

Challenge Studies- "Potentially Hazardous Foods"

Product	Microorganism	Rep	Inoculation		Endpoint	I	Incubation		Enumeration methods	Pass/fail criteria	Other
			Method	Level			t	other			
Italian Salad Dressing (paper 4)	S. enteritidis S. typhimurium	no no			>10 >10	35 C 35 C	5 min 5 min	covered covered	FDA's BAM	no growth/ pass	
67 Salad Dressings (5A)	Salmonella spp (3 ck)			500cfu/g	not detected				XLD agar, enrich in lactose broth/FDA BA protocol	no Salmonella within 72 h	pass
3 Barbecue Sauces (5B)	Salmonella spp (3 ck)			500cfu/g	not detected				XLD agar, enrich in lactose broth/FDA BA protocol	no Salmonella within 72 h	pass
Pumpkin Pie (13)	S. aureus	3	on and in filling	106, 107, 108, 109/g (1 ml)	103, 103, 106, 106/no toxin*	Room T	6 d (3 samp)	bagged, open air, or box	BHI agar/oxidoid staph test	no toxin production/pass	*> 1ng/g
Pumpkin Pie (14)	S. aureus	3	in pie filling	140/g (0.05 ml) 140cps	<100 cps/g	25 C	3 d (2 samp)		Baird-Parker /coagulase +	no growth /g/pass	
Lemon Meringue Pie (15)	S. aureus (2 cultures)/L. monocytogenes (2 cultures)	3	rows in filling, intersection, and meringue.	3,000/1,500/sample	<10 / sample	Room	5 d (3 samp)		Baird-Parker and Mox agar	no growth/pass	TPC, Salmonella -
Hush Puppy Mix (16A)	B. cereus S. aureus S. senftenberg	2 2 2		~3.5log/g ~4log ~2.3log	~3log ~5log, ~6.5log ~2.5log, ~6log	35 C 35 C	8 h 4 h, 8 h 8 h, 19 h		ICMSF and FDA's BAM	no growth	
Hush Puppy Mix w/Onions(16B)	S. aureus	2		~2.3log	~2.3log, ~3.3log	35 C	4 h, 8 h		ICMSF and FDA's BAM	no growth/pass at 4 h	

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Apple-Cheese Danish (17A)	S. aureus ck, (5)	E. 2	in four places	360/g	320, 395, 10/g	25C	24 h, 4d, 11d	in sterile bags	Baird-Parker	no growth at 14-18h/pass	
	L. monocytogenes, coli ck (2)	2	in four places	435/g	235, 160, 10/g	25C	24 h, 4d, 11d 24 h, 4d, 11d 24 h, 4d, 11d	in sterile bags	Mox		
	S. enteritidis/typhimurium ck(5)	2	four places	1900/g	470, 10, 10/g	25C	4d, 11d	in sterile bags	E. coli petrifilm XLD		
Blueberry-Cheese Danish (17B)	S. aureus ck, (5)	E. 2	in four places	360/g	340, 215, 10/g	25C	24 h, 4d, 11d	in sterile bags	Baird-Parker	no growth at 14-18h/pass	
	L. monocytogenes, coli ck (2)	2	four places	435/g	190, 235, 50/g	25C	24 h, 4d, 11d 24 h, 4d, 11d 24 h, 4d, 11d	in sterile bags	Mox		
	S. enteritidis/typhimurium ck(5)	2	four places	1900/g	300, 35, 10/g	25C	4d, 11d	in sterile bags	E. coli petrifilm XLD		
Cherry-Cheese Danish (17C)	S. aureus ck, (5)	E. 2	in four places	360/g	170, 170, 170/g	25C	24 h, 4d, 11d	in sterile bags	Baird-Parker	no growth at 14-18h/pass	
	L. monocytogenes, coli ck (2)	2	four places	435/g	275, 25, 30/g	25C	24 h, 4d, 11d 24 h, 4d, 11d 24 h, 4d, 11d	in sterile bags	Mox		
	S. enteritidis/typhimurium ck(5)	2	four places	1900/g	155, 30, 10/g	25C	4d, 11d	in sterile bags	E. coli petrifilm XLD		
Eclaires (18)	Salmonella spp ck (4)		in filling	90/g	<100, <100, <100	26,12,7C	4 d	in sterile bags	XLD	no growth or toxin at 4.5 days/fail	
	S. aureus ck (5) L. monocytogenes ck		in filling	2.3 x 102/g 4.8 x 102/g	<5log, 2log, <100 <4log, 4log, 4log	26,12, 7C 26,12, 7C	4 d 4 d	in sterile bags in sterile bags	Baird-Parker Mox		
RTE Chocolate Pie and Donut Filling (19)	S. aureus ck (5)			8 x 2log	not detected	10, 32 C	21 d	in sterile bags	Baird-Parker	no growth or toxin at 1.5 x shelf-life/pass at 2 weeks	
	L. monocytogenes (2) B. cereus (2)			1.5 x 3log 3 x 2log	~200 not detected	10, 32 C 32 C	21 d 21 d	in sterile bags in sterile bags	Mox MYP		
	S. enteritidis/typhimurium (6) sporogenes (2)	C.		~2.5 x 2log 2log	not detected not detected	10, 32 C 32 C	21 d 21 d	in sterile bags/ana	XLD SFP		
Fettuccine Alfredo with Chicken (31)	C botulinum ck			4log cfu/ml	no toxin	12, 21 C	60 d, 5 d			no toxin for 5 d at 21C or 60 d at 12 C pass	
Chopped Lettuce (35)	S. enteritidis, cholerae, and typhimurium, L. monocytogenes ck (3)	2		~3log ~3log	~5log ~4log	24 C C	24 h 24 h	sterile containers	XLD MOX	?	
	S. enteritidis, cholerae, and typhimurium, L. monocytogenes ck (3)	2		~3log ~3log	~2log ~4log	24 C C	24 h 24 h	sterile containers	XLD MOX	?	
Tomatoes (37)	Salmonella spp			50	~1log, ~7log	30 C	4h, 24 h			?	Distr. At 5 C
Poultry/Bacon/Cheese-Filled Bread (38)	C. botulinum prot. A + B		added to ground product/anaerob	100-500 spores/g	toxin at aw .98 at 26 C/14d no toxin at aw .89-94	26/18/13 C	14 d/1 wk/8 wk		mouse bioassay	no toxin for 14d at 26 C, 1 wk at 18 C, and 14 wk at 13/	pass or fail aw dependant
	C. botulinum non-prot. A										
Chicken/ Cheese Filled Bread (39)	C. botulinum prot. A + B botulinum non-prot. A	C.	added to ground product/anaero	100-500 spores/g	toxin at aw .98 at 26 C/14d no toxin at aw .89-94	26/18/13 C	14 d/1 wk/8 wk		mouse bioassay	no toxin for 14d at 26 C, 1 wk at 18 C, and 14 wk at 13/	pass or fail aw dependant

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Cheese-Filled Bread (40)	C. botulinum prot. A + B botulinum non-prot. A	C.	added to ground product/anaero	100-500 spores/g	no toxin at aw .89-.98	26/18/13 C	14 d/1 wk/8 wk		mouse bioassay	no toxin for 14d at 26 C, 1 wk at 18 C, and 14 wk at 13/	
Ham-Cheese Filled Bread (41)	C. botulinum prot. A + B botulinum non-prot. A	C.	added to ground product/anaero	100-500 spores/g	toxin at aw .98 at 26 C/14d, no toxin at aw .89-94	26/18/13 C	14 d/1 wk/8 wk		mouse bioassay	no toxin for 14d at 26 C, 1 wk at 18 C, and 14 wk at 13/	pass or fail aw dependant
Precooked Ground Beef/Cheese/Ham- Filled Bread (42)	C. botulinum prot. A + B botulinum non-prot. A	C.	added to ground product/anaero	100-500 spores/g	toxin at aw .98 at 26 C/14d, no toxin at aw .89-94	26/18/13 C	14 d/1 wk/8 wk		mouse bioassay	no toxin for 14d at 26 C, 1 wk at 18 C, and 14 wk at 13/	pass or fail aw dependant
Cheese-Filled Bread (43)	C. botulinum prot. A + B botulinum non-prot. A	C.	added to ground product/anaero	100-500 spores/g	toxin at aw .97 at 26 C/14d, no toxin at aw .89-94	26/18/13 C	14 d/1 wk/8 wk		mouse bioassay	no toxin for 14d at 26 C, 1 wk at 18 C, and 14 wk at 13/	pass or fail aw dependant
Process Cheese Slices (Monterey 44A)	L. monocytogenes Salmonella coli O157:H7	S.aureus E.	surface inoculated	1000cfu/g	3.3log 1log 2.7log 7log	30 C	(24, 48, 72.) 96h		selective media	no growth	failed (pass at 24 only)
Process Cheese Slices (Swiss - 44B)	L. monocytogenes Salmonella coli O157:H7	S.aureus E.	surface inoculated	1000cfu/g	2.8log 3.2log 1log 2.5log	30 C	(24, 48, 72.) 96h		selective media	no growth	pass
Process Cheese Slices (American 44C)	L. monocytogenes Salmonella coli O157:H7	S.aureus E.	surface inoculated	1000cfu/g		30 C	(24, 48, 72.) 96h		selective media	no growth	no data
Cottage Cheese Hot Pack (45)	C. botulinum prot. A + B botulinum non-prot. A	C.	added to ground product/anaero	100-500 spores/g		26 C	108 h		mouse bioassay	no toxin	pass
	S. aureus			4log	5log (no toxin) 5log (no toxin) 5log (no toxin) 2log (no toxin)	140F to 45F 140F to 45F and 98F 140F to 45F 45F	30h 30h 8h 4h 60d		Baird-Parker agar or SET-EIA kit for toxin	no toxin	pass

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<u>Product</u>	<u>Microorganism</u>	<u>Rep</u>	<u>Inoculation</u>		<u>Level</u>	<u>Endpoint</u>	<u>T</u>	<u>Incubation</u>	<u>Other</u>	<u>Enumeration Methods</u>	<u>Pass/Fail Criteria</u>	<u>Other</u>
18 Process Cheese Slices (Cream - 47)	C. botulinum (mixed strains)		added to heated cheese /agitation into tubes		1000 spores/g		86F	4 wk, 8wk		mouse bioassay	no toxin	depending on formulation (salt?)
14 Process Cheese Sauce (50)	C. botulinum (mixed strains)		added to heated cheese /agitation into tubes		1000 spores/g		45, 55, 65, 86F	4 wk, 8wk		mouse bioassay	fail	
Process Cheese Sauce (with Spices) (51)	C. botulinum (mixed strains)				20 or 70 spores/g		86F	13 mo (13 sampling times)		mouse bioassay	no toxin	pass
Process Cheese Spread (52)	C. botulinum (mixed strains)		added uniformly to cheese		1000 spores/g		86F			mouse bioassay	no toxin	1 out of 5 fail at 6 mo
Process Cheese Spread (53)	C. botulinum (mixed strains)		added uniformly to cheese		1000 spores/g		45, 55, 65, and 86F	25 wk		mouse bioassay	no toxin	1 out of 4 fail at 65F/12 wk
Cheese Blend (Pizza) (54)	S. aureus (3) cereus (3) B.		added & mixed		630/g 850/g	3,700/g No toxin 10/g No toxin	80F	10 hr		FDA's BAM	no hazardous level / no toxin	also used pathogen model 4.0