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Inactivation of Airborne Bacteria using Compact Dielectric Barrier Discharge Reactor KAVITA RATHORE, DAVID STAACK, Texas AM University — Airborne pathogens are responsible for most of the infectious diseases and the vast majority of which are uniquely adapted to spread in the indoor environments. An effective and economical sterilization method is required for living spaces, offices and healthcare facilities. Dielectric Barrier Discharge (DBD) treatment is a promising technology for fast and effective sterilization of surfaces, waterflow, and airflow. A compact DBD system is designed and developed for decontamination of airborne bacteria. It is capable of sterilizing at a volumetric flow rate of 2.20610-3 m3/s. The active DBD volume consists of dielectric tubes arranged in hexagonal pattern, also known as staggered grid arrangement. Tubes have a gap of 1.3 mm for carrier gas/liquid the flow. Self-mixing of airflow while passing through the tubes is one of the main characteristics. The maximum air velocity between the electrode tubes of discharge area is 2 m/sec. The designed system is capable of achieving 5-log reduction (99.999%) in the concentration of the airborne bacteria after single airflow pass through the plasma. The DBD treatment requires relatively shorter exposure time (milliseconds) for rapid inactivation of microorganisms in bio-aerosols. Additionally, DBD treatment is safer compared to toxic chemical and ultraviolet radiations.

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