A Research Note

Prevalence of *Listeria monocytogenes* in Raw Milk in Guadalajara, Mexico

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ABSTRACT

The frequency of *L. monocytogenes* and other species of *Listeria* was determined in 100 samples of raw milk obtained from street vendors and retail stores located in the city of Guadalajara, Mexico. *Listeria innocua* and *Listeria welshimeri* were isolated from 7 and 2 samples, respectively, whereas *L. monocytogenes* was not isolated from any samples.

Key words: Milk, *Listeria monocytogenes*, prevalence

Even though *Listeria monocytogenes* was recognized as a pathogen for humans and animals more than 60 years ago (8), and although food was suggested as a mechanism of transmission for this pathogen more than 50 years ago (6), it was not until the last decade when certain foods were recognized as important vehicles for this pathogen.

Outbreaks of human listeriosis associated with consumption of foods, such as those associated with cabbage in Canada in 1981 (14), with pasteurized milk in Massachusetts in 1983 (4), and with a soft Mexican-style cheese in California 1985 (7), have made clear the role of food as an important mechanism of transmission for *Listeria monocytogenes*.

These events aroused worldwide interest in the incidence of this pathogen in foods, with special attention given to testing dairy products for the presence of *L. monocytogenes* because of the higher association of foodborne listeriosis with dairy products (2).

The incidence of *L. monocytogenes* in raw milk has been reported in different countries to be between 0 and 45.3% (2). From these studies, the global incidence of the pathogen in raw milk could be summarized as being about 2.2% (2).

The sale of raw milk is authorized in Mexico (15). Many people purchase raw milk from street vendors, who sell the milk at the consumer’s door. The milk is often temperature abused. Even though most of the time this raw milk is boiled, handling a raw product can increase the risks of cross contamination of other foods by pathogens that may be present. The milking conditions that can prevail in Mexico, as well as the common improper handling of the milk, allow for contamination and possible growth of pathogens in milk and increase the risk of acquiring disease if the product is consumed raw.

In Mexico, there are no published data on the prevalence of *L. monocytogenes* in food. Hence, the purpose of this study was to determine the prevalence of *L. monocytogenes* and other species of *Listeria* in the raw milk sold in the city of Guadalajara, Mexico.

MATERIALS AND METHODS

Samples

One hundred samples of raw bovine milk were collected from 78 street vendors and 22 retail stores in Guadalajara, Jalisco, Mexico, from April through September, 1991. At the time of sampling, the milk was at room temperature. The milk was transferred directly from the containers where the sellers held it into sterile glass flasks. The samples were shipped to the laboratory without refrigeration, and were analyzed before 2 h after sampling.

Isolation of *L. monocytogenes*

Twenty-five milliliters of raw milk was added to 225 ml of *Listeria* enrichment broth (LEB), mixed manually, and incubated for 2 days at 30°C. After 24 and 48 h of incubation, 10 µl of the enrichment culture was streaked onto plates of modified McBride agar (MMA) and lithium chloride-phenylethanol-moxalactam agar (LPM). Both media were incubated for 48 h at 30°C. The colonies grown on both LPM and MMA were observed by using the Henry’s illumination technique (5). Up to 10 colonies per sample that showed a blue-gray or white sheen, with or without the appearance of...
frosted glass under Henry’s illumination, were selected for identification. These typical Listeria colonies were streaked onto trypticase soy agar (Bioxon, Becton Dickinson, Mexico City) with 0.6% yeast extract (Bioxon) added and incubated for 24 to 48 h at 30°C. The cultures were examined again, using Henry’s illumination.

Identification

The colonies suspected to be Listeria spp. were identified according to the criteria and procedures recommended by the U. S. Food and Drug Administration (FDA) (20).

pH measurement

The pH was determined in each sample, directly in 20 ml of milk, using a Corning potentiometer, model 220.

RESULTS AND DISCUSSION

L. monocytogenes was not isolated from any of 100 samples, and only 7 (7%) of the samples were found to contain other species of Listeria.

The absence of L. monocytogenes-positive samples obtained in this study agrees with the results found by Lovett et al. (9), Patterson et al. (13), Massa et al. (11), and Stone (17) in samples collected in California, Minnesota, Italy, and New Zealand, respectively. This result, however, does not necessarily indicate that the milk sold in Guadalajara is free of a risk of the presence of L. monocytogenes. McLauchlin et al. (12) pointed out that the detection in food of Listeria other than L. monocytogenes is likely to indicate an increased risk of contamination by L. monocytogenes, because the physiology and habitat of the different species of Listeria are very similar. Meanwhile, Seeliger (16) points out that L. innocua is a good indicator of the presence of L. monocytogenes and that the presence of either Listeria species is equally significant. In this study, 7% of the samples were contaminated with L. innocua and 2% of them also contained L. welshimeri.

Even though a selective technique was used for this survey, there might still exist the possibility that the growth of L. monocytogenes was suppressed by the associated microflora of the milk during the incubation of the media. However, in other studies it has been concluded that few of the common milk contaminants can compete with L. monocytogenes during their growth in the same selective media used in this study (1, 19).

The pH of the samples contaminated with Listeria spp. ranged from 6.4 to 6.8. These pH values are suitable for the growth of Listeria (2). Of the samples that tested positive for Listeria spp., 4 were collected from street vendors and 3 from retail stores.

Listeria spp. were isolated from 7 samples on LPM agar, and from only 4 samples on MMA. The superiority of LPM agar over MMA for isolating L monocytogenes in different types of foods has been reported by others (3, 18, 19, 21).

Given the poor hygienic conditions under which raw milk is handled and sold in Guadalajara, it is surprising that L monocytogenes was not isolated in our study. However, as other researchers have reported, factors of a methodological, seasonal, or geographic nature, and not only milk quality, influence the isolation of the pathogen.

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