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Analysis of Structural Features of Bis-Quaternary Ammonium Antimicrobial Agents

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The bis-quaternary ammonium compounds (QACs) consisted of two identical alkylpyridinium rings and a bridge structure linking the rings to each other. Most of the median lethal dose (LD_{50}) values in acute cytotoxic assays of these bis-QACs were on an order of 10^{-6} ~ 10^{-5} M, and tended to be lower than those of benzalkonium chloride (Bz). The minimum inhibitory concentration (MIC) of bis-QACs were 0.4 ~ 12.5 μM (4BCAP-4,12), <0.1 ~ 12.5 μM (4DCABP-4,12), 3.3 ~ 80.0 μM (4DOCBP-6,12), <0.2 ~ 10.0 μM (4DTBP-6,8), respectively. From the investigation of the relationship between the LD_{50} and MIC of these compounds, 4DTBP-6,8 as a disinfectant, seems to be very safe for human cells.