

Biochemistry and Molecular Biology

Anti-fluoroquinolone resistance activity of E558: A natural product

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Abstract

Fluoroquinolone resistance (FQR) has paralleled the abuse of this class of antibiotics in Nigeria ever since the patent rights expired in 2003. However, nature has a potent way of uncoupling unfavourable synergies targeted against the serenity of the biosphere. In this preliminary study, we examined the antibacterial activity of E558, a medicinal plant product against multidrug-resistant gram-negative isolates from immunocompromised patients with acute respiratory infections. The agar-well diffusion method was employed to screen for antibacterial activity against strains of *Klebsiella pneumoniae*, *Escherichia coli* and *Pseudomonas aeruginosa*. The organisms were initially subcultured on McConkey agar followed by streaking standard inoculum of the bacterial strains on Mueller-Hinton agar plates. A known concentration of crude extract was loaded into the well bored on the plates and then incubated at 37 °C for 24 hours. Antibiotic susceptibility testing (AST) was carried out to monitor resistance of isolates. Protein profiling with sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE) as well as restriction endonuclease mapping with agarose gel electrophoresis was employed to study alterations in the genomic DNA of selected organisms. A reverse mutation was observed in the morphology of organisms exposed to E558 compared to the organism without exposure. AST result further revealed that strains in the reverted zone, which were originally resistant to fluoroquinolones and other antibiotics had become susceptible with very wide zone of inhibition (≥ 40 mm; CLSI-sensitive). Restriction mapping and SDS-PAGE respectively revealed there are major differences in the genomic composition and protein profile of the reverted strains when compared to the original organisms. It can therefore be deduced that E558 possibly contains bioactive compound(s) with potent antitumour and anti-fluoroquinolone resistance activity.

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