



Factors affecting consumers' preferences for and purchasing decisions regarding pasteurized and raw milk specialty cheeses

A. Colonna,* C. Durham,* and L. Meunier-Goddik†¹

*Food Innovation Center, Oregon State University, Portland 97209

†Department of Food Science and Technology, Oregon State University, Corvallis 97331

ABSTRACT

Eight hundred ninety consumers at a local food festival were surveyed about their specialty cheese purchasing behavior and asked to taste and rate, through nonforced choice preference, 1 of 4 cheese pairs (Cheddar and Gouda) made from pasteurized and raw milks. The purpose of the survey was to examine consumers' responses to information on the safety of raw milk cheeses. The associated consumer test provided information about specialty cheese consumers' preferences and purchasing behavior. Half of the consumers tested were provided with cheese pairs that were identified as being made from unpasteurized and pasteurized milk. The other half evaluated samples that were identified only with random 3-digit codes. Overall, more consumers preferred the raw milk cheeses than the pasteurized milk cheeses. A larger portion of consumers indicated preferences for the raw milk cheese when the cheeses were labeled and thus they knew which samples were made from raw milk. Most of the consumers tested considered the raw milk cheeses to be less safe or did not know if raw milk cheeses were less safe. After being informed that the raw milk cheeses were produced by a process approved by the FDA (i.e., 60-d ripening), most consumers with concerns stated that they believed raw milk cheeses to be safe. When marketing cheese made from raw milk, producers should inform consumers that raw milk cheese is produced by an FDA-approved process.

Key words: cheese, artisan, raw, consumer preference

INTRODUCTION

Specialty cheeses are generally defined as cheeses produced in limited quantity with a focus on quality. The domestic production of these cheeses has increased rapidly over the past decade (Johnson and Lucey, 2006; IDDBA, 2008; USDA, 2009a). The increased produc-

tion coincides with an increase in annual per capita consumption of cheese in the United States, which is currently around 15 kg (USDA, 2010). In 2008, US sales of specialty cheeses and cheese alternatives were estimated to exceed \$3.4 billion (IDDBA, 2008; Tanner, 2009).

Consumers of specialty cheeses typically have a broader knowledge of cheese, spend more money on purchasing cheese, consume a large variety of cheeses, and have little brand loyalty (McCarthy et al., 2001). In addition, these consumers tend to be within a wealthier socioeconomic group than the general population (Kupiec and Revell, 2001). Specialty cheese consumers purchase cheeses based on many characteristics, such as location of cheese producer, price, size, and quality (Monjardino and Ventura Lucas, 2001).

Another parameter of importance to specialty cheese consumers is whether the cheese is made from pasteurized or raw milk (Murphy et al., 2004), with different consumer groups preferring either raw or pasteurized milk cheeses or both. Researchers compared pasteurized and raw milk versions of several cheese types and detected significant differences, as measured by both sensory profiling and flavor chemistry (Fernández-García et al., 2002; Van Leuven et al., 2008). These differences are primarily caused by differences in indigenous milk enzymes (Hickey et al., 2007) and microbial content of the cheese milk, particularly in nonstarter lactic acid bacteria (Buchin et al., 1998; Rehman et al., 2000). In addition, physicochemical changes within pasteurized milk, such as denatured proteins (Lau et al., 1991), affect cheese flavor. Perhaps in recognition of flavor differences, specialty cheese consumers may be willing to pay more for raw milk cheeses (Murphy et al., 2000).

Safety of raw milk cheeses continues to be debated, with numerous studies and reviews pointing to the potential risks associated with raw milk cheeses (Rowe and Donaghy, 2008; Baylis, 2009). Others have demonstrated that pasteurization is not the key to risk-free cheese, due to post-pasteurization contamination (Rudol and Scherer, 2001). West (2008) examined the debate over safety of raw milk cheeses and concluded

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¹Corresponding author: Lisbeth.goddik@oregonstate.edu

that food scares have driven the debate for decades, and support from raw milk cheese enthusiasts is essential to continue allowing the production and sale of raw milk cheeses. Nevertheless, consumers' preferences and attitudes toward raw milk cheeses are poorly documented, especially concerning US consumers of specialty cheese. Without data that examine consumers' attitudes toward raw milk cheese, it is difficult for raw milk cheese producers to properly position and market their cheeses.

A consumer test was conducted to examine whether consumers prefer raw or pasteurized milk cheeses, to provide a venue for asking consumers about their perception of the safety of raw milk cheeses, and to examine the effect of safety information about raw milk cheese on that perception. Additional objectives included collecting and evaluating information on consumers' cheese purchasing habits and preferences, and modeling their willingness to pay for specialty cheeses.

MATERIALS AND METHODS

Cheese Samples for Sensory Test

Approximately 4.5 kg each of 3 Cheddar cheese pairs produced from pasteurized and unpasteurized milk by 3 manufacturers and a pasteurized and unpasteurized milk Gouda produced by a single manufacturer were obtained. These products were chosen as examples of Pacific Northwest cheeses made using pasteurized and unpasteurized milk, affording the opportunity to test consumers' preference for cheeses made with milk of both types. The cheeses used were Beecher's Handmade Cheese Flagship raw milk Cheddar aged 24 mo, Beecher's Handmade Cheese Flagship pasteurized milk Cheddar aged 22 mo (both from Beecher's Cheese, Seattle, WA), Rogue Creamery raw milk Cheddar aged 14 mo, Rogue Creamery pasteurized milk Cheddar aged 12 mo (both from Rogue Creamery, Central Point, OR), Willamette Valley Cheese Co. raw milk Cheddar aged 5 mo, Willamette Valley Cheese Co. pasteurized milk Cheddar aged 4 mo, Willamette Valley Cheese Co. raw milk Gouda aged 10 mo, and Willamette Valley Cheese Co. pasteurized milk Gouda aged 9 mo (all from Willamette Valley Cheese Co., Salem, OR). Cheese samples were cut into 1-inch cubes, weighing approximately 3 to 4 g each, and stored in the refrigerator at 3°C 1 d before testing. On the test day, samples were stored in plastic bags on ice in a cooler. They were served on 6-inch white plates with a toothpick. Each consumer received 2 cubes of cheese per sample. The cheese was served at ambient temperature (approximately 18°C). To cleanse their palates between samples, respondents were provided with purified water.

Testing Environment and Sample and Serving Design

The respondents tested the products in Portland, Oregon, at an Oregon State University-identified canopied booth during the outdoor "Bite of Oregon" food festival. Other booths at the event featured regionally produced foods, fine wines, and microbrewed beer. Music, chef demonstrations, and competitions also took place. Although this is a busy environment, Hersleth et al. (2005) noted that location is not a factor in consumer acceptance of cheese. Testing times ran from 11 a.m. to 10 p.m. over 2 d. Consumers received one pair of samples consisting of a pasteurized and an unpasteurized milk cheese from 1 of the 3 producers. The samples were labeled with product descriptors ("pasteurized" or "unpasteurized") or with 3-digit random codes in a multiple-sample presentation served in balanced pairs across respondents. Half of the consumers saw the product descriptor labels and half saw the 3-digit random codes. The first 50 consumers received plates with 3-digit randomized code identifiers (without any product information), whereas the next 50 received plates with the labels "pasteurized" and "unpasteurized" cheese, with switching continuing after every 50 consumers throughout the test (Table 1). Consumers were asked to taste both samples from left to right and select the sample they preferred. They were also given the options of "no preference" and "I can't tell a difference" (Lawless and Heymann, 1998). Bench testing of the 8 cheeses was done ahead of time and it was determined that each of the 2 cheeses within a cheese pair was sufficiently different to conduct a preference study. Because this was an off-site study conducted at a food festival not specifically related to cheese, it was unclear if the consumers attending, who would be the participants of this study, would be frequent consumers of specialty cheese. For this reason, the "I can't tell a difference" option was added to the paired preference question to allow flexibility for those consumers who felt they could not tell the difference between the 2 samples.

Consumer Survey

After completing the nonforced choice preference test, participants were asked why they preferred the sample they selected, based on the attributes overall appearance, color, aroma, flavor, texture, and other. Additionally, they were asked which cheese had the more complex flavor. Participants were asked to rank, from most preferred to least preferred, the following specialty cheese production characteristics: local, artisan, organic, farmstead, and sustainable. They also answered questions on numerous aspects of their cheese purchasing behavior, including the types of specialty

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