Table 1. Thermal inactivation of bacteria, viruses and protozoa

Organism	Temperature (°C)	Inactivation time(s)	Log_{10} reduction	Reference
BACTERIA				
Campylobacter spp.	60	300	3.9 log	D'Aoust et al. (1988)
	63	300	> 5 log	D'Aoust et al. (1988)
	60	8.2	Per log	Sörqvist (2003)
	62	15	3.5–5 log	Juffs & Deeth (2007)
Coxiella burnetii	79.4	25	No survivors	Juffs & Deeth (2007)
Escherichia coli	60	1 800	6 log	Moce-Llivina et al. (2003)
	65	< 2	Per log	Spinks et al. (2006)
	72	0.4	Per log	Sörqvist et al. (2003)
Escherichia coli O157	60	300	1.5 log	D'Aoust et al. (1988)
	64.5	300	> 5 log	D'Aoust et al. (1988)
	65	3	Per log	Spinks et al. (2006)
	62	15	< 1–5 log	Juffs & Deeth (2007)
Enterococcus faecalis	65	7–19	Per log	Spinks et al. (2006)
Klebsiella pneumoniae	72	23	Per log	Sörqvist (2003)
	65	< 2	Per log	Spinks et al. (2006)
Legionella pneumophila	58	360	Per log	Dennis, Green & Jones (1984)
Legionella spp.	80	18–42	Per log	Stout, Best & Yu (1986)
Mycobacterium paratuberculosis	72	15	> 4 log	Juffs & Deeth (2007)
Pseudomonas aeruginosa	65	5	Per log	Spinks et al. (2006)
Salmonella typhimurium	65	< 2	Per log	Spinks et al. (2006)
Salmonella choleraesuis[a]	60	300	Per log[b]	Moce-Llivina et al. (2003)
Salmonella spp. except *Salmonella seftenberg*	72	0.1	Per log	Sörqvist (2003)
Salmonella seftenberg	60	340	Per log	Sörqvist (2003)
Serratia marcescens	65	< 2	Per log	Spinks et al. (2006)
Shigella sonnei	65	3	Per log	Spinks et al. (2006)
Vibrio cholerae	55	22.5	Per log	Johnston & Brown (2002)
	70	120	> 7 log	Johnston & Brown (2002)
Yersinia enterocolitica	64.5	300	> 5 log	D'Aoust et al. (1988)
	72	0.5	Per log	Sörqvist (2003)
VIRUSES				
Adenovirus 5	70	1 260	> 8 log	Maheshwari et al. (2004)
Coxsackievirus B4	60	1 800	5.1 log	Moce-Llivina et al. (2003)
Coxsackievirus B5	60	1 800	4.8 log	Moce-Llivina et al. (2003)
Echovirus 6	60	1 800	4.3 log	Moce-Llivina et al. (2003)
Enteroviruses	60	1 800	4.3 log	Moce-Llivina et al. (2003)
Hepatitis A	65	120	2 log	Parry & Mortimer (1984)
	65	1 320	3 log	Bidawid et al. (2000)
	75	30	5 log	Parry & Mortimer (1984)
	80	5	5 log	Parry & Mortimer (1984)
	85	< 30	5 log	Bidawid et al. (2000)
	85	< 1	5 log	Parry & Mortimer (1984)
Poliovirus 1	60	1 800	5.4 log	Moce-Llivina et al. (2003)
	62	1 800	> 5 log	Strazynski, Kramer & Becker (2002)
	72	30	> 5 log	Strazynski, Kramer & Becker (2002)
	95	15	> 5 log	Strazynski, Kramer & Becker (2002)
PROTOZOA				
Cryptosporidium parvum	60	300	3.4 log	Fayer (1994)
	72	60	3.7 log	Fayer (1994)
	72	5–15	> 3 log	Harp et al. (1996)
Giardia	56	600	> 2 log[c]	Sauch et al. (1991)
	70	600	> 2 log[d]	Ongerth et al. (1989)

[a] Now known as *Salmonella enterica.*
[b] The log reductions were calculated from the results presented in Moce-Llivina et al. (2003).
[c] The log reductions were calculated from the results presented in Sauch et al. (1991).
[d] The log reductions were calculated from the results presented in Ongerth et al. (1989).

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