

Poster 13

Where did you come from? – Characterization of pathogenic antibiotic-resistant *Escherichia coli* in recreational waters

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Abstract

Background: *Escherichia coli* is a commensal bacterium present in the gastrointestinal tract of warm-blood animals, and therefore routinely used as a microbiological indicator of fecal contamination [1,2]. However, several strains may acquire virulence factors, becoming potentially pathogenic for humans and animals [1,3]. **Objective:** The current study underscores human exposure to pathogenic and antimicrobial resistant *E. coli* through recreational waters. **Methods:** Surface water samples were collected from estuarine and coastal beaches, as well as from treated wastewater. Detection and isolation were performed using selective and differential culture media. Presumptive isolates were confirmed by PCR approach. *E. coli* isolates were submitted to an extensive virulence gene screening. **Results:** The majority of the *E. coli* isolates belonged to the phylogenetic subgroup D1 (24%) or B1 (20%), indicating that animals were a relevant source of contamination. The isolates virulence profiles (n=272) showed that 35% were diarrheagenic *E. coli* (DEC). Among the pathotypes, enterotoxigenic *E. coli* had a prevalence of 12%, followed by enterohaemorrhagic *E. coli* with 10%. Avian pathogenic *E. coli* associated genes were detected, with a higher presence of the *fiuA* (44%), *ompT* (39%), and *iss* (36%) genes. The assessment of antibiotic susceptibility to 22 antibiotics of 9 different classes was carried using the Kirby-Bauer disc diffusion method. A total of 72% of isolates showed resistance to at least 3 different antibiotic classes. The highest percentage of resistance was showed to Erythromycin (98.5%), and Rifampicin (99.2%), whereas 100% susceptibility was found to Imipenem and Nitrofurantoin. **Conclusions:** The results confirmed the circulation of pathogenic *E. coli* and antimicrobial resistant strains in recreational waters. This study highlights the importance of monitoring additional parameters than those officially listed as fecal indicators, in order to improve risk management and guarantee the safe use of the resources.

Keywords: *Escherichia coli*; recreational water; antimicrobial resistance; source tracking; One Health

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