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OH radical flux measurements in the far effluent of a He-H_2O RF plasma jet. HAROLD MCQUAID, PAUL MAGUIRE, Ulster University — The production of ROS continues to define a plasma's ability to induce change in biological material. The presence of gaseous H_2O either inside the plasma or via downstream atmospheric interaction, inherently results in the formation of the most biologically reactive ROS, OH. The short-lived nature of radicals such as OH has led to the application of APPJs via a direct or 'in contact' application. The work presented here illustrates the ability of a humidity-controlled APPJ to deliver a measurable OH flux of 1.9e19 $m^{-2}s^{-1}$ from a significantly remote distance of over 100 mm, modify protein and DNA via OH interaction at 50 mm and rapidly kill E.coli up to 150 mm. OH density measurements performed in the treated liquid via fluorimetry were found to depend heavily on He feed gas humidity. The enclosed system ensures a simple chemistry dominated by H_2O_2 and OH while maintaining low temperature interaction. Simulation of water dissociation products highlights the importance of H and H_2O_2 densities in the efficiency of OH delivery. The capacity to deliver short lived radicals long distances introduces APPJs to a wide range of treatments previously thought inapplicable.

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