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Determining the Efficacy of Phenol, Sodium Hypochlorite and Ethanol for Inactivation of Carbapenem-Resistant Strain of Acinetobacter baumannii

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Abstract : Acinetobacter baumannii, a hospital-acquired pathogen, causes nosocomial infections including pneumonia, urinary tract infection, and secondary meningitis. Carbapenem is most effective antibiotics against it. Its increased resistance to carbapenems has been a rising global concern. Antibiotics such as carbapenem are unable to use on hospital setups to eradicate A. baumannii, hence different concentrations of disinfectants including phenol; sodium hypochlorite and ethanol are increasingly being used. The objective of the present study is to find an effective concentration of above disinfectants against carbapenem-resistant strain RS307 of A. baumannii. Growth kinetics of RS307 has been determined using UV-Vis spectrophotometer in the presence and absence of disinfectants in triplicate and its standard deviation has also been calculated which make the results more reliable. Differential growth curves were plotted, which showed the effective concentration among all the concentrations of phenol, sodium hypochlorite and ethanol. On disc diffusion assay, antimicrobial effect was observed by comparing all the concentrations of disinfectants to check its synergy with imipenem, most effective carbapenem. All the results collectively revealed that 0.5% phenol, 0.5% sodium hypochlorite, and 70% ethanol could preferably be used as disinfectant for hospital setup against the carbapenem-resistant strain of A. baumannii. SDS PAGE analysis showed differential expression in the protein profile of A. baumannii after treatment. The present study highlighted that few disinfectants even in low concentration had shown better antimicrobial activity hence may be recommended for regular use in the hospitals, which will be cost effective and less harmful.

Keywords : Acenatobacter bomunii, phenol, sodium hypoclirite, ethanol, carbapenem resistance, disinfectant
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