**Modified Antibiotic Action of Diphenyl Disulfide, Diphenyl Diselenide and Diphenyl Ditelluride Combined with Aminoglycosides In Vitro**

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Aminoglycosides are drugs that have a broad bactericidal spectrum, by impairing protein synthesis through binding to prokaryotic 30S ribosome. However, bacterium resistance to aminoglycosides has become a problem, leading to the need for searching of new antimicrobial agents. The therapeutic potential of the organochalcogens diphenyl disulfide [(PhS)$_2$], diphenyl diselenide [(PhSe)$_2$] and diphenyl ditelluride [(PhTe)$_2$] has been widely investigated, since they can generate potent nucleophiles. In addition, studies have demonstrated that (PhSe)$_2$ exhibits antioxidant, antiulcer, neuroprotective, anti-hyperglycemic and other biological effects. These observations encouraged us to investigate the antibacterial activity of these organochalcogens as well to verify their possible effect when associated with aminoglycosides. The minimum inhibitory concentration (MIC) of (PhS)$_2$, (PhSe)$_2$ and (PhTe)$_2$ alone, aminoglycosides (gentamicin, amikacyn and neomicyn) alone or the combination of organochalcogens (64 ᵐg/mL) + aminoglycosides against *Escherichia coli* and *Staphylococcus aureus* multi-resistant strains were determined in BHI by microdilution assay (J Med Chem 39:3107,1996) using suspensions of $10^5$ CFU/mL and a drug concentration ranging from 1-1024 ᵐg/mL (in duplicate). Organochalcogens alone demonstrated a MIC ≥ 512 ᵐg/mL against *E. coli* and *S. aureus*. However, when combined with aminoglycosides, all organochalcogens were able to reduce MIC value of amikacyn at 75% for (PhS)$_2$ and (PhSe)$_2$ against *E. coli* strains; 75% for (PhS)$_2$, 87.5% for (PhSe)$_2$ and 50% for (PhTe)$_2$ against *S. aureus* strains. The results obtained indicate that the organochalcogens tested presented a significant synergistic antibiotic effect when combined to amikacyn, probably due to act as permeabilizing of the cell membrane or by increasing penetration of aminoglycoside.

Keywords: aminoglycosides, sinergism, organochalcogens, multi-resistant bacteria
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