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BOOK OF ABSTRACTS



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Bactericidal effects of argon surface discharge in long tube on planktonic bacteria

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Non-thermal plasma at atmospheric pressure is predetermined for decontamination of thermally sensitive surfaces, because it produces reactive species and UV emission, while temperature remains close to ambient. Pulsed corona discharge in argon flowing inside the narrow long tube can decontaminate its inner wall and can be used in medicine (catheters or endoscope tubes) [1].

An atmospheric pressure dry and humid argon pulsed corona discharge was propagated in a 49 cm long quartz tube (8 mm inner diameter). Positive high voltage (HV) pulses (25 kV peak, 2.2 μ s width, 500 pulses/s) were applied to a tungsten needle electrode at the tube inlet; the grounded electrode was at the tube outlet. The bacterial survival in the discharge and the UV effect from the discharge were tested on two 10 μ l *Escherichia coli* droplets (10⁸ cfu/ml) deposited on the inside and outside surface of the tube 2 and 44 cm from the HV electrode. The results suggest that the major contributors to the measured bactericidal effect are OH radicals with the additional effect of UV B radiation. Pulsed discharge plasma in dry and wet argon is promising for bio-decontamination of inner walls of long tubes because it operates at atmospheric pressure without surface heating (temperature remained below 29°C) and does not produce toxic by-products.

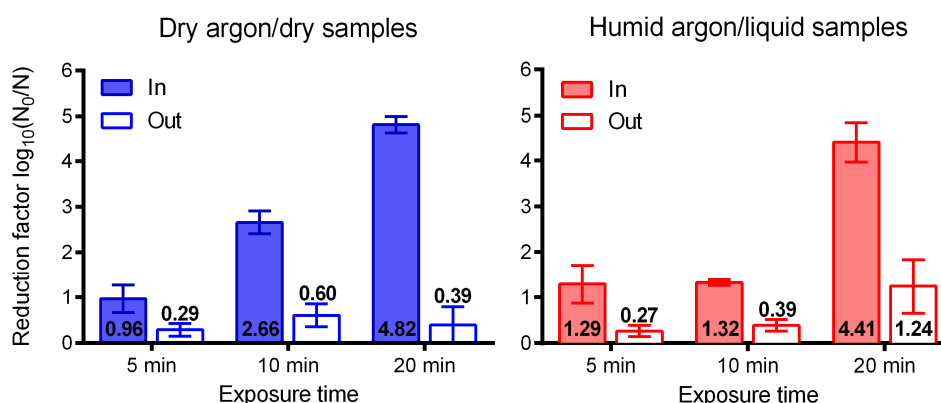


Fig. 1 *E. coli* reduction factor measured after the argon plasma treatment (In) and the argon plasma-generated UV B radiation (Out) for increasing exposure times at 44 cm in dry and humid argon with liquid and dried samples. Assays were carried out in triplicates. Graphed: mean \pm SEM.

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[1] Z. Kovalova, et al., *J. Phys. D: Appl. Phys.* **48**:46, 464003 (2015).