Inactivation of E. coli in Water Using Pulsed Dielectric Barrier Discharge in a Coaxial Reactor

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Results from an experimental study about the elimination of ATCC 8739 Escherichia coli bacteria in water by means of Pulsed Dielectric Barrier Discharge (PDBD) atmospheric pressure plasmas are presented. The plasmas are generated by an adjustable power source capable to supply high voltage (1-30 kV) pulses 1-50 µs long at 100-1000 Hz frequencies. A coaxial reactor formed by a one gas inlet ~30 cm³ cylindrical stainless steel chamber and a straight central filament has been selected for the process. The bacterial concentration per ml was varied from $10^3$ hasta $10^8$. Oxygen was added to the gas supply in order to increase the ozone content in the process, achieving an inactivation percentage in the order of 80%. Later on, the oxygen injection was modulated so as to suppress it alternately for specific time intervals, leading to elimination percentages above 99%.

Keywords
Pulsed Dielectric Barrier Discharge atmospheric pressure plasmas
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