

**Title** Effect of protein films containing antioxidants on lipid oxidation and microbial growth of beef during storage

**Author** K.B. Song, S. Ha, S. Lee and M. Lee

**Citation** Book of Abstracts, 2004 IFT (Institute of Food Technologists) Annual Meeting and Food Expo, 13-16 July 2004, Las Vegas, Nevada, USA. 321 pages.

**Keywords** beef; protein film; zein; soy protein

### Abstract

Protein films provide edible barriers that are environment-friendly, as well as extension of shelf-life of foods as a package. High-fat containing foods like beef are easily subjected to lipid oxidation during storage. Therefore, protein films containing antioxidants extracted from food sources or edible natural products can offer better quality of foods by preventing lipid oxidation during storage. Our objective was to elucidate the effect of antioxidant protein film as a food package to prevent lipid oxidation and to have better quality of beef during storage. Zein and SPI film forming solutions were prepared by dissolving zein and soy protein isolate (SPI) in 95% ethanol and distilled water, respectively and followed by heating and stirring a mixture. Glycerol as a plasticizer was added at 2.5%. As natural antioxidants, rosemary extract and isoflavone were added to the film forming solution. Film forming solutions were then cast and dried films were peeled intact from the casting surface. Fresh beef samples were wrapped with each film and stored at 4 °C for 8 d. During storage, TBARS and microbial analysis of beef samples were determined. Zein film containing isoflavone had 8.06 TBARS value (mg MDA/kg beef sample) after 8 d of storage, compared with 13.3 for non-packaging and 12.29 for zein film without the antioxidant, resulting in decrease of lipid oxidation by 3.5%. For SPI film containing rosemary extract, it had a similar pattern and showed the decrease in lipid oxidation by 13%. Protein films containing antioxidants also inhibited the growth of total bacteria, *Salmonella*, and *E. coli* by about one log cycle. These results clearly showed that protein films containing natural antioxidants provided less lipid oxidation of beef and deterred microbial growth during storage, resulting in higher quality and longer shelf-life of beef.