Growth monitoring of *Listeria monocytogenes* and *Salmonella* spp. according to the packaging technique in pork minced meat

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Introduction

Listeria monocytogenes is a pathogen found within the food-processing industries, mainly brought by human, and was responsible of 1,381 confirmed cases of foodborne listeriosis for 2008 in Europe. *Salmonella* was in 2008, the second most often reported zoonotic disease in humans, and 131,468 confirmed cases of human salmonellosis were reported in Europe. Some of these cases are related to meat products consumption, as pork meat. Products can be contaminated at the slaughterhouse or during the manufacturing/packaging process. Furthermore, the number of these microorganisms can increase in function of the storage conditions.

Objectives

The aim of the present work was to analyse the effect of packaging (modified atmosphere or not modified air) and of the initial meat flora (irradiated meat or non irradiated) on the growth of *L. monocytogenes* and *Salmonella* spp. in pork meat.

Materials and methods

Food matrix (artificially contaminated) pork minced meat

Irradiated (**IR**) — non irradiated (**NI**)

Packaging

expanded polystyrene tray + stretch film (**EPS**)

modified atmosphere PP/EVOH/PP tray + OPA/EVOH/PE film (**MAP**: 70% O_2/30% CO_2)

Bacteria

ISO 11290-2:1998
ISO 6579

L. monocytogenes

Strains mix
L. monocytogenes^T NTCT 11994
L. monocytogenes DETRY 952
L. monocytogenes QP 08/03123/02

Level of contamination
100 cfu.g^{-1}

Incubation
5, 8 and 10° C
10 to 14 days

***Salmonella* spp.**

Strains mix
Salmonella Typhimurium^T ATCC 14028
Salmonella Typhimurium DETRY 942
Salmonella brandenburg QP 08/03093/03

Level of contamination
100 cfu.g^{-1}

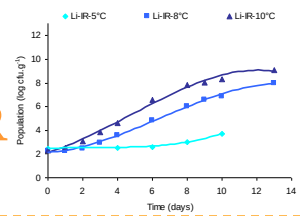
Incubation
8, 10 and 12° C
10 to 14 days

Results

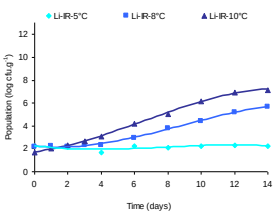
Total Flora (TF) — *Pathogen* (*Li.* or *Sa.*)

L. monocytogenes

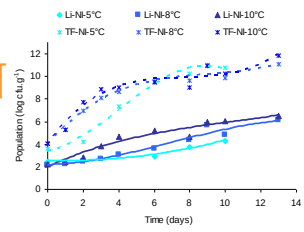
EPS - Irradiated



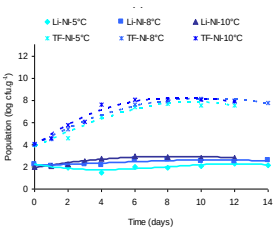
MAP - Irradiated



EPS – Non irradiated

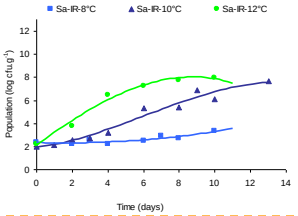


MAP - Non irradiated

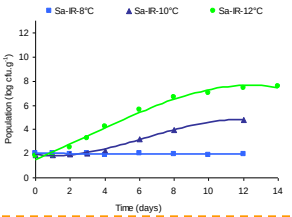


Salmonella spp.

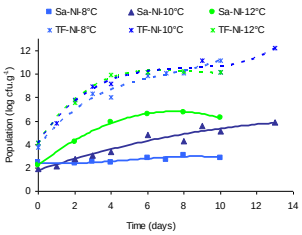
EPS - Irradiated



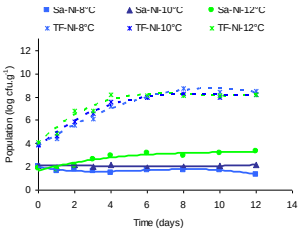
MAP - Irradiated



EPS – Non irradiated



MAP - Non irradiated



Irradiated meat: higher final population / higher μ_{opt} / shorter lag time
MAP packaging: lower final population / lower μ_{opt} / longer lag time

Conclusions

Results indicated that growth observations were similar for both pathogens depending on incubation temperature. All growth indicators for both pathogens were higher on the irradiated meat, meaning the initial flora inhibited their growth, by producing inhibitors and/or by competition for substrates. As expected, MAP packaging was more restrictive for growth of pathogens and for the initial flora

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