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Characterization of STEC in strains isolated of raw and cooked hamburgers in Argentina

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INTRODUCTION & AIM

In Argentina, Shiga toxin-producing *Escherichia coli* (STEC) is the primary aetiological agent of haemolytic uremic syndrome (HUS), and *E. coli* O157:H7 is the predominant serotype.

The consumption of undercooked ground meat or cross-contamination during food preparation are also common routes of STEC infection.

The AIM of this work is genetically describe a group of strains isolated in raw and cooked foods from a fast food chain.

METHOD

In Buenos Aires, as a part of monitoring, samples of raw and cooked hamburgers were obtained from a fast food restaurant and were studied at the local bromatology laboratory. The isolated STEC strains were phenotypic and molecular characterized using traditional methods by Reference National Laboratory (RNL) for STEC infections. Then the STEC strains were send for sequencing to the ANLIS National Centre for Genomics and Bioinformatics Operational Unit. Strains sequenced with the Illumina platform were analyzed by the RNL based on command line scheme using the following flowchart:

Figure 1: Characterization Flow chart.

RESULTS

In all samples of raw and cooked hamburgers, *E. coli* O157:H7 stx_{1a}/stx_{2c}/*eae*/*ehxA* (ST7816) was isolated, and virulence genes were detected (Figure 2). These genes are mainly related to adherence, secretion system, and toxins.

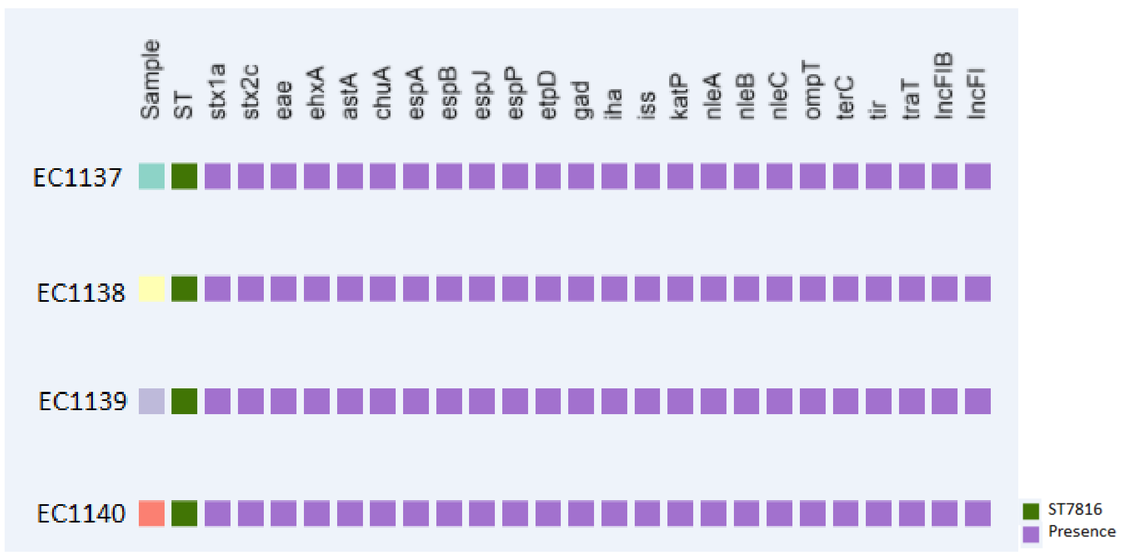

Figure 2. Summary of virulence and plasmid profiles found by the WGS analysis of the studied strains (microreact.org)

In the sequences, no genes associated with resistance were detected and showed only seven SNPs of difference, indicating high genetic similarity between the isolates (Figure 3)

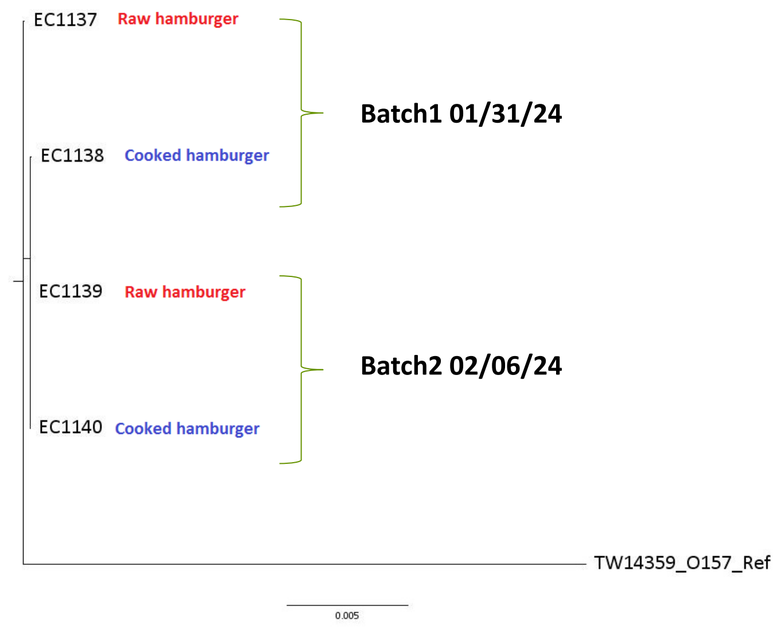

Figure 3 SNPs phylogenetic tree, using the program Snippy v4.4.5 (Reference *E. coli* TW14359) and visualized with FigTree v1.4.3.

CONCLUSION

In our country, the prevalence of HUS in the pediatric population has reached worrying numbers and the consumption of hamburgers in fast food chains is a common practice. We believe that the practice of periodic monitoring would be an effective tool to maintain good practices within these fast food establishments over time. We were able to demonstrate that the cooking process affects the presence of the pathogen in food but also the application of good hygiene practices in the handling of row and cooked foods is important avoid cross contamination and to reduce the risk of transmission of STEC infection.