Pediocin for Control of Listeria monocytogenes on Frankfurters

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Pediocin for Control of *Listeria monocytogenes* on Frankfurters

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Summary and Implications

Application of pediocin, as ALTA™ 2341, on the
surface of frankfurters before packaging reduced the
population of contaminating *Listeria monocytogenes* and
delayed growth of the remaining cells. Therefore,
pediocin provides an effective intervention treatment for
control of *L. monocytogenes* on frankfurters and
contributes to improved safety of these products for
consumers.

Introduction

Numerous illnesses and several deaths have occurred
from *L. monocytogenes* contamination of ready-to-eat
(RTE) processed meats such as frankfurters. *L.
monocytogenes* is a hardy organism that is difficult to
eradicate from the environment and most often
contaminates processed meats after cooking and before
packaging. Pediocin, a compound produced by lactic acid
bacteria, is a significant microbial inhibitor and may offer
enhanced protection from *L. monocytogene* in RTE meat
products.

Materials and Methods

Frankfurters were manufactured, cooked, smoked
and chilled in preparation for inoculation and packaging.
For packaging, frankfurters were placed in high-barrier
bags, sprayed with a 40% solution of pediocin (ALTA™
2341) to result in 3000 AU or 6000 AU of pediocin, and
then inoculated with a 5-strain mixture of *L.
monocytogenes*. After sealing, packages were then
separated into groups to be stored at 4°C, 10°C and 25°C.

Packages were opened periodically during storage
and surviving *L. monocytogenes* enumerated at each
temperature. Uninoculated frankfurters were also
evaluated for quality changes including purge, color and
sensory quality.

Results and Discussion

Application of the pediocin (ALTA™ 2341)
immediately reduced *L. monocytogenes* populations by
1.5 to 2.0 log CFU/g in a concentration-dependent
manner. Further, the pediocin treatment delayed growth
of survivors for 7 weeks at 4°C, 2 weeks at 10°C and 1
day at 25°C. Figure 1 shows the results for both *L.
monocytogenes* and aerobic bacteria on frankfurters stored
at 10°C. There was no difference in effectiveness
between the two concentrations of the pediocin during
storage at 10°C but a reduction in the initial number of
organisms plus a delay in growth of the survivors for the
first 2 weeks is clearly evident.

Quality evaluations of uninoculated frankfurters
treated with the pediocin showed that color was slightly
darker and redder but all other quality characteristics were
unaffected. Consequently, treatment of frankfurters with
pediocin (ALTA™ 2341) can provide an intervention step
to reduce the risk of *L. monocytogenes* on these products.

Acknowledgement

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Sarasota, FL and was provided by Quest for this study.
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Foundation is gratefully acknowledged.
Figure 1 - Survival and growth of *Listeria monocytogenes* (3.40 log CFU/g inoculation) and aerobic bacteria on the surface of frankfurters treated with pediocin (in ALTAÔ 2341) at 3,000 AU or 6,000 AU and stored at 10°C; A. *L. monocytogenes* on MOX agar, B. Aerobic bacterial counts (A.P.C.) on TSA-YE

Pdn-3000- Frankfurters (5 links / pkg) treated with 3,000 AU pediocin
Pdn-6000- Frankfurters (5 links / pkg) treated with 6,000 AU pediocin