



## Comunicación breve

# Prevalence of *Listeria monocytogenes* in Idiazabal cheese

E. Arrese<sup>1</sup> and M. Arroyo-Izaga<sup>2</sup>

<sup>1</sup>Department of Immunology, Microbiology and Parasitology. Faculty of Pharmacy. University of the Basque Country (UPV/EHU). Spain. <sup>2</sup>Department of Pharmacy and Food Sciences. Faculty of Pharmacy. University of the Basque Country (UPV/EHU). Spain.

### Abstract

**Introduction:** Raw-milk cheese has been identified in risk assessment as a food of greater concern to public health due to listeriosis.

**Objective:** To determine the prevalence and levels of *Listeria monocytogenes* in semi-hard Idiazabal cheese manufactured by different producers in the Basque Country at consumer level.

**Methodology:** A total of 51 Idiazabal cheese samples were obtained from 10 separate retail establishments, chosen by stratified random sampling. Samples were tested using the official standard ISO procedure 11290-1 for detection and enumeration methods.

**Results and conclusion:** All cheese samples tested negative for *L. monocytogenes*. However, 9.8% tested positive for *Listeria spp.*, different from *L. monocytogenes*. Positive samples came from two brands, two were natural and three were smoked. The presence of *Listeria spss.* suggests that the cheese making process and the hygiene whether at milking or during cheese making could be insufficient.

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Key words: Food microbiology. *Listeria monocytogenes*. Cheese. Consumer.

### PREVALENCIA DE *LISTERIA MONOCYTOGENES* EN QUESO IDIAZABAL

### Resumen

**Introducción:** *Listeria monocytogenes* se ha asociado a quesos elaborados a partir de leche cruda, lo que supone un importante riesgo de salud pública debido a la listeriosis.

**Objetivo:** Estudiar la prevalencia y los niveles de *L. monocytogenes* en quesos Idiazabal semi-curados de distintos productores del País Vasco, a nivel de consumidor.

**Metodología:** Se analizaron 51 muestras de queso Idiazabal procedentes de 10 establecimientos de venta al público; el muestreo fue aleatorio y estratificado. Los análisis se hicieron según el método de detección y de enumeración del procedimiento estandarizado ISO 11290-1.

**Resultados y conclusión:** Todas las muestras dieron negativo para *L. monocytogenes*. Sin embargo, el 9,8% dio positivo para *Listeria spp.*, distinta de *L. monocytogenes*. Las muestras positivas procedían de dos marcas, dos eran quesos naturales y tres ahumados. La presencia de *Listeria spss.* sugiere que el procesado del queso y la higiene durante el ordeño o durante la fabricación podría ser insuficiente.

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Palabras clave: Microbiología de los alimentos. *Listeria monocytogenes*. Queso. Consumidor.

### Abbreviations

DO: Denomination of Origin.

RE: Retail establishments.

### Introduction

Raw-milk cheese has been identified in risk assessment as a food of greater concern to public health due

to listeriosis.<sup>1,2</sup> *Listeria monocytogenes* has been isolated from sheep and goat cheese from raw milk.<sup>3,4</sup> However, other authors have not found *Listeria monocytogenes* in cheese made from unpasteurized milk.<sup>5</sup>

Idiazabal cheese is a traditional semi-hard cheese from the Basque Country region of Northern Spain made with raw ovine milk which can be manufactured either with any commercial animal rennet or with artisan-produced lamb rennet paste, as approved by its Denomination of Origin.<sup>6</sup> The Idiazabal Denomination of Origin (DO), which was created in 1987, defines the basic regulations for the product's manufacturing and permits external smoking of the cheese.

The pH levels (pH 4.9 to 5.5), the aw (0.96)<sup>7</sup> and low salt content (1.8%),<sup>8</sup> and considerable hand manipulation during manufacturing by small processors are factors that may all contribute to providing a favourable environment for contamination and survival/growth of *L. monocytogenes* in Idiazabal cheese. However, to the

**Correspondence:** Marta Arroyo-Izaga.  
Department of Pharmacy and Food Sciences.  
Faculty of Pharmacy. University of the Basque Country.  
(UPV/EHU).  
Paseo de la Universidad, 7.  
01006 Vitoria. Spain.  
E-mail: marta.arroyo@ehu.es

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**Table I**  
*Idiazabal cheese samples analyzed*

Region	Total no. of REs per region	No. of natural cheese samples taken	No. of smoked cheese samples taken	No. of brands
Álava	17	7	10	15
Vizcaya	17	10	7	9
Guipúzcoa	17	9	8	16

RE: Retail establishment.

best of our knowledge, there are even fewer studies about the hygienic quality of Idiazabal cheese<sup>9</sup> and there are no studies at consumer level.

Based on the association of *Listeria monocytogenes* with raw-milk cheese and, in turn, on the potential threat of listeriosis, the objective of this study was to determine the prevalence and levels of *Listeria monocytogenes* in semi-hard Idiazabal cheese manufactured by different producers in the Basque Country at consumer level.

## Methodology

### Retail sampling

A total of 51 Idiazabal cheese samples representing 16 different brands (two to three samples per brand) were obtained from 10 separate retail establishments (REs) (table I), chosen by stratified random sampling, located in the three autonomous region of the Basque Country (Álava, Vizcaya and Guipúzcoa). Commercial vacuum-packed cheeses were transported to the Microbiology Laboratory (University of the Basque Country, UPV/EHU) for microbiological analyses where they were stored at 3-4°C.

### Isolation, identification and enumeration of *L. monocytogenes*

Cheese samples were collected as finished packaged products at the above-mentioned REs. Samples were tested using the official standard ISO procedure 11290-1 for detection and enumeration methods (ISO 1998 ISO 11290-1) and triplicate analyses were performed. Agar *Listeria* according to Ottaviani & Agosti (ALOA) chromogenic agar (AES Chemunex España, S.A., Barcelona, Terrassa) and polymyxin acriflavine lithiumchloride ceftazidime aesculin manitol PALCAM *Listeria* selective agar (OXOID S.A, Madrid, Spain) were used as culture plates. *L. monocytogenes* identification was based on colony morphology and results of gram-staining, catalase test, beta -haemolysis, carbohydrate utilisation and CAMP reaction.<sup>10</sup>

## Results and discussion

Our survey of 10 REs in the Basque Country revealed that all 51 cheese samples from 16 brands tested negative for *L. monocytogenes*, by both direct plating and enriched cultures. However, 9.8% (5 out of 51 samples) tested positive for *Listeria* species. Positive samples came from two brands, two were natural and three were smoked. These samples positive for *Listeria* were analyzed, although it was not possible to identify the species, it was confirmed that they were not *L. ivanovii*, *L. innocua*, *L. welshimeri*, *L. seeligeri* or *L. grayi*.

The most recent official data of *L. monocytogenes* refer to the year 2010 wherein 21 cases were declared.<sup>11</sup> Although *L. monocytogenes* is widespread in nature as well as in the dairy environment, our results and those of other investigators confirm that all raw-milk cheese is not a common source of this pathogen,<sup>5,9</sup> probably because the procedure eliminates it. The literature data indicate that *L. monocytogenes* contamination may occur both during and after cheese processing<sup>12,13</sup> and that the introduction of *L. monocytogenes* can be produced via contaminated raw milk.<sup>14,15</sup>

Our data also confirmed that these cheeses can be a source of *Listeria* spp., different from *Listeria monocytogenes*, to consumers even they are smoked. The presence of *Listeria* spss. suggests that the cheese making process and the hygiene whether at milking or during cheese making could be insufficient.

In conclusion, this work has increased our knowledge of the prevalence of *L. monocytogenes* in Idiazabal cheese at consumer level and gives an account of the hygiene status during production. However, continued efforts are needed to decrease *Listeria* in RTE foods, also populations vulnerable to listeriosis need to be appropriately educated.

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tion of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation.

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