 0–4 colonies/plate and again are not practically important. For Level 4 of sliced white bread and tomatoes, the differences are significant and may reflect slower growing yeast or mold strains in these particular samples. However, no differences were seen in any other contamination levels for either matrix. All matrixes, with the exception of mayonnaise, were naturally contaminated with yeasts and molds, and it is possible that the contamination was not completely homogenous throughout the samples. For Level 4 of tomatoes in particular, the high s_r value (>0.7) across all methods would indicate this. Also, outliers were found in Levels 2 and 3 in sliced white bread, Levels 1 and 2 of cheese, and Levels 2, 3 and 4 of tomatoes, but since no justifiable causes were noted for the outliers, no data were removed from the statistical analysis. Values for s_r and RSD_r were similar between the Compact Dry YM (3 and 7 days) and ISO 21527-1, particularly at the three highest contamination levels. In some cases the Compact Dry values were lower, and in other cases the ISO values were lower, but there did not appear to be a trend favoring either method. Across all matrixes, the r^2 values were ≥0.84 for between the Compact Dry YM 3 day and ISO 21527-1, ≥0.87 for the Compact Dry YM 7 day and ISO method and ≥0.96 for the Compact Dry YM 3 day and 7 day. The lowest r^2 values were seen in the tomatoes.

In the multi-laboratory study on orange juice, no statistical differences were found between the Compact Dry YM and the ISO 21527-1 for enumeration of yeasts and molds. Due to shipping and scheduling issues, two laboratories initiated testing one day later than the other laboratories. Because of this delay, the organizing laboratory tested a full set of samples on the intended start and on the next day as well. In addition, some of the collaborators indicated that some samples arrived frozen, and so the organizing laboratory stored the second set of samples at -18°C overnight before testing on the second day to determine if freezing would have an effect on the yeast and mold recovery. No differences were determined by ANOVA, and thus data were included from all laboratories. Across 11 data sets, the mean differences between the Compact Dry YM, at either time point, and ISO 21527-1 were less than 0.08 $\log_{10}$ CFU/g with a CI of (0.015, 0.142) well within the (-0.5, 0.5) acceptance criterion. The s_r, RSD_r, s_R, and RSD_R were similar for each method, and the r^2 value was 1.0 for all comparisons.

Table 1. Single laboratory matrix study: Compact Dry YM – 3 day vs ISO 21527-1 (4)

Matrix	Cont. level	Compact Dry YM – 3 day			ISO 21527-1			Mean diff.[d]	95% CI[e]		r^{2h}
		Mean[a]	s_r[b]	RSD_r[c]	Mean	s_r	RSD_r		LCL[f]	UCL[g]	
Cooked deli turkey	1	0.000	0.000	NA	0.000	0.000	NA	0.000	0.000	0.000	0.93
	2	0.312	0.503	161	1.818	0.992	54.6	-1.506	-2.220	-0.791	
	3	3.294	0.459	13.9	3.630	0.320	8.81	-0.336	-0.563	-0.108	
	4	5.642	0.090	1.60	5.765	0.112	1.94	-0.123	-0.152	-0.094	
	5	6.539	0.266	4.07	6.642	0.268	4.03	-0.104	-0.172	-0.035	
Fresh whole tomatoes	1	0.000	0.000	NA	0.200	0.634	317	-0.200	-0.654	0.253	0.84
	2	1.134	0.477	42.1	1.741	0.944	54.2	-0.607	-1.109	-0.104	
	3	2.168	0.338	15.6	1.741	1.259	72.3	0.427	-0.295	1.149	
	4	3.087	0.700	22.7	3.824	0.833	21.8	-0.737	-1.249	-0.226	
	5	4.980	0.076	1.53	5.267	0.152	2.89	-0.286	-0.367	-0.206	
Wensleydalecheese	1	0.000	0.000	NA	0.862	1.117	130	-0.862	-1.660	-0.063	0.95
	2	3.568	0.100	2.80	3.663	0.103	2.81	-0.095	-0.166	-0.023	
	3	4.490	0.065	1.45	4.625	0.075	1.62	-0.135	-0.171	-0.098	
	4	5.684	0.056	0.99	5.772	0.080	1.39	-0.088	-0.148	-0.028	
	5	7.290	0.210	2.88	7.533	0.197	2.62	-0.243	-0.305	-0.108	
Sliced white bread	1	0.000	0.000	NA	0.000	0.000	NA	0.000	-0.000	0.000	0.96
	2	1.477	0.749	50.7	0.820	1.353	165	0.657	-0.011	1.325	
	3	5.137	0.299	5.82	5.234	0.339	6.48	-0.097	-0.133	-0.062	
	4	4.932	0.392	7.95	5.946	0.446	7.50	-1.013	-1.350	-0.677	
	5	6.737	0.261	3.87	7.192	0.164	2.28	-0.455	-0.598	-0.313	
Mayonnaise[i]	1	0.000	0.000	NA	0.200	0.634	317	-0.200	-0.654	0.253	0.88
	2	0.839	0.728	86.8	1.079	1.147	106	-0.240	-1.195	0.715	
	3	2.241	0.122	5.44	2.806	0.212	7.56	-0.565	-0.699	-0.432	
	4	3.744	0.119	3.18	3.962	0.088	2.22	-0.219	-0.286	-0.151	
	5	4.750	0.069	1.45	4.903	0.112	2.28	-0.153	-0.200	-0.105	

[a]Mean of five replicate portions, plated in duplicate, after logarithmic transformation: Log_{10}[CFU/g + (0.1)f].

[b]Repeatability standard deviation.

[c]Relative standard deviation for repeatability. NA = not applicable.

[d]Mean difference between the candidate and reference methods.

[e]Confidence interval.

[f]95% Lower confidence limit for difference of means.

[g]95% Upper confidence limit for difference of means.

[h]Square of correlation coefficient.

[i]Inoculated with *Pichia membranaefaciens* (Campden BRI code 16014) and *Penicillium chrysogenum* (CABI Bioscience, UK, 1394016). All other matrixes naturally contaminated.

Table 2. Single laboratory matrix study: Compact Dry YM – 7 day vs ISO 21527-1 (4)

Matrix	Cont. level	Compact Dry YM – 7 day			ISO 21527-1			Mean diff.[d]	95% CI[e]		r^{2h}
		Mean[a]	s_r[b]	RSD_r[c]	Mean	s_r	RSD_r		LCL[f]	UCL[g]	
Cooked deli turkey	1	0.000	0.000	NA	0.000	0.000	NA	0.000	0.000	0.000	0.97
	2	1.249	0.523	41.8	1.818	0.992	54.6	-0.569	-1.092	-0.047	
	3	3.366	0.403	12.0	3.630	0.320	8.82	-0.264	-0.516	-0.012	
	4	5.685	0.075	1.32	5.765	0.112	1.94	-0.080	-0.113	-0.047	
	5	6.557	0.263	4.01	6.642	0.268	4.03	-0.086	-0.155	-0.016	
Fresh whole tomatoes	1	0.000	0.000	NA	0.200	0.634	317	-0.200	-0.654	0.253	0.87
	2	1.190	0.480	40.3	1.741	0.944	54.2	-0.550	-1.037	-0.064	
	3	2.173	0.333	15.3	1.741	1.259	72.3	0.433	-0.296	1.162	
	4	3.552	0.737	20.7	3.824	0.833	21.8	-0.272	-0.654	0.110	
	5	4.994	0.073	1.46	5.267	0.152	2.89	-0.272	-0.338	-0.207	
Wensleydale cheese	1	1.199	0.728	60.7	0.862	1.117	130	0.338	-0.372	1.048	0.96
	2	3.592	0.103	2.87	3.663	0.103	2.81	-0.071	-0.138	-0.004	
	3	4.520	0.072	1.59	4.625	0.075	1.62	-0.105	-0.139	-0.070	
	4	5.707	0.067	1.17	5.772	0.080	1.39	-0.066	-0.132	0.000	
	5	7.300	0.216	2.96	7.533	0.197	2.62	-0.233	-0.296	-0.169	
Sliced white bread	1	0.000	0.000	NA	0.000	0.000	NA	0.000	0.000	0.000	0.97
	2	1.554	0.818	52.6	0.820	1.353	165	0.734	0.087	1.382	
	3	5.147	0.308	5.98	5.234	0.339	6.48	-0.087	-0.115	-0.059	
	4	5.657	0.306	5.41	5.946	0.446	7.50	-0.289	-0.614	0.036	
	5	6.968	0.175	2.51	7.192	0.164	2.28	-0.224	-0.346	-0.103	
Mayonnaise[i]	1	0.000	0.000	NA	0.200	0.634	317	-0.200	-0.654	0.253	0.89
	2	1.322	0.531	40.2	1.079	1.147	106	0.243	-0.578	1.063	
	3	2.388	0.116	4.86	2.806	0.212	7.56	-0.418	-0.565	-0.270	
	4	3.748	0.106	2.83	3.962	0.088	2.22	-0.214	-0.278	-0.150	
	5	4.768	0.058	1.22	4.903	0.112	2.28	-0.135	-0.187	-0.082	

[a]Mean of five replicate portions, plated in duplicate, after logarithmic transformation: Log_{10}[CFU/g + (0.1)f].
[b]Repeatability standard deviation.
[c]Relative standard deviation for repeatability. NA = not applicable.
[d]Mean difference between the candidate and reference methods.
[e]Confidence interval.
[f]95% Lower confidence limit for difference of means.
[g]95% Upper confidence limit for difference of means.
[h]Square of correlation coefficient.
[i]Inoculated with *Pichia membranaefaciens* (Campden BRI code 16014) and *Penicillium chrysogenum* (CABI Bioscience, UK, 1394016). All other matrixes naturally contaminated.

Table 3. Single laboratory matrix study: Compact Dry YM – 3 day vs Compact Dry YM – 7 day (4)

Matrix	Cont. level	Compact Dry YM – 3 day			Compact Dry YM – 7 day			Mean diff.[d]	95% CI[e]		r^{2h}
		Mean[a]	s_r[b]	RSD_r[c]	Mean	s_r	RSD_r		LCL[f]	UCL[g]	
Cooked deli turkey	1	0.000	0.000	NA	0.000	0.000	NA	0.000	0.000	0.000	0.97
	2	0.312	0.503	161	1.249	0.523	41.9	-0.936	-1.428	-0.444	
	3	3.294	0.459	13.9	3.366	0.403	12.0	-0.072	-0.193	0.049	
	4	5.642	0.090	1.60	5.685	0.075	1.32	-0.043	-0.062	-0.024	
	5	6.539	0.266	4.07	6.557	0.263	4.01	-0.018	-0.028	-0.008	
Fresh whole tomatoes	1	0.000	0.000	NA	0.000	0.000	NA	0.000	0.000	0.000	0.97
	2	1.134	0.477	42.1	1.190	0.480	40.3	-0.056	-0.141	0.029	
	3	2.168	0.338	15.6	2.173	0.333	15.3	-0.006	-0.019	0.007	
	4	3.087	0.700	22.7	3.552	0.737	20.7	-0.465	-0.912	-0.019	
	5	4.980	0.076	1.53	4.994	0.073	1.46	-0.014	-0.039	0.010	
Wensleydalecheese	1	0.000	0.000	NA	1.199	0.728	60.7	-0.728	-1.720	-0.679	0.96
	2	3.568	0.100	2.80	3.592	0.103	2.87	-0.024	-0.035	-0.013	
	3	4.490	0.065	1.45	4.520	0.072	1.59	-0.030	-0.057	-0.003	
	4	5.684	0.056	0.99	5.707	0.067	1.17	-0.022	-0.036	-0.009	
	5	7.290	0.210	2.88	7.300	0.216	2.96	-0.010	-0.022	0.002	
Sliced white bread	1	0.000	0.000	NA	0.000	0.000	NA	0.000	0.000	0.000	0.98
	2	1.466	0.749	50.7	1.554	0.818	52.6	-0.077	-0.156	0.001	
	3	5.137	0.299	5.82	5.147	0.308	5.98	-0.010	-0.027	0.007	
	4	4.932	0.392	7.95	5.657	0.306	5.41	-0.724	-1.080	-0.369	
	5	6.737	0.261	3.87	6.958	0.175	2.51	-0.231	-0.355	-0.107	
Mayonnaise[i]	1	0.000	0.000	NA	0.000	0.000	NA	0.000	0.000	0.000	0.98
	2	0.839	0.728	86.8	1.322	0.531	40.2	-0.483	-0.850	-0.115	
	3	2.241	0.122	5.44	2.388	0.116	4.86	-0.148	-0.177	-0.118	
	4	3.744	0.119	3.18	3.748	0.106	2.83	-0.004	-0.023	0.013	
	5	4.750	0.069	1.45	4.768	0.058	1.22	-0.018	-0027	-0.009	

[a]Mean of five replicate portions, plated in duplicate, after logarithmic transformation: $Log_{10}[CFU/g + (0.1)f]$.

[b]Repeatability standard deviation.

[c]Relative standard deviation for repeatability. NA = not applicable.

[d]Mean difference between the candidate and reference methods.

[e]Confidence interval.

[f]95% Lower confidence limit for difference of means.

[g]95% Upper confidence limit for difference of means.

[h]Square of correlation coefficient.

[i]Inoculated with *Pichia membranaefaciens* (Campden BRI code 16014) and *Penicillium chrysogenum* (CABI Bioscience, UK, 1394016). All other matrixes naturally contaminated.

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