

APPENDIX A

Experimental Data

Enhancement of plate count agar technique

Table A.1 Comparison of the total cell count of *E. coli* at different background color of the medium using plate count agar (PCA)

treatment	<i>E. coli</i> count (log CFU/ml)					
	Rep1	Rep2	Rep3	Rep4	Ave	SD
Control	9.51	9.65	9.76	8.48	9.35	0.59
Green dye	9.65	9.87	9.03	9.26	9.45	0.38
Red dye	9.12	9.66	9.76	9.39	9.48	0.29
Yellow dye	9.49	9.55	9.13	9.39	9.39	0.19

Implementation of TPC enumeration on industrial samples

Table A.2 TPC enumeration in food samples using various techniques (pour plate, spread plate and MIC techniques)

Sample type	Sample No.	Total plate count (log CFU/ ml)											
		Pour plate				Spread plate				MIC			
		Rep1	Rep2	Ave	SD	Rep1	Rep2	Ave	SD	Rep1	Rep2	Ave	SD
Somtum	1-5	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
	6-9	TNTC	TNTC	TNTC	-	TNTC	TNTC	TNTC	-	TNTC	TNTC	TNTC	-
	10	2.38	2.41	2.39	0.02	2.41	2.43	2.42	0.01	2.49	2.47	2.48	0.01
	11	2.78	2.72	2.75	0.04	2.88	2.81	2.85	0.05	2.78	2.65	2.72	0.09
	12	3.08	3.04	3.06	0.02	3.20	3.10	3.15	0.07	3.20	3.03	3.12	0.12
	13	2.81	2.76	2.79	0.04	2.88	2.82	2.85	0.04	2.90	2.85	2.88	0.03
	14	2.44	2.50	2.47	0.04	2.65	2.45	2.55	0.14	2.65	2.49	2.57	0.11
	15	2.88	2.77	2.83	0.08	2.90	2.87	2.89	0.02	2.90	2.87	2.89	0.02
Rice	1-11	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
	12	2.89	2.76	2.83	0.09	2.98	2.78	2.88	0.14	2.98	2.80	2.89	0.13
	13	2.65	2.59	2.62	0.04	2.72	2.65	2.69	0.05	2.72	2.62	2.67	0.07
	14	2.45	2.65	2.55	0.14	2.60	2.58	2.59	0.01	2.60	2.43	2.52	0.12
	15	2.68	2.62	2.65	0.04	2.61	2.65	2.63	0.03	2.70	2.68	2.69	0.01
Topping	1	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
	2	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
	3	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
	4	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
	5	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-

Table A.3 TPC enumeration in production lines using various techniques (pour plate, spread plate and MIC techniques)

Sample	Total Plate Count (log CFU/ ml)											
	Pour plate				Spread plate				MIC			
	Rep1	Rep2	Ave	SD	Rep1	Rep2	Ave	SD	Rep1	Rep2	Ave	SD
Plastic curtain	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
Worker glove	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
Worker hands	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-
Tray before freezing	TNTC	TNTC	TNTC	-	4.25	4.39	4.32	0.10	4.31	4.33	4.32	0.01
Stainless steel tray	2.44	2.64	2.54	0.14	2.85	3.05	2.95	0.14	3.35	2.87	3.11	0.34

Effect of temperature on TPC growth

Table A.4 Comparison of the total cell count of *E. coli* at different incubation temperatures using Chromocult® Coliform Agar

Incubation temperature	<i>E. coli</i> count (log cfu/ ml)					
	Rep 1	Rep 2	Rep 3	Rep 4	Ave	SD
30°C	8.39	8.39	8.30	8.30	8.35	0.06
35°C	8.30	8.39	8.30	8.39	8.35	0.06
37°C	8.48	8.40	8.40	8.48	8.44	0.05
40°C	8.48	8.48	8.54	8.48	8.50	0.03
45°C	0.00	0.00	0.00	0.00	0.00	0.00

Kinetics of *E.coli* colony expansion

Table A.5 Growth kinetics of *E.coli* on Chromocult® Coliform Agar and relative coefficient of logistic model at different incubation temperatures ($\mu_{\max}$)

Incubation temperatuers	Growth kinetic parameters					
	Rep1	Rep2	Rep3	Rep4	Ave	SD
30°C	0.162	0.164	0.165	0.162	0.163	0.002
35°C	0.165	0.162	0.163	0.165	0.163	0.002
37°C	0.175	0.174	0.172	0.173	0.174	0.002
40°C	0.200	0.202	0.203	0.198	0.200	0.002
45°C	0.00	0.00	0.00	0.00	0.00	0.00

Table A.6 Growth kinetics of *E.coli* on Chromocult® Coliform Agar and relative coefficient of logistic model at different incubation temperatures ($X_{\max}$)

Incubation temperatuers	Growth kinetic parameters					
	Rep1	Rep2	Rep3	Rep4	Ave	SD
30°C	17313	17205	17318	17108	17236	100
35°C	20016	20800	20001	20206	20256	375
37°C	26304	26958	25914	26121	26324	456
40°C	32439	31845	32966	32515	32441	461
45°C	0.00	0.00	0.00	0.00	0.00	0.00

Kinetics of *E.coli* color development

Table A.7 Comparison of key kinetic parameters in term of color development (delta blue) ($\mu_{\max}$)

Incubation temperatuers	Growth kinetic parameters					
	Rep1	Rep2	Rep3	Rep4	Ave	SD
30°C	0.878	0.895	0.832	0.865	0.868	0.027
35°C	0.991	1.012	1.013	0.993	1.002	0.019
37°C	0.883	0.799	0.821	0.930	0.860	0.059
40°C	1.129	1.125	1.122	1.098	1.119	0.014
45°C	0.00	0.00	0.00	0.00	0.00	0.00

Table A.8 Comparison of key kinetic parameters in term of color development (delta blue) ($X_{\max}$)

Incubation temperatuers	Growth kinetic parameters					
	Rep1	Rep2	Rep3	Rep4	Ave	SD
30°C	9087	9018	9199	9047	9087.750	75.378
35°C	9155	9207	9137	9168	9166.750	29.691
37°C	9916	9877	9938	9931	9915.500	27.258
40°C	10227	10342	10109	10229	10226.750	95.136
45°C	0.00	0.00	0.00	0.00	0.00	0.00

Effect of substrate dilution and nutrient limitation on *E.coli* growth

Table A.9 Colony count on culture plates using different concentrations of CCA comparing to the original concentration

CCA dilution	<i>E. coli</i> count (log CFU/ ml)					
	Rep 1	Rep 2	Rep 3	Rep 4	Ave	SD
10%	9.12	9.13	9.19	9.05	9.11	0.04
20%	9.21	9.28	9.21	9.19	9.22	0.04
30%	9.26	9.35	9.23	9.20	9.26	0.06
40%	9.25	9.28	9.29	9.32	9.29	0.03
50%	9.24	9.29	9.27	9.32	9.28	0.03
60%	9.28	9.30	9.29	9.31	9.30	0.01
70%	9.28	9.29	9.32	9.26	9.29	0.03
80%	9.29	9.32	9.31	9.32	9.31	0.01
90%	9.29	9.28	9.31	9.32	9.30	0.02
Original conc.	9.31	9.30	9.28	9.31	9.30	0.01

Optimization of liquid substrate for yeast/mold

Table A.10 Comparison of alternative media for the enumeration of yeast/mold when perform on pure culture

Treatments	No. of yeast/mold count (log CFU/ml)									
	Yeast					Mold				
	Rep1	Rep2	Rep3	Ave	SD	Rep1	Rep2	Rep3	Ave	SD
Long grain rice flour	5.23	5.35	5.32	5.30	0.06	5.27	5.21	5.08	5.18	0.09
Corn flour	5.15	5.11	5.28	5.18	0.08	5.15	5.36	5.27	5.26	0.10
Cassava flour	5.23	5.21	5.20	5.21	0.01	5.07	4.81	4.97	4.95	0.13
Wheat flour	5.53	5.61	5.40	5.51	0.10	5.15	5.22	5.24	5.20	0.04
Glutinous rice flour	5.05	5.30	5.27	5.20	0.13	5.35	5.02	5.30	5.22	0.17
Long grain rice	5.09	5.20	5.27	5.19	0.09	5.25	5.32	5.22	5.26	0.05
Glutinous rice	5.09	5.25	5.26	5.20	0.09	5.20	5.04	5.00	5.08	0.10
PDB control	5.59	5.45	5.56	5.53	0.07	5.49	5.22	5.32	5.34	0.13

Table A.11 Viable cell counts of yeast and mold comparing pure dextrose to PDB control media using pure cultures

Treatments	No. of yeast/mold count (log CFU/ml)									
	Yeast					Mold				
	Rep1	Rep2	Rep3	Ave	SD	Rep1	Rep2	Rep3	Ave	SD
Water + dextrose	5.80	5.99	5.48	5.76	0.26	5.67	5.47	5.52	5.55	0.10
PDB control	5.55	5.12	5.38	5.30	0.22	5.20	5.30	5.47	5.32	0.13

Table A.12 Final colony enumeration of yeast and mold culturing by nitrogen-supplement PDB and control PDB

Treatments	No. of yeast/mold count (log CFU/ml)									
	Yeast					Mold				
	Rep1	Rep2	Rep3	Ave	SD	Rep1	Rep2	Rep3	Ave	SD
PDB + chicken soup	5.41	5.21	5.33	5.31	0.10	5.31	5.20	5.46	5.32	5.13
PDB + Mushroom soup	5.45	5.64	5.39	5.49	0.13	5.25	5.32	5.35	5.30	5.05
PDB + yeast extract	5.49	5.41	5.58	5.49	0.08	5.41	5.62	5.49	5.50	5.10
PDB control	5.31	5.25	5.46	5.34	0.10	5.45	5.64	5.39	5.49	5.13

Implementation of yeast and mold enumeration on industrial plasticine and dough clay samples

Table A.13 Comparison of test kit and MIC for the enumeration of yeast and mold when perform on plasticine sample

Sample No.	No. of yeast/mold count (CFU/ml)				
	Plasticine				
	Rep1	Rep2	Rep3	Ave	SD
1-5	ND	ND	ND	ND	-
6	3.91	3.95	3.89	3.91	0.03
7	3.75	3.66	3.68	3.69	0.04
8	3.47	3.53	3.45	3.48	0.04
9	3.79	3.74	3.81	3.78	0.03
10	4.93	4.99	4.87	4.93	0.06

Table A.14 Comparison of test kit and MIC for the enumeration of yeast and mold when perform on dough clay sample

Sample No.	No. of yeast/mold count (CFU/ml)				
	Dough clay				
	Rep1	Rep2	Rep3	Ave	SD
1-5	ND	ND	ND	ND	-
6	5.05	5.31	5.01	5.12	0.16
7	4.33	4.11	4.20	4.21	0.11
8	2.71	2.43	2.41	2.51	0.16
9	3.34	3.22	3.12	3.22	0.11
10	2.40	2.15	2.37	2.30	0.13