

PHoP mediated Colistin-Resistance in Enterobacteria in water in the Ho Municipality, Ghana

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The advent and spread of colistin resistance genes have significantly hampered the efficacy of colistin; which is a last resort antibiotic for treating terminal infections. The rising prevalence of AMR in Gram-negative bacteria is a major medical concern with ramifications that will inevitably affect a variety of socioeconomic aspects on a global scale. Globally, both humans and animals are colonized by potentially pathogenic colistin-resistant organisms and this has left the world with limited therapeutic options. Thus, this study sought to determine the relationship between the type of habitat and the presence of bacteria with colistin resistance genes. A total of 39 water samples were collected aseptically from five (5) different communities in the Volta region of Ghana from June 2021 to August 2021. Bacteria was isolated from the samples and analysed for colistin resistance phenotypically using the MIC method. Isolates which showed resistance phenotypically were subjected to Whole Genome Sequencing (WGS) using the Oxford Nanopore Technology. The WGS data was processed and analyzed using the Epi2Me Cloud platform. No Mobile Colistin Resistance (MCR) gene was detected. However, PhoP which is part of a two-component regulating system that activates the PmrA/B system which has downstream effects, leading to antimicrobial resistance to colistin was found in 81.01% of the isolates. This gene was detected majorly in Lokoe and haboured mostly by *Proteus mirabilis* (37.84%). Some other Enterobacteria identified during the study to harbour the PHoP gene include *E. coli* (16.22%), *Klebsiella pneumoniae* (5.41%), *Pseudomonas aureginosa* (16.22%) and *Citrobacter werkmanii* (5.41%). The results demonstrate a high frequency of colistin resistance in enterobacterial strains isolated from water samples in the region. Thus, there is the need to halt the indiscriminate and non-therapeutic use of colistin to prevent the emergence and spread of colistin resistance genes.

Keywords: PHoP gene, Colistin resistance, Enterobacteria.

Biography

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