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ABSTRACTS

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Atmospheric Pressure Plasma Jet for Decontamination Purposes

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Presently many medical wards, biotechnological facilities and food production factories struggle with persistent microbial infections caused by pathogens deposited on various inert and living surfaces.

The compact, portable, low-temperature gas discharge plasma device for cold decontamination of various heat-sensitive surfaces and materials based on Atmospheric Pressure Plasma Jet (APPJ) was proposed. Experimental set-up consisted of the following sub systems:

- gas and liquid dosing sub-system,
- electrical discharge generating sub-system
- chemical and biological analyzing sub-system

The main part of the device was powered changeable needle electrode encapsulated an insulated case. Screw, turtle and flat surface shapes of central electrodes were made of stainless, acid-proof steel and tungsten. Discharge gap was between 1 to 4 mm. The nozzle electrode was powered by regulated RF supply through an impedance matching network.

Oxygen, air and nitrogen were used as substrate gases. Gas flows ranged from 0.5 to 10 dm³/min. Basic electrical characteristics of working device in various regimes were analyzed in order to optimize parameters of power supply and device itself. Concentrations of oxidants were measured as sufficient for decontamination purposes. Produced discharge plasma sized from 3 to 20 mm in diameter and length. Temperature of plasma was below 100°C.