ABSTRACT

Bacterial resistance to antibiotics has become a common occurrence especially in areas where antibiotic drugs are widely used. Moreover, the potential effect of antibiotic pollution and the presence of antibiotic-resistant genes (ARGs) on the composition of bacterial communities in the ecosystems continue to degrade the quality of most ecosystems. Despite the use of ultraviolet (UV) radiation and ultrasound (US) technologies in wastewater purification, little is known on their application in the elimination of fecal pathogenic microorganisms such as *Escherichia coli*. Moreover, their individual and combined potential in the elimination of erythromycin- and quinolone-resistant *E. coli* is a topic that still requires proper understanding. Therefore, this study was aimed at evaluating the individual and combined/integrative potential of UV radiation and ultrasonic technologies in the removal of erythromycin- and quinolone-resistant *E. coli* from domestic effluents using a laboratory experimental-based set-up. The results showed that UV radiation experiment was able to significantly eliminate erythromycin- and quinolone-resistant *E. coli* from the water to a value of 2 log units. Additionally, US technology was equally able to significantly reduce both the erythromycin- and quinolone-resistant *E. coli* to 2 log units. However, on combining the two technologies, there was further reduction to 1 log unit, hence, pointing to the need for adopting the integrative approach in water purification for increased wastewater purification efficiencies and improved ecosystem and human health.

Keywords: erythromycin, quinolones, ultrasonic, ultraviolet radiation, wastewater