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Awareness and perceptions of food safety of artisan cheese makers in Southwestern Ontario: A qualitative study

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ABSTRACT

The purpose of this research is to assess the food safety awareness and perceptions of artisan cheese makers using semi-structured interviews based on the Risk Analysis Framework. Seventeen in-depth interviews were conducted with managers and workers from 11 different cheese companies. The interviews were audio taped and transcribed verbatim. Common themes in the interview transcripts were identified. *Listeria monocytogenes* was perceived to be the most concerning biological hazard due to its potential impact on human health and business. Overall, the impact on food safety from chemical and physical hazards was perceived to be limited, and to be more of an occupational health and safety risk. More than half of the respondents supported the production of safe raw milk cheese, although they acknowledged the inherent bacterial hazards associated with it. Current food safety management systems such as HACCP were perceived to be excessively complicated due to the over-emphasis on documentation and the need for additional resources. Cheese safety education was valued, but participation was limited due to the lack of financial resources and available programs in the region.

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1. Introduction

Foodborne illness is caused by consumption of foods contaminated with viruses, bacteria, parasites, toxins, metals, and prions. Symptoms range from mild gastroenteritis to life-threatening neurological, hepatic, and renal syndromes (Mead et al., 1999). Each year in Canada, an estimated 11 million cases of foodborne illness occur, in which the occurrence of acute gastrointestinal illness (AGI), a common symptom of microbial foodborne illness, is estimated to cost CAD $3.7 billion in the form of healthcare costs and lost productivity (Sargeant, Majowicz, & Snelgrove, 2008; Thomas, Majowicz, Pollari, & Sockett, 2008). Regional studies focusing on smaller Canadian communities have estimated AGI to cost CAD $1089 per case and CAD $115 per capita (Majowicz et al., 2006). Furthermore, contamination of food and the resulting outbreaks of foodborne illness require costly corrective measures for producers (Neuman, 2010), cause media attention (Notermans & Todd, 2010), result in lawsuits (Canadian Broadcasting Corporation, 2008), and loss of consumer confidence in the food industry (University of Guelph, 2008).

Food safety concerns have affected dairy products, including cheese. Pathogens such as *E. coli 0157:H7, L. monocytogenes*, *Salmonella* spp., and *Staphylococcus aureus* found in raw milk (D'Amico & Donnelly, 2010; D'Amico, Groves, & Donnelly, 2008; Mee, Geraghty, O'Neil, & More, 2012; Ryser, 2011, pp. 81–86; Steele et al., 1997; West, 2008; Yilmaz, Moyer, MacDonell, Cordero-Coma, & Gallagher, 2009) can persist in the cheese-making environment, and may contaminate cheese during production (Ahmed et al., 2000; Canillac & Mourey, 1993; Hill & Warriner, 2011). Also, chemical hazards such as pesticides, antibiotics, hormones, and sanitizers used throughout the dairy industry can affect the final cheese product (Fischer, Schilter, Tritscher, & Stadler, 2011; Molina, Molina, Althaus, & Gallego, 2003). As a result, contaminated cheese from artisan and non-artisan sources has caused numerous product recalls (Canadian Food Inspection Agency, 2008a; CFIA, 2008b) and, in some cases, illness (Ahmed et al., 2000; Yilmaz et al., 2009).

Despite the food safety risks in cheese, including cheese from artisanal sources, very few studies have focused specifically on the artisan cheese industry (D'Amico et al., 2008; D'Amico & Donnelly, 2010). To our knowledge, there is no known research pertaining to the perceptions and awareness of food safety or attitudes towards food safety management programs among artisan cheese makers. This topic has been explored among dairy producers (Dias et al., 2012; Hoe & Ruegg, 2006; Karaman, 2012; Karaman, Cobanoglu, Tunalioglu, & Ova, 2011; Kristensen & Jakobsen, 2011; Moore,

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Merryman, Hartman, & Klingborg, 2008; Moore & Payne, 2007; Young et al., 2010) and in settings such as restaurants, catering businesses, healthcare food services, and meat processors (Angelillo, Viggiani, Greco, & Rito, 2001; Jevšnik, Hlebec, & Raspor, 2008; Rennie, 1994; Roberts et al., 2008; Wilcock, Ball, & Fajumo, 2011). Although dairy producers were not the focus of this study, their important role in providing the milk that is necessary for cheese production warranted a discussion of the pertinent research findings.

This study was undertaken to investigate perceptions of, and awareness about, food safety by artisan cheese makers and to provide their perspectives on the food safety challenges and management practices used to control food safety hazards within this industry. Semi-structured in-depth interviews were used to investigate this topic among artisan cheese makers in Southwestern Ontario, Canada. The Risk Analysis Framework (World Health Organization/Codex Alimentarius Commission, 1995; World Health Organization/Food and Agriculture Organization, 2006) guided the development of interview questions and the subsequent interpretation of the data.

2. Risk analysis

The Risk Analysis Framework (RAF) is a science-based, structured policy development tool used by risk managers to reduce risks to acceptable levels. It incorporates 3 interrelated components: risk assessment, risk management, and risk communication (Cahill, 2003; Garrett, 2003; Gunn, Heffernan, Hall, McLeod, & Hovi, 2008; WHO/CAC, 1995; WHO/FAO, 2006). The authors applied the principles of this interrelated framework into the design of questions to assess the perceptions and awareness of the food safety risks associated with artisan cheese making. By incorporating the RAF throughout the questions, researchers are able to better assess the cheese makers' understanding of the pathogens, and situations that may lead to foodborne illness, known as Risk Assessment (Lammerding & Fazil, 2000). In addition, by incorporating the RAF into the questions, participants will be better able to provide insight into their understanding of the risk management procedures that are required to mitigate and prevent food safety risks. The RAF will also allow researchers to assess if and how participants obtained and communicated food safety information (WHO/CAC, 1995).

3. Methodology

3.1. Participants

For the purpose of this study, artisan cheese was defined as cheese that is produced primarily by hand in small batches using minimal mechanization. Artisan cheese can be made from all types of milk and may include various flavorings (Dairy Farmers of Ontario, 2012). Researchers made an effort to verify that participants did, in fact, manufacture cheese using the artisanal process as defined. This was done by gathering information from company websites and/or verbal descriptions of cheese making processes by the participants.

Researchers identified artisan cheese makers from a publicly accessible list on the Canadian Cheese Society's website (2012). In addition, the Department of Food Science, University of Guelph, provided contact information for potential participants. In total, 50 artisan cheese companies were identified and all were subsequently contacted via telephone and email; of those, researchers received responses from representatives of 22 companies. Of those 22 companies, 11 agreed to participate in the study, and 6 of them permitted the researchers to interview both managers and employees. The remaining 5 companies permitted interviews with managers only, despite several attempts made by researchers to gain employee participation. The participating companies were classified as either small (1–2 employees) or medium (3–49 employees) in accordance with existing definitions of craft/artisan/skilled trades branches of business (Loecher, 2000). Companies that did not participate in this study also did not provide any details about the particulars of their companies. Researchers could not establish any form of communication with them.

3.2. Design of interview questions

A semi-structured, in-depth interview protocol was designed using published recommendations (Berg, 2007; Creswell, 1998; Mason, 1996). Questions were grouped into categories in accordance with the components of the RAF. The RAF guided the design of questions to assess perceptions and awareness of the three major subgroups of hazards that affect food, i.e. biological, chemical and physical. Initial demographic questions were used to characterize each participant and the organization by which he/she was employed (years of experience, food safety education received, number of employees presently working at site, and volume of milk processed per week). The questions used by the researchers in this study have been provided (Appendix 1). The semi-structured format allowed researchers to ask probing questions throughout the interview to elicit additional opinions and explanations of the topics. At the conclusion of the interview, participants were given an opportunity to return to questions that required additional clarification, and to provide additional content.

3.3. Pre-testing

Prior to conducting the interviews, the questions were pretested with a production worker, quality assurance manager, and cheese plant manager during an on-site visit to a small artisan cheese company in Southern Ontario. The results of the pretest were used to enhance the sequence of questions but no substantial changes were made to the questions. The pretesting was supplemented by a tour of the artisan cheese plant, which helped to familiarize the researchers with the major processing steps of cheese making including pasteurization, cutting and handling of formed cheese curds, cheese ripening, and packaging.

3.4. Interviews

Seventeen in-depth interviews ranging from 20 to 40 minutes in duration were conducted and audio recorded on secure encrypted devices between February and November of 2012. Managers were interviewed first, followed by workers in those companies that permitted both. Interviews were conducted by telephone because of time constraints and costs associated with travel. The use of telephone interviews also provided anonymity for participants (Jevšnik, Hlebec, & Raspor, 2009; McCracken, 1988). Before the start of the interviews, participants were informed of the purpose of the research, and assured that their identities would not be revealed. Telephone calls were made to participants in quiet rooms to ensure they could speak freely with minimal interruption, and to prevent third parties from over-hearing the conversation.

3.5. Content analysis

Completed interviews were transcribed verbatim, except for repetitions, filler words, and hesitations, which did not add value to the statements (Ball, Wilcock, & Aung, 2009). Researchers used the transcripts to identify common themes within the discussions (Ball et al., 2009), and the content was further analyzed using NVivo 8

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