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BOOK OF ABSTRACTS



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Low frequency atmospheric pressure plasma jets for bacteria inactivation on solid surfaces and in aqueous solutions

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Atmospheric pressure plasma jets (APPJs) have been widely studied during the recent years for several applications, nowadays more attention is given to low energy consumption APPJs. In the biomedical field, it is well known that plasma discharges have a bactericidal effect [1 - 3]. The aim of this work is to investigate the possibility of creating a low power APPJ at low frequencies and its ability to inactivate bacteria on solid surfaces and in aqueous solutions. Using a dielectric barrier discharge cylindrical reactor [4] and applying a sinusoidal high voltage of 4 kV in the frequency range 50 Hz to 2 kHz, we obtained a plasma jet of 4 cm of length using as precursor gases Argon (Ar) (Fig. 1) and Helium (He) with a flow rate of 3 l/min. The consumed power was less than 1 W. By maintaining the same experimental conditions (applied voltage, signal frequency and flow rate), we treated *Escherichia coli* spread on agar plates and in water using both Ar and He jets in order to determinate how they interact and affect living micro-organisms in different environments. Results from the thermostatic growth of bacteria treated by APPJs directly on agar plates revealed that, Ar jet was more efficient than He jet: decontaminated areas of approximately 7.3 cm² were measured on treated agar plates with Ar jet as opposed to 4.75 cm² with He jet (for 6 min treatment time). We also carried out preliminary tests of bacteria inactivation in aqueous solutions by APPJs: more experiments will be performed in order to determinate which jet is more efficient.

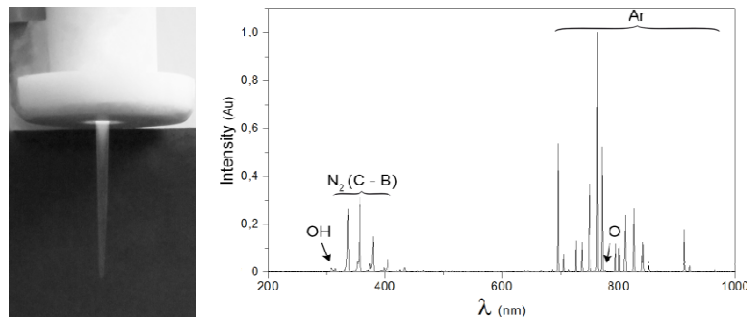


Fig. 1 Argon atmospheric pressure plasma jet and optical emission spectrum.

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