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## Inhibition of *Listeria monocytogenes* in hot dogs by surface application of freeze-dried bacteriocin-containing powders from lactic acid bacteria

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Six lactic acid bacteria (LAB) strains, *Lactococcus lactis* BFE 920, *L. lactis* subsp. *lactis* ATCC 11454, *L. lactis* subsp. *cremoris* ATCC 14365, *Lactobacillus curvatus* L442, *Lact. curvatus* LTH 1174, and *Lact. bavaricus* MN, were grown in cheddar cheese whey supplemented with complex nutrient sources. Cell-free culture supernatants were freeze-dried and the resulting bacteriocin-containing powders were applied on the surface of hot dogs that were inoculated (~ 4 log cfu/hot dog) with a five-strain *Listeria monocytogenes* cocktail. Hot dogs were vacuum sealed and stored at 4°C for 4 weeks. *L. monocytogenes* was enumerated, using both Tryptic Soy Agar (TSA) and Oxford Listeria Agar (OXA), on day 0 and at 1, 2, 3, and 4 weeks of the refrigerated storage. In hot dogs containing only the *L. monocytogenes* inoculum, *L. monocytogenes* counts increased from 4 log cfu/hot dog up to 7 log cfu/hot dog. All samples containing freeze-dried bacteriocin-containing powders exhibited significantly lowered ( $P < 0.05$ ) *L. monocytogenes* populations on the surface of hot dogs throughout the 4-week study except for bavaricin MN powder. Bacterial counts on hot dogs packed without any powder were statistically equal on day 0 when enumerated on OXA. Freeze-dried bacteriocin-containing powders from *L. curvatus* L442 and *L. lactis* subsp. *cremoris* ATCC 14365 decreased *L. monocytogenes* populations on the surface of hot dogs by greater than 2 log cfu/hot dog throughout the 4-week study. For the powdered bacteriocin preparations from *L. lactis* BFE 920, *L. lactis* subsp. *lactis* ATCC 11454, and *L. curvatus* LTH 1174, *L. monocytogenes* populations were determined to be approximately 3-log cfu/hot dog after 4 weeks of storage.

### Biography

Gulhan Unlu is an Associate Professor within the School of Food Science at the University of Idaho and Washington State University. Her research interests include food microbiology, dairy microbiology, food biotechnology, microbial food safety, food bio-preservation, bioactive packaging of foods, functional foods, and bioconversion of agricultural and industrial waste into value-added products. She is an alumna (2012-2013) of The Fulbright US Scholar Program. She is an active member of the Institute of Food Technologists (IFT) and served as the Chair for the Biotechnology Division of the IFT (2014-2015). She serves on the Editorial Board of Probiotics and Antimicrobial Proteins.

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