

Title Development of spoilage microbiota in beef stored in nisin activated packaging
Author Danilo Ercolini, Ilario Ferrocino, Antonietta La Storia, Gianluigi Mauriello, Sergio Gigli, Paolo Masi and Francesco Villani
Citation Food Microbiology, Volume 27, Issue 1, February 2010, Pages 137-143
Keywords Active packaging; Meat spoilage; Nisin; Spoilage microbial flora

Abstract

The aim of this study was to assess the microbial populations causing the spoilage of chilled beef during storage and to evaluate the effect of the use of an antimicrobial packaging for the meat storage. A nisin activated antimicrobial packaging was developed by using a nisin, HCL and EDTA solution and used for the storage of beef cuts at 1 °C. The common spoilage related microbial groups were monitored during the storage of beef in activated and non activated plastic bags by using selective media. The use of the antimicrobial packaging caused an overall significant reduction of viable counts of Gram positive bacteria such as carnobacteria, lactic acid bacteria and *Brochotrix thermosphacta* whose development was inhibited for at least 11 days of storage compared to the control. Moreover, a 1–3 log cycles reduction of enterobacteria was also registered between 22 and 32 days of storage. The microbiota was assessed at species level by using Polymerase chain reaction-denaturing gradient gel electrophoresis (PCR-DGGE) analysis of 16S rRNA gene of DNA extracted directly from meat and from bulk cells from selective media plates and showed that the species occurring within the targeted microbial groups did not change according to storage conditions. In conclusion, the use of the nisin activated packaging reduced the number of spoilage populations but did not affect the species diversity. Improved antimicrobial packaging is needed, possibly coupled with vacuum storage, to possibly achieve a simultaneous inhibition of more spoilage microbial groups and to preserve the microbiological quality of beef during chilled storage.