

Rapid Detection of Coliform & *E. coli* in a Variety of Desserts with MicroSnap test kits and the EnSURE Monitoring System

Aim

Demonstrate the effectiveness of MicroSnap rapid Coliform and *E. coli* assays using a variety of desserts and ice cream, listed in Table 1.

Table 1: Assayed Desserts

Desserts	Assayed with
Trifle	Coliform/ <i>E. coli</i>
Lemon cheesecake	Coliform/ <i>E. coli</i>
Chocolate mousse	Coliform/ <i>E. coli</i>
Vanilla ice cream	Coliform/ <i>E. coli</i>
Chocolate ice cream	Coliform/ <i>E. coli</i>
Strawberry ice cream	Coliform/ <i>E. coli</i>

Sample Preparation

- 50g of each dessert was added to 450mL of MRD (Maximum Recovery Diluent) and homogenized in a stomacher.
- Sample was then split into 10 50mL 10% homogenates; *E. coli* was then diluted from an overnight culture into each 50mL portion. Because *E. coli* is a member of the Coliform group, specific dilutions of Coliform bacteria were not used. Dilutions of *E. coli* were as following:

Table 2: Dilutions of *E. coli* in 10% homogenates

Dilution	Estimated <i>E. coli</i> count/mL (CFU)	Actual Counts	Data Shown
-1	80,000,000	Too numerous to count (TNTC)	
-2	8,000,000	TNTC	
-3	800,000	TNTC	
-4	80,000	TNTC	YES
-5	8,000	TNTC	
-6	800	901	YES
-7	80	88	
-8	8	12	YES
-9	0.8	1	
-10	0 (Uninoculated)	0	YES

- Each dilution was then pipetted into 5 enrichment devices for each MicroSnap Coliform and MicroSnap *E. coli*. The enrichment devices were then incubated at 37°C for 6 hours (for enumerated results) and 8 hours (for presence/absence results). Results were measured with the EnSURE luminometer and presented in relative light units (RLU). The conversion of EnSURE RLU to CFU can be found in Table 3 below.
- The recoveries of Coliforms and *E. coli* from the samples are presented in Tables 4-7. Note that some food products will have naturally high backgrounds, though that is not the case with the products sampled in this study.

Table 3: EnSURE RLU to CFU Conversion

EnSURE RLU	CFU/ml
<2	<10
3-4	11-20
5-7	21-50
8-12	51-100
13-20	101-200
21-35	201-500
36-60	501-1,000
61-180	1,001-5,000
181-300	5,001-10,000
301+	10,000+

Results

Table 4: Coliform spike and recovery in 6 hours in desserts

6 hours	Trifle	Lemon cheesecake	Choc mousse	Vanilla ice cream	Choc ice cream	Strawberry ice cream
<i>CFU</i>	Coliform (RLU)					
80K	2048	2420	2212	3915	2597	4152
800	14	29	33	16	12	13
8	0	0	1	1	0	1
<i>Blank</i>	0	0	0	0	0	0

Table 5: Coliform spike and recovery in 8 hours in desserts

8 hours	Trifle	Lemon cheesecake	Choc mousse	Vanilla ice cream	Choc ice cream	Strawberry ice cream
<i>CFU</i>	Coliform (RLU)					
80K	9122	8090	5630	6337	5031	3003
800	2779	2967	2518	6489	5053	2239
8	5	20	6	16	13	20
<i>Blank</i>	1	1	1	1	1	1

Table 6: E. coli spike and recovery in 6 hours in desserts

6 hours	Trifle	Lemon cheesecake	Choc mousse	Vanilla ice cream	Choc ice cream	Strawberry ice cream
<i>CFU</i>	<i>E. coli</i> (RLU)					
80K	1247	814	2214	2247	3118	4144
800	45	65	166	354	294	214
8	3	2	1	2	11	1
<i>Blank</i>	1	1	2	1	2	1

Table 7: *E. coli* spike and recovery in 8 hours in desserts

8 hours	Trifle	Lemon cheesecake	Choc mousse	Vanilla ice cream	Choc ice cream	Strawberry ice cream
<i>CFU</i>	<i>E. coli</i> (RLU)					
80K	5056	2388	1521	2694	2371	3678
800	2941	121	133	162	215	151
8	10	20	14	32	12	11
Blank	1	1	0	1	1	0

Summary Conclusions

- MicroSnap Coliform and *E. Coli* tests effectively detect the presence of Coliform and or *E. Coli* in high sugar desserts such as those assayed in this experiment.
- At 6 hours, both the MicroSnap Coliform and *E. coli* tests detect at a level of 100 – 1000 bacteria/mL (CFU) in the 10% homogenates from each dessert.
- At 8 hours, the detection level drops to <10 bacteria/mL (CFU) per spike and recovery for each dessert.
- Beta Glucuronidase and Beta Galactosidase are enzymes characteristic of Coliform bacteria. Enzyme assays were also ran on each dessert to show that the high sugar desserts do not inhibit the enzyme activity, and thus detection capabilities of MicroSnap Coliform and *E. coli*. This data is shown in Appendix 1.



Appendix 1

Table 7: Beta Glucuronidase enzyme spiked into 10% desserts at various levels compared to control (no dessert)

	10% Trifle	10% Lemon cheesecake	10% choc mousse	10% Vanilla ice cream	10% Choc ice cream	10% Strawberry ice cream	Control
	beta GluR (EnSURE RLU)						
100u/ml	9999	9999	9999	9999	9999	9999	9999
10u/ml	5652	8148	7107	8841	9992	9841	9999
1u/ml	497	894	562	1673	1545	1812	557
0.1u/ml	46	103	59	175	158	203	57
0.01u/ml	6	19	7	21	19	22	9
Blank	3	10	2	4	3	4	5

Table 8: Beta Galactosidase enzyme spiked into 10% desserts at various levels compared to control (no dessert)

	10% Trifle	10% Lemon cheesecake	10%choc mousse	10% Vanilla ice cream	10% Choc ice cream	10% Strawberry ice cream	Control
	beta Gal (EnSURE RLU)						
10u/ml	7182	8841	8752	9954	8521	9932	9910
1u/ml	1225	4457	3027	2537	2240	2003	2103
0.1u/ml	126	432	297	40	249	239	233
0.01u/ml	7	52	31	12	33	33	15
0.001u/ml	4	14	7	13	13	13	34