

Kinetics of heat destruction of *Listeria monocytogenes* in porkmeat and soyflour based sausages

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Introduction

Listeria monocytogenes is the causative organism of listeriosis. Studies have indicated that, this microbe has a higher resistance to thermal inactivation than most other vegetative food pathogen microorganisms (Brown, 1991). Preliminary investigations indicated that soy flour can be incorporated at up to 25% level in pork meat sausages based on sensory attributes. The design of process schedules for these products which would assure safety from the microbe during conventional cooking is necessary. The parameters needed for such designs include the decimal reduction times (D-values) and the characteristic temperature changes (z-values) for a one-log cycle change in D-values of *L. monocytogenes* in the sausage.

Materials and Methods

Thermal resistance of three strains of *L. monocytogenes* (all hemolysin positive at different levels) inoculated at 10^7 CFU/g in whole pork meat sausages (WPS) and 75% pork meat 25% soy flour sausages (PSS) were studied at 50 to 65°C (5-30mins). Survivors were evaluated by plating serial dilutions onto trypticase soy agar (TSA) and counting after 48hrs at 37°C.

Results and Discussion

The regression parameters for destruction of *Listeria monocytogenes* by heat (50-60°C) in pork and soy flour based sausages are shown in Table I. Thermal resistance of *L. monocytogenes* was higher in the PSS than in the WPS-The D-values (50 to 65°C) ranged from 40.35 to 0.54mins in WPS and 46.84 to 0.93mins in PSS. The z-values were 7.70°C and 8.45°C in WPS and PSS respectively.

Reference

Brown, W.C. (1991). Designing *Listeria monocytogenes* thermal inaction studies for extended-shelf-life refrigerated foods. *Journal of Food Protection*, 45 (4) 152 – 153.

Table 1. Regression parameters for destruction of *Listeria innocua* in pork and soy flour based sausages by heat (50-60°C) in pork and soy flour based sausages.

Product	Regression parameter	Heating Temperature			
		50	55	60	65
WPS	n	7	7	7	5
	r ²	0.988	0.996	0.985	0.992
	Std. error	0.34	0.22	0.52	0.43
	95% Confidence Interval	0.66	0.42	1.01	0.83
	Intercept	18.4219	18.4207	18.4210	18.4175
	Gradient	-0.0571	-0.1693	-1.2794	-4.2602
	D-value(min)	40.35	13.60	1/80	0.54
PSFS	n	7	7	7	5
	r ²	0.998	0.991	0.996	0.998
	Std. error	0.27	0.39	0.41	0.40
	95% Confidence Interval	0.53	0.77	0.81	0.79
	Intercept	18.4203	18.4215	18.4208	18.4210
	Gradient	-0.0492	-0.1404	-0.9139	-2.4764
	D-value(min)	46.84	16.40	2.52	0.93

WPS=whole pork sausages, PSFS=75% pork + 25% soy flour sausages, n = number of points, r²=coefficient of regression.