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Bactericidal effect of needle plasma system on *Pseudomonas aeruginosa*

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Plasma is a neutral ionized gas, which is composed of particles including free electrons, radicals, positive and negative ions, quanta of electromagnetic radiation, excited and non-excited molecules. The plasma needle (NBS) is a type of nonthermal atmospheric capacitive coupled glow discharge; it has a single electrode configuration and is operated in a noble gas. Important properties of this type of plasma are that it operates near room temperature and atmospheric pressure, and allows treatment of irregular surfaces and has a small penetration depth. Opportunistic bacterial pathogens are ubiquitous inhabitants of both the environment and the human body, causing serious infections in immune compromised patients. *Pseudomonas aeruginosa* is a major cause of nosocomial infections, as it shows a remarkable capacity to resist antibiotics. Physical treatments NBS is an alternative approach to fight opportunistic infections when the effectiveness of chemical agents is weak due to a natural pathogen. The plasma needle is capable of bacterial decontamination and of localized cell removal without causing necrosis to the treated or the neighboring cells. In addition, it has a relatively simple design. The metal pin or needle syringe used as high voltage electrode. Noble gas flows through the electrode at a different rate of L/min. The flow rate is regulated by a mass flow controller. Due to advantages presented in terms of cost, environmental compliance and ease of processing, this study aimed to decrease pathogenicity of *P. aeruginosa* by applying an alternative method represented by needle plasma at different treatment time as a bactericidal effectiveness tool.

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