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Determination of Tolerance Limits of Dimethyl Sulfoxide (DMSO) on Selected Bacterial Strains for the Antimicrobial Assays of Natural Products

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Abstract

Dimethyl sulfoxide (DMSO) is extensively used as a solvent in natural product chemistry to dissolve plant extracts. Although it serves as a universal solvent for many fields of science, the toxicity of certain concentrations of DMSO may interfere in antimicrobial assays of natural products by inhibiting the growth of bacteria. Therefore, the present study was carried out to investigate the maximum concentrations of DMSO which can be used to dissolve plant extracts for antimicrobial assays without any toxic effects on test microorganisms. Different concentrations of DMSO (5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% and 100%) were tested against *Escherichia coli* (ATCC 25922), *Staphylococcus aureus* (ATCC 25923) and *Pseudomonas aeruginosa* (ATCC 27853) by broth dilution method. Sterile distilled water used to dilute DMSO was served as the negative control. The results indicated that bactericidal concentrations of DMSO are 80%, 50% and 30% for *E. coli*, *S. aureus* and *P. aeruginosa* respectively. Subsequently, the exact maximum concentrations of DMSO which the tested bacteria can tolerate were also determined by the same method. The obtained maximum DMSO tolerant concentrations were 70%, 40% and 25% for the test organisms accordingly. The results of the experiment suggests the optimal DMSO concentrations to be used to dissolve plant extracts in antimicrobial assays in commonly used bacteria, thus further tests to be undertaken to evaluate the DMSO tolerance limits of some other bacteria and yeast species.

Keywords: DMSO, Plant extracts, Antimicrobial