



# CERTIFICATION

## AOAC Research Institute *Performance Tested Methods*<sup>SM</sup>

Certificate No.  
**092002**

The AOAC Research Institute hereby certifies the method known as:

### **Compact Dry "Nissui" YMR**

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*<sup>SM</sup> 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*<sup>SM</sup> 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.

A handwritten signature in black ink that reads "Scott Coates".

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Scott Coates, Senior Director  
Signature for AOAC Research Institute

Issue Date

January 10, 2023

Expiration Date

December 31, 2023

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<b>METHOD NAME</b> Compact Dry "Nissui" YMR	<b>CATALOG NUMBERS</b> Nissui: 06777, 6778
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<b>INDEPENDENT LABORATORY</b> Campden BRI Chipping Campden Gloucestershire, UK	<b>ERV JUNE 2021</b> Q Laboratories 1930 Radcliff Drive Cincinnati, OH 45204	<b>AOAC EXPERTS AND PEER REVIEWERS</b> Yi Chen <sup>1</sup> , Yvonne Salfinger <sup>2,6</sup> , Maria Cristina Fernandez <sup>3</sup> , Farahath Shenaz Dave <sup>4,6</sup> , Michael Brodsky <sup>5,6</sup> <sup>1</sup> Food and Drug Administration, Center for Food Safety and Applied Nutrition, Maryland, USA <sup>2</sup> Consultant, Colorado, USA <sup>3</sup> Consultant, Buenos Aires, ARGENTINA <sup>4</sup> Maryland Medical Cannabis Commission, Maryland, USA <sup>5</sup> Brodsky Consultants, Ontario, CANADA <sup>6</sup> ERV approval May 2021
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<b>APPLICABILITY OF METHOD</b> Target Organisms – Yeasts and molds  Matrixes – (10 g samples) – cooked, peeled, chilled, cold water prawns with heads off (1.3% salt); beetroot deli salad (66% beetroot, 11% carrot in a vinaigrette dressing 1.3% fat, 0.1% salt); chilled tuna pâté (23% fat, 0.9% salt); fermented strawberry yogurt drink (1.8% fat containing <i>L. acidophilus</i> , <i>Bifidobacterium</i> and <i>L. casei</i> ); spinach and ricotta quiche (14.3% fat, 0.3% salt); egg custard tarts (pastry cases filled with sweet egg custard, 12.8% fat, 14.1% sugar); fruit and vegetable smoothie (cucumber, lemon, kale, spinach, pear, apple); full fat soft cream cheese (24% fat); fresh chilled egg mayonnaise salad sandwich on malted brown sliced bread (6.3% fat, 0.9% salt); and deli pasta salad (7.4% fat 0.7% salt) containing cooked chicken (11%), bacon (2.5%) and blanched sweet corn (17%) ERV Matrix Extension June 2021 – (10 g) Dried cannabis flower (THC > 0.3%)  Performance claims – Performance was found to be equivalent to that of ISO 21527-1:2008, <i>Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of yeasts and molds - Colony count technique in products with water activity greater than 0.95 (2)</i> and Dichloran Rose Bengal Chloramphenicol agar for dried cannabis flower.	<b>REFERENCE METHODS</b> 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 (2)  ERV Matrix Extension for dried cannabis flower compared to Dichloran Rose Bengal Chloramphenicol agar
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<b>ORIGINAL CERTIFICATION DATE</b> September 25, 2020	<b>CERTIFICATION RENEWAL RECORD</b> Renewed annually through December 2023.
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<b>METHOD MODIFICATION RECORD</b> 1. ERV Matrix Extension June 2021	<b>SUMMARY OF MODIFICATION</b> 1. Matrix extension to add Dried cannabis flower (THC > 0.3%).
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<b>Under this AOAC Performance Tested Methods<sup>SM</sup> License Number, 092002 this method is distributed by:</b> 1. Hardy Diagnostics 2. R-Biopharm AG	<b>Under this AOAC Performance Tested Methods<sup>SM</sup> License Number, 092002 this method is distributed as:</b> 1. Compact Dry YMR 2. Compact Dry YMR
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**PRINCIPLE OF THE METHOD (1)**  
Compact Dry "Nissui" YMR are ready-to-use dry media sheets comprising culture medium and a cold-soluble gelling agent. The film is rehydrated by inoculating 1 mL of diluted sample into the center of the self-diffusible medium. The CompactDry "Nissui" YMR method contains a special spread sheet containing nutrients, chloramphenicol to inhibit bacterial growth, and a chromogenic enzyme substrate, X-phos, for the detection and enumeration of yeasts and molds after incubation at 25 ± 1°C for 3 days. While most colonies are some shade of green/blue, any colored colony should be counted. In addition, mold colonies may have a diffuse or cottony appearance with blue/green or other color.

**DISCUSSION OF THE VALIDATION STUDY (1)**

The results of this study indicate that the CompactDry "Nissui" YMR method can be used for rapid and accurate enumeration of yeast and mold species in a variety of food commodities, including cooked prawns, deli vegetable salad, tuna pâté, fermented yogurt drink, spinach and ricotta quiche, egg custard tarts, fruit and vegetable smoothie, cream cheese, egg salad sandwich, and deli pasta salad. The Compact Dry "Nissui" YMR method shows slightly better repeatability than the ISO 21527-1:2008 reference method and equivalent mean results. The inclusivity and exclusivity results showed excellent selectivity of the Compact Dry "Nissui" YMR with all 51 inclusivity strains positive and all 32 exclusivity strains negative.

The method was shown to be robust to changes in sample volume, incubation temperature and incubation time. While the data demonstrated no significant difference when incubation temperature was varied between 23-28°C and incubation time was varied between 48-72 h, for best results it is recommended to incubate at 25±1°C for 72±3 h. The product consistency and stability study demonstrated no significant lot-to-lot variation or loss of performance over a 24-month shelf life.

The Compact Dry "Nissui" YMR method offers a time saving of 2 days over the reference method. There is a reduction in the amount of technical labor required in preparation of agar and there is no need for confirmation procedures. There are additional advantages in reduction of storage space, waste disposal and required incubator space.

**Table 1. Inclusivity testing of Yeast and Mold species on CompactDry "Nissui" YMR (1)**

No.	Species	Type	Source <sup>a</sup>	Origin	Growth at 72 h <sup>b</sup>	Morphology at 72 h
1	<i>Alternaria alternata</i>	Mold	IFO 31188	living leaf, <i>Stevia rebaudiana</i>	+	blue green - dark green, unclear edge
2	<i>Aspergillus brasiliensis</i>	Mold	NBRC 9455	Blueberry, <i>Vaccinium</i> sp.	+	white - blue green unclear edge, black spots in center
3	<i>Aspergillus flavus</i>	Mold	NBRC 6343	Shoe sole	+	pale blue green atypical, black spots in hypha
4	<i>Aspergillus fumigatus</i>	Mold	NBRC 33022	unknown	+	pale blue green rather unclear colony
5	<i>Aspergillus niger</i>	Mold	NBRC 105649	Leather	+	deep blue green; black spots in center
6	<i>Aspergillus oryzae</i>	Mold	NBRC 5375	unknown	+	blue green; pale brown center
7	<i>Aspergillus terreus</i>	Mold	NBRC 6346	Haversack	+	White; not clearly formed edge
8	<i>Aspergillus versicolor</i>	Mold	NBRC 4098	tobacco	+	pale blue green; not clearly formed edge
9	<i>Aureobasidium pullulans</i>	Yeast	NBRC 6353	unknown	+	blue - dark green
10	<i>Candida albicans</i>	Yeast	NBRC 1594	Clinical bronchomycosis	+	white - pale green
11	<i>Candida apicola</i>	Yeast	NBRC 10261	intestine of bee	+	blue green
12	<i>Candida lactis-condensi</i>	Yeast	NBRC 1286	fermenting condensed milk	+	blue green; blue green edge
13	<i>Chaetomium globosum</i>	Mold	NBRC 6347	Stored cotton	+	blue green
14	<i>Cladosporium cladosporioides</i>	Mold	NBRC 6348	unknown	+	pale blue green - blue green; not clearly formed colony
15	<i>Cladosporium halotolerans</i>	Mold	NBRC 4460	Air	+	white - pale blue green; not clearly formed colony
16	<i>Debaryomyces hansenii</i>	Yeast	IFO 0026	beef-and-pork sausage	+	white
17	<i>Debaryomyces maramus</i>	Yeast	NBRC 0668	Air	+	white
18	<i>Fusarium oxysporum</i>	Mold	NBRC 7155	unknown	+	pale blue green; deep blue green center
19	<i>Fusarium solani</i>	Mold	NBRC 5232	unknown	+	blue green; cottony center
20	<i>Geotrichum candidum</i>	Yeast	NBRC 4598	unknown	+	pale greenish white; cottony
21	<i>Hormoconis resiniae</i>	Mold	NBRC 100535	unknown	+	very pale blue green; atypical growth, not clearly formed colony
22	<i>Monascus purpureus</i>	Mold	NBRC 32316	red rice	+	blue green; pale brown center
23	<i>Moniliella acetoabutans</i>	Yeast	NBRC 9482	sweet fruit sauce	+	blue green
24	<i>Myrothecium verrucaria</i>	Mold	NBRC 6113	Deteriorated baled cotton	+	blue green; pale brown center
25	<i>Neosartorya fischeri</i>	Mold	IFO 8789	rubber tire scrap	+	pale blue green - blue green; not clearly formed edge
26	<i>Paecilomyces variotii</i>	Mold	NBRC 33284	unknown	+	pale blue green - blue green
27	<i>Penicillium aurantiogriseum</i>	Mold	NBRC 7733	Rotting grain of <i>Zea mays</i>	+	blue green
28	<i>Penicillium brevicompactum</i>	Mold	NBRC 5727	soil	+	blue green; white - pale brown center
29	<i>Penicillium chrysogenum</i>	Mold	IFO 32030	cheese	+	blue green; white cottony center
30	<i>Penicillium citrinum</i>	Mold	NBRC 6352	unknown	+	yellow green; white cottony center
31	<i>Penicillium funiculosum</i>	Mold	NBRC 100958	Mercury-treated fabric	+	pale white; not clearly formed colony
32	<i>Penicillium martensii</i>	Mold	NBRC 8142	unknown	+	Green; not clearly formed edge
33	<i>Penicillium ochrochloron</i>	Mold	NBRC 4612	unknown	+	blue green; not clearly formed edge
34	<i>Penicillium pinophilum</i>	Mold	NBRC 33285	unknown	+	white - very pale blue green; not clearly formed colony
35	<i>Phialophora fastigiata</i>	Mold	IFO 6850	unknown	+	blue green; not clearly formed edge
36	<i>Phoma herbarum</i>	Mold	NBRC 107643	Polyester straw on drinking pot	+	white - very pale blue green; not clearly formed edge
37	<i>Pichia anomala</i>	Yeast	IFO 10213	unknown	+	blue green (nearly green)
38	<i>Pseudocochliobolus lunatus</i>	Mold	NBRC 30883	leaf of sudangrass 'Greenleaf'	+	pale blue green; not clearly formed edge
39	<i>Rhizopus oryzae</i>	Mold	NBRC 31005	Radio set	+	partly pale yellow brown; atypical growth black spots in hypha
40	<i>Rhodotorula acuta</i>	Yeast	IFO 1912	grape must	+	blue green; pale blue green edge

41	<i>Rhodotorula glutinis</i>	Yeast	NBRC 1125	Air	+	blue green; pale blue green edge
42	<i>Rhodotorula mucilaginosa</i>	Yeast	NBRC 0889	unknown	+	pale blue green; very pale blue green edge
43	<i>Saccharomyces cerevisiae</i>	Yeast	NBRC 101557	Fermenting sake mash	+	white - pale green
44	<i>Scopulariopsis brevicaulis</i>	Mold	NBRC 100536	Chrysalis of silkworm	+	pale blue green - blue green; not clearly formed colony
45	<i>Torulasporea delbrueckii</i>	Yeast	IFO 1180	grape must	+	blue green (nearly green); pale blue green edge
46	<i>Trichoderma citrinoviride</i>	Mold	IFO 31137	Soil in organic layer	+	pale blue green; not clearly formed edge, deep blue green center
47	<i>Trichoderma virens</i>	Mold	NBRC 6355	Soil	+	blue green - yellow green; atypical growth unclear colony
48	<i>Trichophyton mentagrophytes</i>	Mold	IFO 6202	unknown	+	pale blue green
49	<i>Trichosporon asahii</i>	Yeast	NBRC 103889	case of trichosporia cutis psoriaticiformis progressiva	+	blue green
50	<i>Zygosaccharomyces bailii</i>	Yeast	NBRC 1098	unknown	+	pale blue green - blue green; very pale blue green edge
51	<i>Zygosaccharomyces rouxii</i>	Yeast	NBRC 1960	cane sugar	+	white - pale blue green; very pale blue green edge

<sup>a</sup>IFO = Campden Culture Collection (Campden BRI, Chipping Campden, UK); NBRC = National Institute of Technology and Evaluation Biological Resource Center (Tokyo, Japan)

<sup>b</sup>"+" indicates growth occurred.

**Table 2. Exclusivity testing of non-Yeast and non-Mold species on CompactDry "Nissui" YMR (1)**

No.	Species	Source <sup>a</sup>	Origin	Growth <sup>b</sup>
1	<i>Acinetobacter baumannii</i>	JCM 6841	Urine	-
2	<i>Acinetobacter baumannii</i>	ATCC 19606	Urine	-
3	<i>Alcaligenes faecalis</i>	IFO 13111	unknown	-
4	<i>Bacillus cereus</i>	IFO 13494	unknown	-
5	<i>Bacillus licheniformis</i>	NBRC 12200	unknown	-
6	<i>Bacillus subtilis</i>	NBRC 3134	unknown	-
7	<i>Burkholderia cepacia</i>	NBRC 15124	10% benzalkonium chloride solution	-
8	<i>Citrobacter freundii</i>	IFO 12681	unknown	-
9	<i>Klebsiella aerogenes</i> (formerly <i>Enterobacter aerogenes</i> )	ATCC 13048	Sputum, South Carolina Dept. of Health and Environmental Control	-
10	<i>Enterobacter cloacae</i> subsp. <i>Cloacae</i>	NBRC 13535	Spinal fluid	-
11	<i>Enterococcus faecalis</i>	NBRC 12965	Citrus juice	-
12	<i>Enterococcus faecium</i>	ATCC 19434	unknown	-
13	<i>Escherichia coli</i>	NBRC 3301	Human feces	-
14	<i>Escherichia coli</i>	NBRC 3972	Feces	-
15	<i>Myroides odoratus</i> (formerly <i>Flavobacterium odoratum</i> )	ATCC 4651	unknown	-
16	<i>Kocuria rhizophila</i>	ATCC 9341	Soil	-
17	<i>Lactobacillus casei</i>	NBRC 15883	Cheese	-
18	<i>Lactococcus lactis</i>	NS 6938	human	-
19	<i>Listeria monocytogenes</i>	VTU 206	unknown	-
20	<i>Micrococcus luteus</i>	NBRC 3333	unknown	-
21	<i>Morganella morganii</i>	ATCC 25830	Patient with summer diarrhea	-
22	<i>Paenibacillus polymyxa</i>	NBRC 15309	unknown	-
23	<i>Proteus mirabilis</i>	IFO 3849	unknown	-
24	<i>Pseudomonas aeruginosa</i>	NBRC 13275	Outer ear infection	-
25	<i>Pseudomonas stutzeri</i>	ATCC 17587	Bile	-
26	<i>Rhodococcus equi</i>	IFO 14956	Lung abscess of foal	-
27	<i>Salmonella</i> Typhimurium	ATCC 14028	Tissue, animal - pools of heart and liver from 4-week-old chickens	-
28	<i>Serratia marcescens</i> subsp. <i>Marcescens</i>	NBRC 102204	Pond water	-
29	<i>Shigella flexneri</i>	ATCC 12022	unknown	-
30	<i>Staphylococcus aureus</i> subsp. <i>Aureus</i>	NBRC 12732	unknown	-
31	<i>Staphylococcus epidermidis</i>	ATCC 35984	Catheter sepsis, Tennessee	-
32	<i>Streptococcus pyogenes</i>	JCM 5674	Scarlet fever	-

<sup>a</sup>JCM = Japan Collection of Microorganisms (RIKEN BioResource Center, Ibaraki, Japan); ATCC = American Type Culture Collection (Manassas, VA, USA); IFO = Campden Culture Collection (Campden BRI, Chipping Campden, UK); NBRC = National Institute of Technology and Evaluation Biological Resource Center (Tokyo, Japan); VTU = Visvesvaraya Technological University (Bangalore, India)

<sup>b</sup>"-" indicates growth did not occur.

**Table 7. Method comparison data summary and statistics (1)**

Matrix	Contamination level	n <sup>a</sup>	CompactDry "Nissui" YMR			ISO 21527-1:2008			DOM <sup>d</sup>	95 % CI <sup>e</sup>		90 % CI	
			Mean Log <sub>10</sub> CFU <sup>b</sup> /g	s <sub>r</sub>	RSD <sub>r</sub> , %	Mean Log <sub>10</sub> CFU/g	s <sub>r</sub>	RSD <sub>r</sub> , %		LCL <sup>f</sup>	UCL <sup>g</sup>	LCL	UCL
Fermented yogurt drink	Low	5	2.828	0.048	1.70	2.819	0.046	1.63	0.009	-0.076	0.094	0.056	0.074
	Medium	5	4.851	0.029	0.60	4.818	0.022	0.46	0.033	-0.007	0.073	0.003	0.064
	High	5	5.769	0.078	1.35	5.776	0.095	1.64	-0.008	-0.135	0.120	-0.106	0.090
Cream cheese	Low	5	2.767	0.107	3.87	2.629	0.057	2.17	0.139	0.010	0.268	0.040	0.238
	Medium	5	4.778	0.058	1.21	4.841	0.064	1.32	-0.064	-0.095	-	-0.088	-0.039
	High	5	5.660	0.103	1.82	5.716	0.096	1.68	-0.057	-0.131	0.018	-0.114	0.001
Egg custard tarts	Low	5	2.420	0.049	2.02	2.370	0.157	6.62	0.050	-0.145	0.244	-0.099	0.199
	Medium	5	2.963	0.102	3.44	3.247	0.122	3.76	-0.284	-0.310	-	-0.304	-0.263
	High	5	4.645	0.115	2.48	4.837	0.063	1.30	-0.192	-0.359	-	-0.320	-0.063
Spinach and ricotta quiche	Low	5	2.396	0.050	2.09	2.343	0.062	2.65	0.053	-0.060	0.166	-0.034	0.139
	Medium	5	2.963	0.102	3.44	3.247	0.122	6.67	-0.284	-0.310	-	-0.304	-0.263
	High	5	4.510	0.107	2.37	4.668	0.202	4.33	-0.158	-0.353	0.037	-0.308	-0.009
Deli vegetable salad	Low	5	2.180	0.090	4.13	2.457	0.151	6.15	-0.277	-0.534	0.019	-0.475	-0.079
	Medium	5	3.968	0.066	1.66	3.934	0.057	1.45	0.033	-0.050	0.116	-0.030	0.097
	High	5	5.976	0.029	0.49	5.922	0.065	1.10	0.053	-0.027	0.133	-0.008	0.115
Fruit and vegetable smoothie	Low	5	3.427	0.057	1.66	3.537	0.109	3.08	-0.111	-0.246	0.024	-0.214	-0.007
	Medium	5	4.718	0.115	2.44	4.846	0.118	2.43	-0.128	-0.220	-	-0.119	-0.057
	High	5	5.758	0.106	1.84	5.880	0.131	2.23	-0.122	-0.205	-	-0.186	-0.059
Cooked prawns	Low	5	1.466	0.118	8.05	1.159	0.221	19.1	0.307	-0.013	0.627	0.061	0.553
	Medium	5	4.202	0.138	3.28	4.265	0.124	2.91	-0.063	-0.260	0.133	-0.215	0.088
	High	5	5.539	0.113	2.04	5.603	0.114	2.03	-0.064	-0.153	0.025	-0.133	0.004
Tuna pâté	Low	5	2.454	0.040	1.63	2.275	0.194	8.53	0.179	-0.080	0.438	-0.020	0.378
	Medium	5	4.208	0.136	3.23	4.279	0.187	4.37	-0.070	-0.209	0.069	-0.177	0.036
	High	5	5.485	0.094	1.71	5.394	0.082	1.52	0.091	-0.081	0.263	-0.041	0.223
Egg salad sandwiches	Low	5	2.459	0.161	6.55	2.436	0.134	5.50	0.022	-0.062	0.107	-0.043	0.087
	Medium	5	3.930	0.232	5.90	3.933	0.150	3.81	-0.003	-0.199	0.193	-0.153	0.147
	High	5	5.322	0.075	1.41	5.383	0.095	1.76	-0.060	-0.255	0.134	-0.210	0.089
Deli pasta salad	Low	5	2.991	0.060	2.01	3.120	0.091	2.92	-0.129	-0.304	0.046	-0.263	0.006
	Medium	5	3.833	0.065	1.70	3.810	0.121	3.18	0.024	-0.133	0.180	-0.097	0.144
	High	5	5.050	0.179	3.54	5.233	0.053	1.01	-0.183	-0.400	0.033	-0.350	-0.017

<sup>a</sup>n = number of replicate test portions

<sup>b</sup>CFU = Colony-forming units

<sup>c</sup>RSD<sub>r</sub> = Relative standard deviation of repeatability

<sup>d</sup>DOM = Difference of Means

<sup>e</sup>CI = Confidence Interval for DOM

<sup>f</sup>LCL = Lower confidence limit for DOM

<sup>g</sup>UCL = Upper confidence limit for DOM

**DISCUSSION OF ERV MATRIX EXTENSION APPROVED JUNE 2021 (3)**

CompactDry YMR was previously shown to be equivalent to ISO 21527-1:2008 and awarded PTM certification number 092002 (2). The current matrix extension study compared the performance of the CompactDry YMR to DRBC agar at 72 hours for the enumeration of yeasts and molds in cannabis flower [THC >0.3%]. Naturally contaminated low, medium and high-level cannabis test materials were evaluated. The plate counts from the CompactDry YMR plate method were compared with colony counts from the reference agar.

The method comparison data demonstrated statistically equivalent enumeration between the CompactDry YMR method and the reference DRBC agar at all levels at 72 hours for cannabis material. For this matrix, DRBC and CompactDry repeatability values were comparable at all inoculum levels. No negative feedback was reported to the study directors from the independent laboratory.

All inclusivity organisms evaluated were recovered on CompactDry YMR. Two exclusivity organisms, *Klebsiella pneumoniae* (ATCC 13883) and *Pseudomonas fluorescens* (ATCC 13525), showed growth at 72 hours. *Klebsiella pneumoniae* grew weakly and had less than 10 small blue colonies after 72 hours of incubation. This organism is inhibited by the media since only a few colonies were observed at the concentration tested (1.5x10<sup>8</sup> CFU/mL). *Pseudomonas fluorescens* had no distinct colonies present, but the background of the plate was green, likely due to a lawn of bacteria as the plate was inoculated with about 1.5x10<sup>8</sup> CFU.

**Table 1. Inclusivity testing of yeast and mold species on CompactDry YMR for Cannabis ERV (3)**

No.	Organism	Fungus Type	Source <sup>c</sup>	Origin	Result <sup>d</sup>
1	<i>Arthrrium aureum</i> <sup>a</sup>	Mold	ATCC 56042	Not available	+
2	<i>Aspergillus aculeatus</i> <sup>a</sup>	Mold	ATCC 56925	Grape	+
3	<i>Aspergillus caesiellus</i> <sup>a</sup>	Mold	ATCC 42693	Dried chilies	+
4	<i>Botrytis cinerea</i> <sup>a</sup>	Mold	ATCC 11542	Azalea flowers	+
5	<i>Candida tropicalis</i> <sup>b</sup>	Yeast	ATCC 750	Patient with bronchomycosis	+
6	<i>Papiliotrema laurentii</i> (formerly <i>Cryptococcus laurentii</i> ) <sup>b</sup>	Yeast	ATCC 18803	Palm wine	+
7	<i>Cryptococcus neoformans</i> <sup>b</sup>	Yeast	ATCC 32045	Fermenting fruit juice	+
8	<i>Fusarium proliferatum</i> <sup>a</sup>	Mold	QL 0567112-1C	Environmental	+
9	<i>Mucor circinelloides</i> <sup>a</sup>	Mold	ATCC 24905	Rice fermentations	+
10	<i>Mucor hiemalis</i> <sup>a</sup>	Mold	ATCC 34334	Cow dung	+
11	<i>Penicillium rubens</i> <sup>b</sup>	Mold	ATCC 9179	Culture contaminant	+
12	<i>Penicillium venetum</i> <sup>a</sup>	Mold	ATCC 16025	<i>Hyacinthus</i> sp. bulb	+
13	<i>Purpureocillium lilacinum</i> <sup>a</sup>	Mold	ATCC 10114	Soil	+
14	<i>Rhizopus stolonifera</i> <sup>a</sup>	Mold	QL 14181-2A	Not available	+
15	<i>Scopulariopsis acremonium</i> <sup>a</sup>	Mold	ATCC 58636	Chicken house soil	+
16	<i>Stemphylium</i> sp. <sup>a</sup>	Mold	QL 15229-1	Potable water	+
17	<i>Talaromyces pinophilus</i> <sup>a</sup> ( <i>Penicillium pinophilum</i> )	Mold	NRRL 11797	Corn	+
18	<i>Yarrowia lipolytica</i> <sup>a</sup>	Yeast	ATCC 9773	Not available	+

<sup>a</sup>Tested by Q Laboratories

<sup>b</sup>Tested by Hardy Diagnostics

<sup>c</sup>ATCC = American Type Culture Collection (Mannassas, VA, USA); QL = Q Laboratories culture collection (Cincinnati, OH, USA); NRRL = Agriculture Research Service (Northern Regional Research Laboratory) Culture Collection (Peoria, IL, USA)

<sup>d</sup>"+" indicates that growth typical for these species occurred.

**Table 3. Exclusivity testing of non-yeast and non-mold species on CompactDry YMR for Cannabis ERV (3)**

No.	Species	Source <sup>c</sup>	Origin	Growth <sup>d</sup>
1	<i>Aeromonas hydrophila</i> <sup>a</sup>	ATCC 7966	Tin of milk with fishy odor	-
2	<i>Citrobacter braaki</i> <sup>a</sup>	ATCC 43162	Clinical isolate	-
3	<i>Edwardsiella tarda</i> <sup>a</sup>	ATCC 15947	Human feces	-
4	<i>Erwinia amylovora</i> <sup>b</sup>	ATCC 51852	Plant	-
5	<i>Escherichia coli</i> O157:H7 <sup>a</sup>	ATCC 43888	Human feces	-
6	<i>Escherichia hermani</i> <sup>b</sup>	ATCC 33650	Mouse brain	-
7	<i>Escherichia vulneris</i> <sup>b</sup>	ATCC 29943	Human wound	-
8	<i>Hafnia alvei</i> <sup>a</sup>	ATCC 29926	Clinical isolate	-
9	<i>Klebsiella oxytoca</i> <sup>a</sup>	ATCC 43165	Clinical isolate	-
10	<i>Klebsiella pneumoniae</i> <sup>a</sup>	ATCC 13883	Not available	+
11	<i>Pantoea agglomerans</i> <sup>b</sup>	ATCC 19552	Sewage	-
12	<i>Pseudomonas fluorescens</i> <sup>a</sup>	ATCC 13525	Pre-filter tanks	+
13	<i>Pseudomonas putida</i> <sup>a</sup>	HDX 9061	Clinical isolate	-
14	<i>Ralstonia pickettii</i> <sup>b</sup>	ATCC 27511	Clinical isolate	-
15	<i>Rahnella aquatilis</i> <sup>a</sup>	ATCC 33071	Drinking water	-
16	<i>Stenotrophomonas maltophilia</i> <sup>a</sup>	ATCC 13636	Spinal fluid	-

<sup>a</sup>Tested by Hardy Diagnostics

<sup>b</sup>Tested by Q Laboratories

<sup>c</sup>ATCC = American Type Culture Collection (Mannassas, VA, USA); HDX = Hardy Diagnostics Culture Collection (Santa Maria, CA, USA)

<sup>d</sup>"-" indicates growth did not occur. "+" indicates growth occurred.

**Table 6. Method comparison data summary and statistics for dried cannabis flower (3)**

Contamination level	n <sup>a</sup>	CompactDry <sup>TM</sup> YMR			DRBC <sup>d</sup>			95 % CI <sup>f</sup>		90 % CI		
		Mean Log <sub>10</sub> CFU <sup>b</sup> /g	s <sub>r</sub>	RSD <sub>r</sub> <sup>c</sup> , %	Mean Log <sub>10</sub> CFU/g	s <sub>r</sub>	RSD <sub>r</sub> , %	DOM <sup>e</sup>	LCL <sup>g</sup>	UCL <sup>h</sup>	LCL	UCL
Low	5	2.828	0.048	1.70	2.819	0.046	1.63	0.009	-0.076	0.094	0.056	0.074
Medium	5	4.851	0.029	0.60	4.818	0.022	0.46	0.033	-0.007	0.073	0.003	0.064
High	5	5.769	0.078	1.35	5.776	0.095	1.64	-0.008	-0.135	0.120	-0.106	0.090

<sup>a</sup>n = number of replicate test portions

<sup>b</sup>CFU = Colony-forming units

<sup>c</sup>RSD<sub>r</sub> = Relative standard deviation of repeatability

<sup>d</sup>DRBC = Dichloran Rose Bengal Chloramphenicol agar

<sup>e</sup>DOM = Difference of Means

<sup>f</sup>CI = Confidence Interval for DOM

<sup>g</sup>LCL = Lower confidence limit for DOM

<sup>h</sup>UCL = Upper confidence limit for DOM

**REFERENCES CITED**

1. Mizuochi, S., Validation of the CompactDry “Nissui” YMR for Enumeration of Yeasts and Molds in a Variety of Foods, AOAC *Performance Tested Methods*<sup>SM</sup> certification number 092002.
2. 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 <https://www.iso.org/standard/38275.html> accessed June 2020
3. Hamilton, L, Klavins, A., Malherbe, R., Youngblood, J., Hsiung, A., Yusuke, Ito, Matrix Extension of the CompactDry™ “Nissui” YMR for Enumeration of Yeasts and Molds in Dried Cannabis Flower, AOAC® *Performance Tested*<sup>SM</sup> certification number 092002. Approved June 2021.