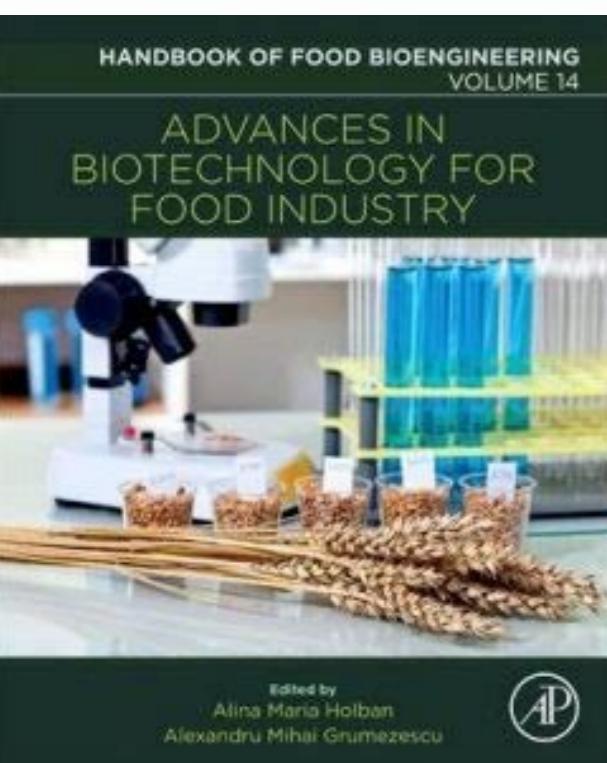
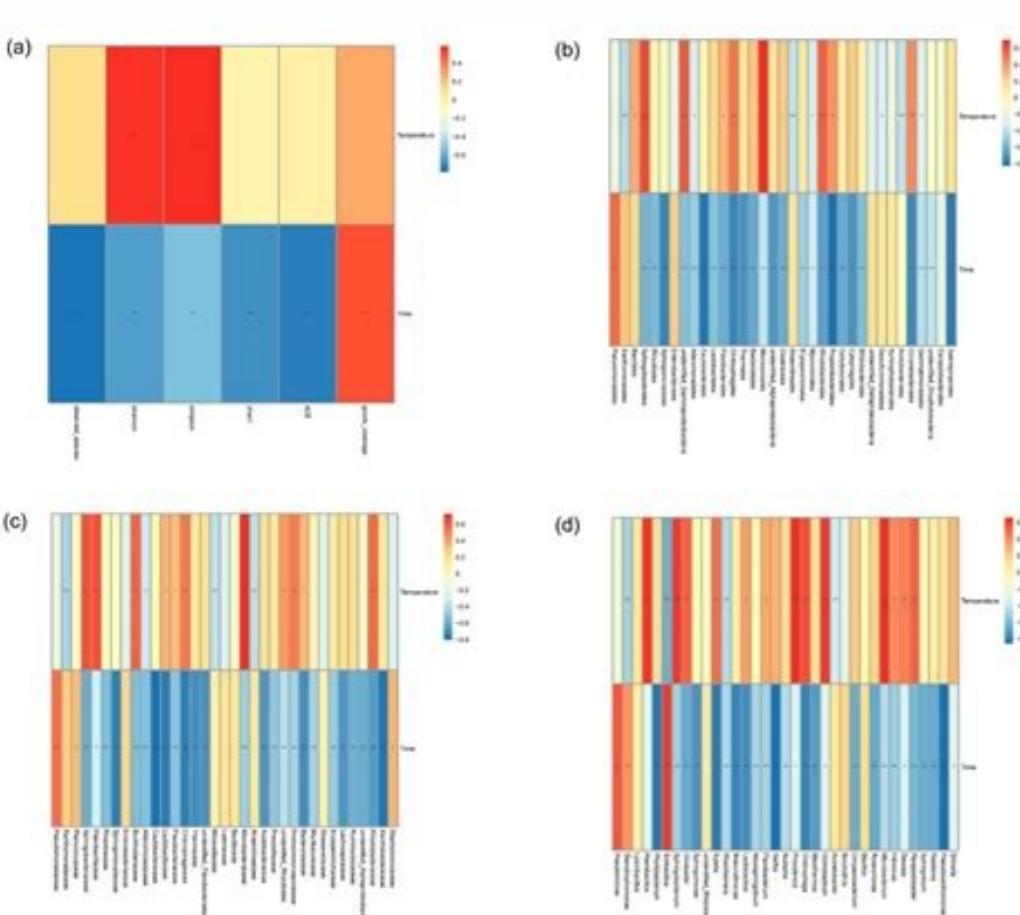
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## **Outbreaks Where Food Workers Have Been Implicated in the Spread of Foodborne Disease. Part 8. Gloves as Barriers To Prevent Contamination of Food by Workers**

EWEN C. D. TODD,<sup>1,\*</sup> BARRY S. MICHAELS,<sup>2</sup> JUDY D. GREIG,<sup>3</sup> DEBRA SMITH,<sup>4</sup> AND CHARLES A. BARTLESON<sup>5</sup>

<sup>1</sup>Department of Advertising, Public Relations and Retailing, Michigan State University, East Lansing, Michigan 48824, USA; <sup>2</sup>The B. Michaels Group Inc., 487 West River Road, Palatka, Florida 32177, USA; <sup>3</sup>Public Health Agency of Canada, Laboratory for Foodborne Zoonoses, 160 Research Lane, Unit 206, Guelph, Ontario, Canada N1G 5B2; <sup>4</sup>Campden BRI, Chipping Campden, Gloucestershire GL55 6LD, UK; and  
<sup>5</sup>6110 Troon Lane S.E., Olympia, Washington 98501, USA

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## ABSTRACT

The role played by food workers and other individuals in the contamination of food has been identified as an important contributing factor leading to foodborne outbreaks. To prevent direct bare hand contact with food and food surfaces, many jurisdictions have made glove use compulsory for food production and preparation. When properly used, gloves can substantially reduce opportunities for food contamination. However, gloves have limitations and may become a source of contamination if they are punctured or improperly used. Experiments conducted in clinical and dental settings have revealed pinhole leaks in gloves. Although such loss of glove integrity can lead to contamination of foods and surfaces, in the food industry improper use of gloves is more likely than leakage to lead to food contamination and outbreaks. Wearing jewelry (e.g., rings) and artificial nails is discouraged because these items can puncture gloves and allow accumulation of microbial populations under them. Occlusion of the skin during long-term glove use in food operations creates the warm, moist conditions necessary for microbial proliferation and can increase pathogen transfer onto foods through leaks or exposed skin or during glove removal. The most important issue is that glove use can create a false sense of security, resulting in more high-risk behaviors that can lead to cross-contamination when employees are not adequately trained.

barriers (hurdles) are recommended. Glove use is one of these recommended hurdles (126). The use and effectiveness of soaps and alcohol-based gels and other products for hand sanitizing are addressed in subsequent articles in this series (124, 125, 127).

## HAND HYGIENE

**Hand contamination.** In 1938, Price (103) examined hand and arm skin microflora and decontamination practices and found that from the finger tip to 2 in. (5.1 cm) above the elbow the arm and hands, including fingernails, have between  $2 \times 10^6$  and  $1 \times 10^7$  CFU of total aerobic bacteria, and 90% of these organisms reside on the hands. Even when these areas are effectively cleansed by disinfection techniques, under normal circumstances full regrowth of these bacteria will occur within 5 to 7 days. Price also found that after more than 2 h of glove wear, total bacterial counts on the hand increased by about one order of magnitude, and the bacterial population comprised both normal resident and transient flora in a nonfood environment. By using marker bacteria, Price was able to demonstrate that recommended washing procedures could almost totally remove transient microorganisms from the hands. He deduced from this that no appreciable increase in food pathogens would occur because these bacteria typically

\* Author for correspondence. Tel: 517-355-8371; Fax: 517-432-2589;  
E-mail: toddf@msu.edu.

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