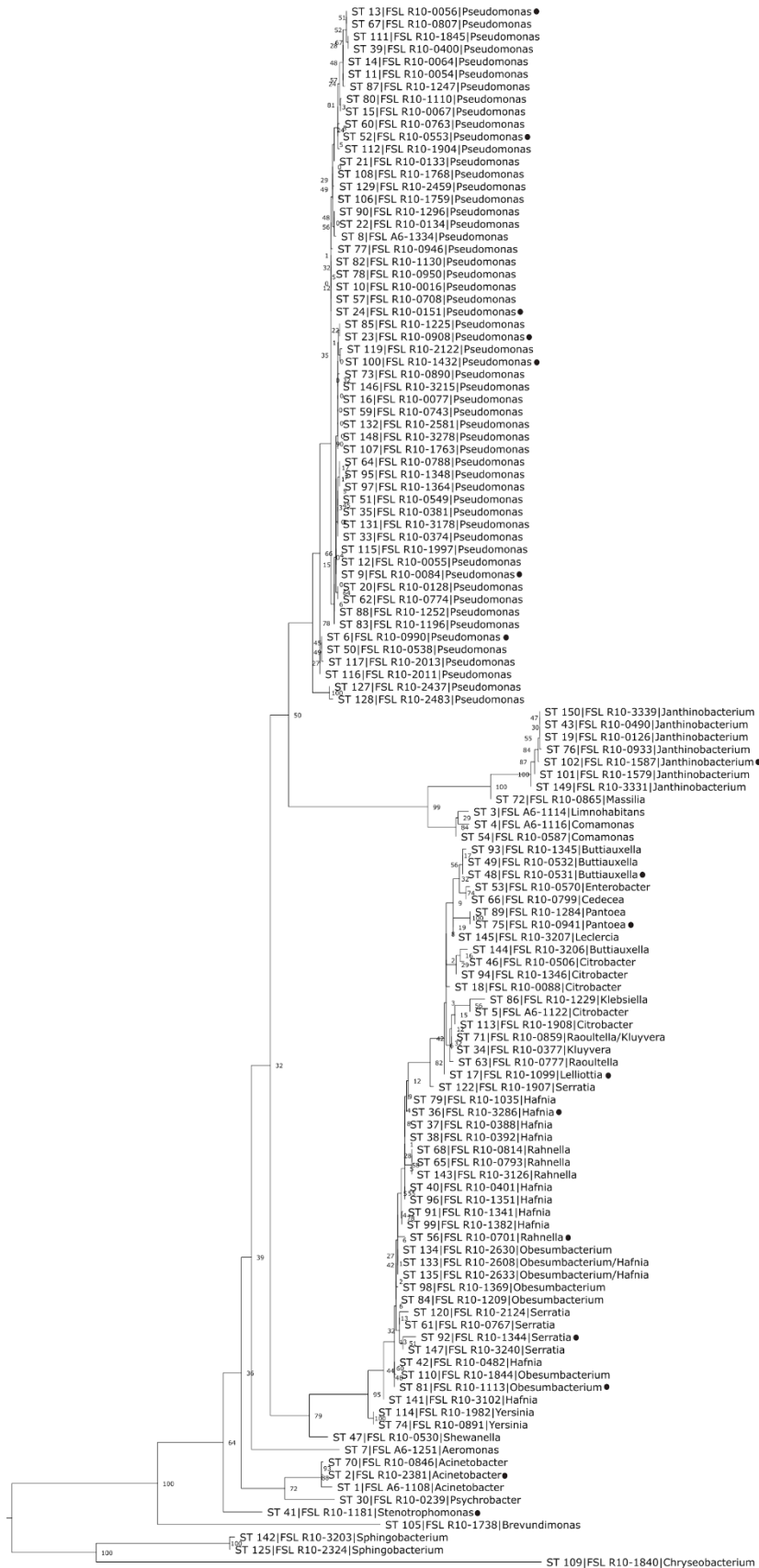
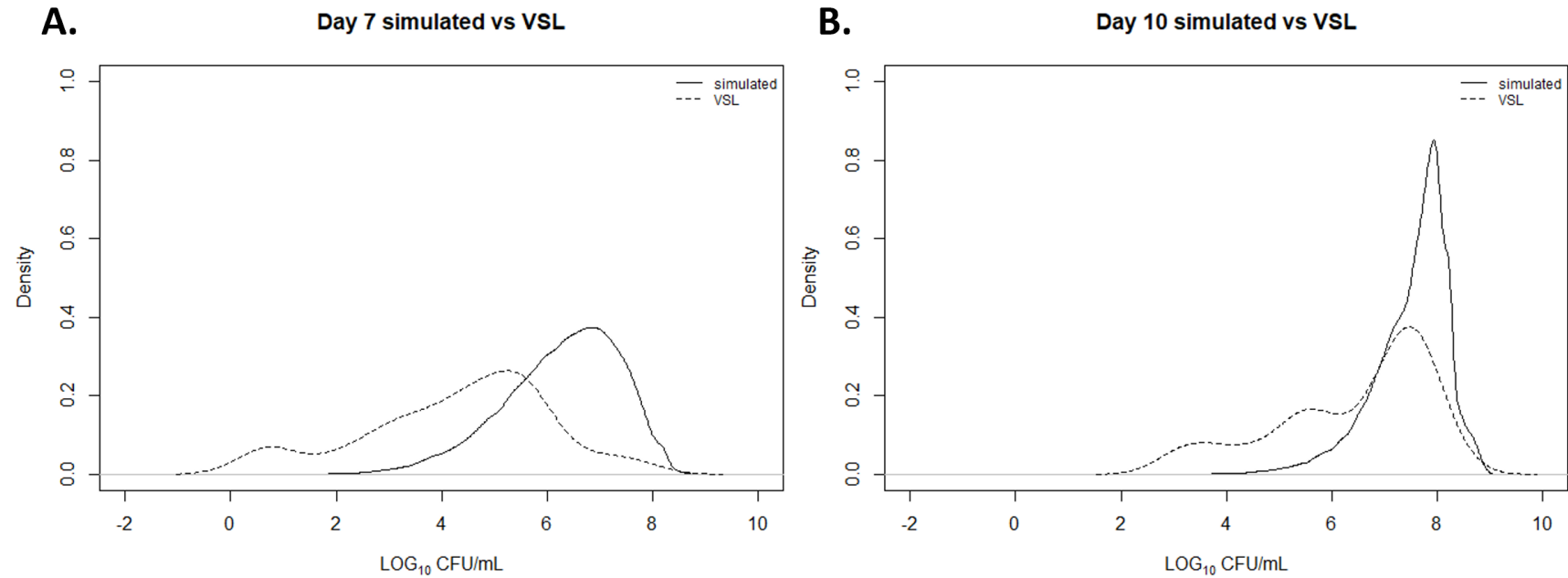


Supplemental Figure S1. Maximum likelihood phylogenetic tree of representative 16S rDNA sequence types (ST) isolated from 10 HTST pasteurized fluid milk processing facilities from Reichler et al. (2018) study used to select isolates for growth. The black circle next to select ST indicates the isolates used to collect growth data in skim milk broth. The number following FSL is an isolate identification number and the data for these isolates are available in the Food Microbe Tracker database (<http://www.foodmicrobetracker.com>).



Supplementary Figure S2. Initial validation of simulated concentration of PPC organisms (\log_{10} CFU/mL) in fluid milk per half-gallon at (A) 7 d and (B) 10 d of storage at 6°C (solid line) and actual concentrations of PPC organisms in fluid milk per half-gallon at 7 d and 14 d of storage at 6°C, based on commercial fluid milk samples tested as part of the Voluntary Shelf life Program (VSL; dashed line). In (B) there is a peak around 8 \log_{10} CFU/mL for the simulated concentration of PPC organisms which can be explained by the ST reaching its N_{max} concentration. This initial validation was conducted using the model before applying the adjustment factor of 0.684 for maximum growth rate.



Supplemental Table S1. Sensitivity analysis of initial microbial concentration, lag, μ_{\max_adj} , frequency, and storage temperature. Baseline is the model where no changes have been made to the individual parameters and serves as the benchmark to compare in the sensitivity analysis. Percent change of 0 represents the baseline model in which the other parameters were compared to. Positive percent change represents a change to the parameter that will decrease shelf life or increase spoilage due to PPC. Negative percent change represents a change to the parameter that will increase shelf life or reduce spoilage due to PPC.

Parameter	Percent Change	Percentage >20,000 CFU/mL at day 7	Percentage >20,000 CFU/mL at day 10
Baseline	0	34.32%	56.18%
Adjusted maximum growth rate	-60	4.97%	12.64%
Adjusted maximum growth rate	-40	13.44%	23.08%
Adjusted maximum growth rate	-20	23.73%	43.46%
Adjusted maximum growth rate	20	44.09%	65.96%
Adjusted maximum growth rate	40	52.65%	73.04%
Adjusted maximum growth rate	60	59.88%	78.14%
Frequency	-60	45.78%	68.39%
Frequency	-40	41.03%	63.78%
Frequency	-20	37.81%	60.59%
Frequency	20	31.34%	53.32%
Frequency	40	26.19%	47.64%
Frequency	60	24.45%	45.35%
Initial microbial concentration	-60	26.00%	48.45%
Initial microbial concentration	-40	28.47%	51.08%
Initial microbial concentration	-20	31.34%	53.65%
Initial microbial concentration	20	37.37%	58.67%
Initial microbial concentration	40	40.36%	61.12%
Initial microbial concentration	60	43.21%	63.38%
Lag	-60	31.25%	52.80%
Lag	-40	32.21%	53.89%
Lag	-20	33.23%	55.02%
Lag	20	35.44%	57.36%
Lag	40	36.59%	58.53%
Lag	60	37.81%	59.73%
Storage temperature	-60	14.27%	26.39%
Storage temperature	-40	19.26%	34.83%
Storage temperature	-20	25.91%	45.08%
Storage temperature	20	44.25%	66.89%
Storage temperature	40	55.17%	75.99%
Storage temperature	60	65.58%	83.04%

¹The results from the lag parameter were inverted to go in the same direction as the other parameters (e.g., for Figure 3a., the -60 percent change should not be interpreted as a 60 percent decrease in lag. The negative percent change represents a change in the parameter that will increase shelf life and thus should be interpreted as a 60 percent increase in shelf life (i.e., 60 percent increase in lag).