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Comparison of Culture Preparation and Inoculum Levels of *Listeria monocytogenes* in Challenge Studies Applied to Cooked Ready-to-eat Meat Products

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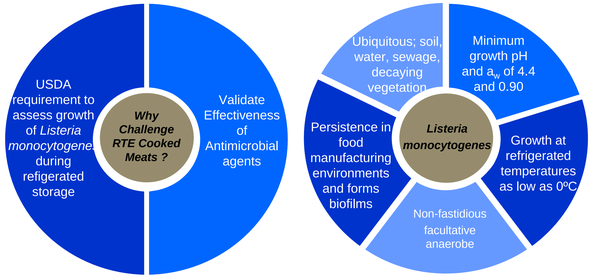
INTRODUCTION

According to the USDA, *"a ready-to-eat (RTE) product is defined as a meat or poultry product that is in a form that is edible without additional preparation to achieve food safety and that may receive additional preparation for palatability or aesthetic, epicurean, gastronomic, or culinary purposes."*

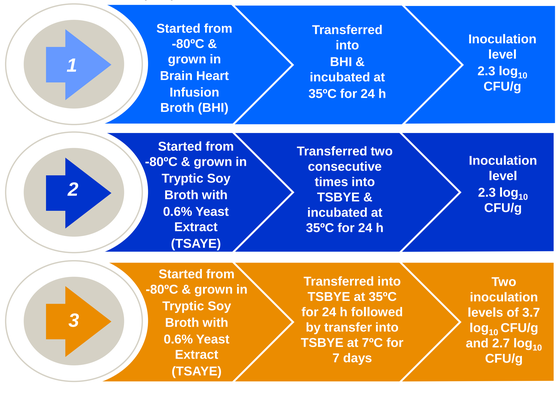


PURPOSE

To compare the effect of culture preparation and inocula levels when challenging up to nine RTE meats with *L. monocytogenes* to assess growth at 4ºC for 18 weeks.

METHODS

Three culture preparations were evaluated.



METHODS

Products were inoculated with composite cultures of five strains shown in Table 1. Inoculums were prepared with cell suspensions with equal number of cells of each strain.

Table 1. Strains Used for Inoculation

Listeria monocytogenes	Kraft Heinz ID	Source and Type
Listeria monocytogenes	101	Food Research Institute[1]
Listeria monocytogenes	108	Food Research Institute
Listeria monocytogenes	V7	Food Research Institute
Listeria monocytogenes	310	Food Research Institute
Listeria monocytogenes	109	Food Research Institute

[1]*University of Wisconsin-Madison*

Figure 1. Preparation of Test Samples and Storage

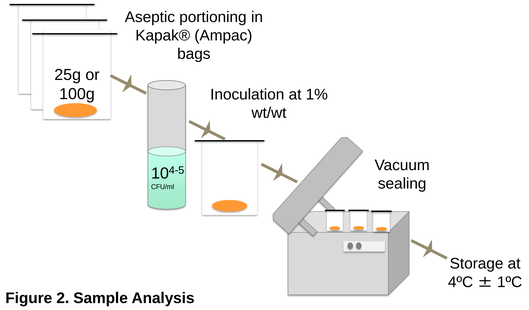
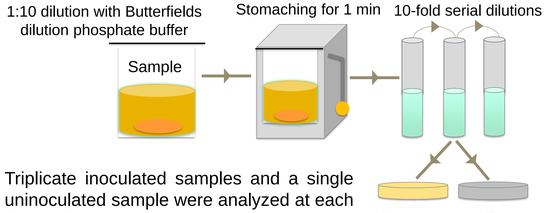


Figure 2. Sample Analysis



Triplicate inoculated samples and a single uninoculated sample were analyzed at each time point.
Acceptance criterion for inoculated samples was less than 1 $\log_{10}$ CFU/g increase of *L. monocytogenes* over inoculum levels during storage.

METHODS

Nine products presented in Table 2 below were inoculated with composite cultures that were grown using culture preparations 1 and 2. Six products presented in Table 3 were inoculated with composite cultures that were grown using culture preparation 3.

Table 2. Products inoculated with *L. monocytogenes* grown using culture preparations 1 &2

Product Descriptions	
Ham 0.76% Buffered vinegar[2]	Turkey 1.05% Buffered vinegar
Ham 1.05% Buffered vinegar	Turkey 1.18% Buffered vinegar
Ham 1.18% Buffered vinegar	Turkey 0% Buffered vinegar
Turkey 0.76% Buffered vinegar-25g	Turkey 5.5% [1]Cultured vinegar
Turkey 0.76% Buffered vinegar-100g	

[2]*Proprietary ingredient*

Table 3. Products inoculated with *L. monocytogenes* grown using culture preparations 3

Sample	Ingredient A[3]	Ingredient B (only 1 level)
S1	Level 1	Added
S2	Level 2	Added
S3	Level 3	Not Added
S4	Level 3	Added
S5	Level 4	Not Added
S6	Level 4	Added

[3]*Level 1 is the lowest and level 4 is the highest.*

RESULTS

Greater than a 1 $\log_{10}$ CFU/g increase of *L. monocytogenes* was observed in 9 meat samples (Figure 1) using the second culture preparation compared to 2 meat samples using the first culture preparation (Figure 2).

Figure 1. *L. monocytogenes* grown using culture preparation 2 in RTE meats stored at 4ºC

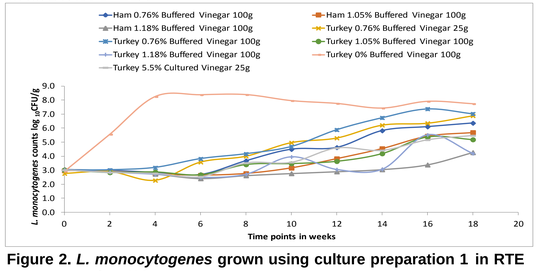
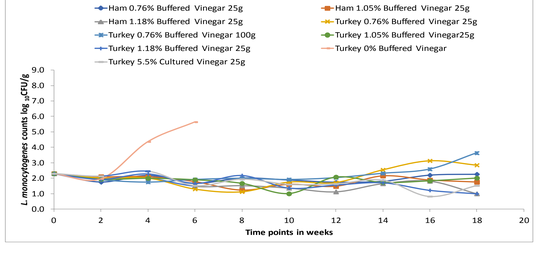


Figure 2. *L. monocytogenes* grown using culture preparation 1 in RTE meats stored at 4ºC



RESULTS

With the third inoculum preparation, greater than 1 log CFU/g of *L. monocytogenes* counts was observed in 6 products with the higher inoculum level (Figure 3) as compared to 5 products with the lower inoculum level (Figure 4).

Figure 3. Growth of *L. monocytogenes* in RTE meats inoculated at 3.7 $\log_{10}$CFU/g

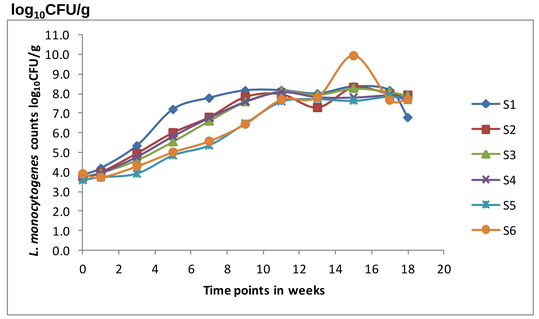
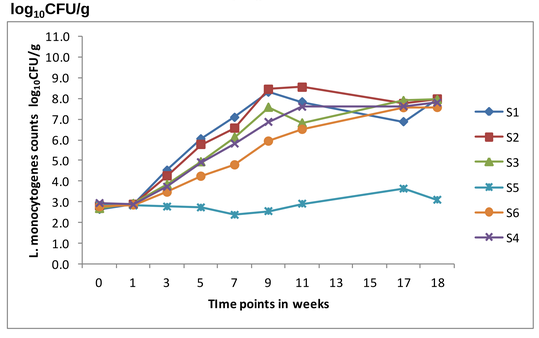


Figure 4. Growth of *L. monocytogenes* in RTE meats inoculated at 2.7 $\log_{10}$CFU/g



CONCLUSION

Culture preparation or inocula levels can impact the growth of *Listeria monocytogenes* in RTE meats during refrigerated storage.

ACKNOWLEDGMENT

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