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Shiga toxin-producing *Escherichia coli* (STEC) screening in Trentino Traditional Dairy farms

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Abstract

Ruminants are a major reservoir of Shiga toxin-producing *Escherichia coli* (STEC) strains, zoonotic Gram-negative bacteria that pose a significant risk to public health and food safety. Although the consumption of raw milk cheese is healthy, contamination with pathogens such as STEC can occur due to poor hygiene practices at the farm level. STEC is a significant threat to human health due to its ability to cause gastroenteritis hemorrhagic colitis and hemolytic uremic syndrome. Therefore, it is important to limit this pathogen along the food chain. The aims of this preliminary study were to evaluate the presence of STEC and its correlation with milk quality in Trentino dairy farms. The pathogen's presence was screened monthly in 15 farms; bulk milk samples, milking filters, and environmental samples by overboot swabs were collected. Milk samples were analyzed for total bacterial count, lactobacilli, lactococci, coliforms, hemolytic streptococci, and *Prototheca* spp. Milking filters and environmental samples were enriched with selective different antibiotics; then they were analyzed by multiplex-PCR for gene detection. The positive enrichments were subcultured on Sorbitol MacConkey agar and positive colonies were isolated as putative STEC. After an incubation, the isolates were tested by multiplex-PCR analysis. Preliminary results on the monthly monitoring of these farms, from the summer of 2023 to autumn of 2023, showed no positive correlation between the presence of Shiga toxin-producing genes and coliforms count (mean 1.48 log CFU/mL, range 0.97 to 2.63 log CFU/mL). Moreover, many of the environmental samples are negative despite having a positive presence in filters. Overall, more than 300 isolates are worth further investigation in order to perform Whole Genome sequencing (WGS). This study was carried out within the ONFoods² and received funding from the European Union Next-GenerationEU (PNRR-MISSIONE 4 COMPONENTE 2, INVESTIMENTO 1.3-D.D. 1550 11/10/2022, PE00000003).

Keywords

Food safety, Health, Dairy safe, Milk quality