TITLE: EVALUATION OF MICROBICIDE ACTIVITY UNDER COPPER SULFATE AND SILVER NITRATE SALT SOLUTIONS AGAINST *ESCHERICHIA COLI*

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ABSTRACT:

Several microorganisms in direct contact with copper and silver surfaces lose their cell viability preventing their growth and development making bactericidal metals. This phenomenon has been known since our ancestral civilisations. At recent pandemic period these metals were reactivated as important tools to keep safe materials for the control of infectious diseases, caused by microbial agents. Their microbicidal action are known and came from the release of ions, those when in solutions, can help to reduce fomites, preventing the transmission of microorganisms between people and or even the formation of biofilms. In order to verify the effect of these released ions on microbicidal activity under an important pathogen, we performed tests based on minimum inhibitory concentration (MIC) method. The metals were evaluated as salts, variating the concentrations between copper and silver as bioactive agents: from 112.35 µg/mL to 0.001 µg/mL of copper sulfate pentahydrate ($CuSO_4.5H_2O$), and from 500 µg/mL to 3.9 µg/mL for silver nitrate ($AgNO_3$) under *Escherichia coli* (ATCC 8739). Absorbance values were obtained by measurementsat wavelength of 600 nm, during 16 hours, at intervals of 5 minutes, using the spectrophotometer Synergy HTX Biotek. The results showed as minimum inhibitory concentration for microbicide activity the composition based on of 435µg /mL for copper sulfate pentahydrate and 13 µg/ml of silver nitrate solution. Thereby, we have the inhibitory activity of copper sulfate with silver nitrate. It was also verified that solutions containing copper and silver could show an improvement of the efficiency of copper microbicide activity, if compared to the individual metals, maybe related to the decrease of copper oxidation, allowing major contact between metal and microbial cell.

Keywords: Microbicidal activity; Copper Sulfate; Silver Nitrate; *Escherichia coli*.

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