

## Prevalence of *Campylobacter* Species in Raw Bovine Milk in Isfahan, Iran

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**Abstract:** *Campylobacter* spp. is one of the most frequent pathogens of acute bacterial gastroenteritis, which is transmitted mostly via food originating from animals. It may lead to Guillain-Barre syndrome, which is a serious neurological disease with symptoms that include flaccid paralysis this study was conducted to determine the prevalence of *Campylobacter* spp. in raw bovine milk in Iran. From June 2008 to June 2009, 120 raw bovine milk samples from randomly selected dairy bovine herds in Isfahan, Iran and were evaluated for the presence of *Campylobacter*. In this study, 3 of 120 raw bovine milk samples (2.5%) were found to be contaminated with *Campylobacter*. *Campylobacter* isolates recovered from raw bovine milk were all identified as *C. jejuni*.

**Key words:** *Campylobacter* • Raw milk • Bovine • Iran

### INTRODUCTION

*Campylobacter* are small, curved-to-spiral shaped, flagellated Gram-negative rods, ranging from 0.5 to 8 µm in length and from 0.2 to 0.5 µm wide [1] of the 17 species within the genus *campylobacter* [2, 3], *Campylobacter jejuni* and *Campylobacter coli* are the most important from a food safety point of view [4]. *Campylobacter* is a major etiological agent of bacterial gastroenteritis in humans [5] with an estimated 400 million food borne disease cases worldwide a year [6]. Disease caused by *Campylobacter* usually manifests as diarrhea, fever, malaise and severe abdominal pain [7]. However, it may lead to Guillain-Barre syndrome, which is a serious neurological disease with symptoms that include flaccid paralysis [8].

*Campylobacter* is common in animals, especially poultry and meat consumption is the probable source of infection in most sporadic cases of *Campylobacter* enteritis [9]. Implicated sources of infection in investigated outbreaks have included unpasteurised or inadequately pasteurized cows' milk [10-16]. *Campylobacter* in raw milk most commonly derive from secondary faecal contamination during the milking process. Cattle frequently harbor *campylobacter* as

commensal in their gastrointestinal tract and *campylobacter* in raw milk most commonly derive from secondary faecal contamination during the milking process [17, 18].

Currently, there is limited information regarding the prevalence of *Campylobacter* in raw milk in Iran. The present study was conducted to determine the prevalence of *Campylobacter* spp. from raw cow milk in Isfahan, Iran.

### MATERIALS AND METHODS

**Sample Collection:** From June 2008 to June 2009, 120 raw cow milk samples from randomly selected dairy bovine herds in Isfahan, Iran. The samples were immediately transported to the laboratory in a cooler with ice packs and were processed within an hour of collection.

**Microbiological Analysis:** The samples were processed immediately upon arrival using aseptic techniques. Of each milk sample, 10 mL was homogenized and transferred to 90 mL of Preston enrichment broth base containing *Campylobacter* selective supplement IV and 5% (v/v) defibrinated sheep blood. After inoculation at 42°C for 24 h in a microaerophilic condition (85% N<sub>2</sub>, 10% CO<sub>2</sub>, 5% O<sub>2</sub>), 0.1 mL of the enrichment was then streaked onto

*Campylobacter* selective agar base supplemented with an antibiotic supplement for the selective isolation of *Campylobacter* species and 5% (v/v) defibrinated sheep blood and incubated at 42°C for 48 h under the same condition. One presumptive *Campylobacter* colony from each selective agar plate was subcultured and identification of presumptive *Campylobacter* species was performed using standard microbiological and biochemical procedures including Gram staining, production of catalase, oxidase, hippurate hydrolysis, urease activity, indoxyl acetate hydrolysis and susceptibility to cephalotin [19].

## RESULTS AND DISCUSSION

The consumption of raw milk is accompanied by the risk of ingesting micro-organisms that can pose serious health risks, including *Salmonella*, *Campylobacter*, Shiga toxin producing *Escheichia coli* (STEC) and *Listeria* [10, 18, 20-22].

In this study, 3 of 120 raw bovine milk samples (2.5%) were found to be contaminated with *Campylobacter*. The present study shows that *Campylobacter* spp. was not widely associated with milk in Isfahan, Iran. *Campylobacter* isolates recovered from raw bovine milk were all identified as *C. jejuni* as the most frequently isolated food borne campylobacter species [23]. It was previously shown that raw, unpasteurized and inadequately pasteurized milk could act as a transmission vehicle of *Campylobacter* spp. causing several outbreaks of intestinal disease [24, 25]. However, the incidence rate of *Campylobacter* in raw milk appears to differ between locations and the current study shows that the pathogen's presence in milk was generally limited.

Transmission of *Campylobacter* infections to humans via the consumption of raw milk is acknowledged with numerous outbreaks and cases previously reported [26, 27]. *Campylobacter* was detected in one bulk tank raw milk sample out of 62 examined (1.6%) in our study. The isolated was speculated as *C. coli*. Previous studies have also recovered *Campylobacter* from raw milk with prevalence's up to 12.3% reported [28, 29]. In Iran, all retail liquid milk must be pasteurized as a minimum heat treatment. Therefore, most of the public would not be exposed to contaminated raw milk; however, the consumption of raw milk; however, the consumption of raw milk by farm families is still widespread and could pose a potential risk to public health. To our knowledge, the present study is the first report of the isolation of *Campylobacter* spp. from raw bovine milk in

Isfahan, Iran.

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