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Plasma Wand Device for Surface Sterilization

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Atmospheric pressure plasmas are a source of a range of reactive species, UV light, and charge that has the capacity to destroy bacteria and viral particles. The destruction pathways include mechanical or chemical destruction of the outer protective envelope or genetic material damage. Here we present the capacity of a plasma tool called the plasma wand to deliver oxidative stress to surfaces for the purpose of sterilization. Delivery of hydrogen peroxide and ozone is quantified along with the production of reactive nitrogen species using chemical probes and physical targets. The effect of these species on E-Coli colonies is also ascertained. Preparation for MS2 phage as a surrogate virus is described. Implications for the treatment of COVID-19 virus is discussed along with a review of diagnostic tools required to access efficacy. This latter point is generally applicable to all plasma based sterilizers and thus serves as general guidance for accessing decontamination.