

Interaction of an Atmospheric Pressure Non-thermal Plasma Microjet with Water and Water Borne Bacteria

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Abstract— An atmospheric pressure non-thermal plasma microjet (PMJ) is generated through a hand-held microhollow cathode discharge (MHCD) based device and used to interact distilled water and distilled water purposely contaminated by *Staphylococcus aureus* or by *Bacillus subtilis* endospores. Properties of water, such as pH and temperatures were monitored with respect to time. The effective inactivation of both vegetative state bacteria and endospores is mainly attributed to the reactive oxygen species (ROS) generated directly in the plasma and in water. A few short lived ROS (hydroxyl, superoxide anion and singlet oxygen) were investigated with spin-trap electron spin resonance (ESR) spectroscopy. Their contribution to the inactivation process will be discussed.