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Irrigation water enrichment using atmospheric pressure dielectric barrier discharge EDGAR PEREZ-LOPEZ, VENKATTRAMAN AYYASWAMY, University of California, Merced — Low temperature plasmas ignited above the surface of water has been studied for years due to their importance in practical applications in biology, chemistry, and electrochemistry. Specifically, the application of strong electric fields on the surface have been investigated and developed for use in wastewater treatment and environmental applications. The current work deals with the injection of nitrate ions into irrigation water. Several dielectric barrier discharge based plasma ignition configurations that ignite the plasma in ambient air (as opposed to underwater) are considered and the rate of nitrate ion injection and energy requirements are quantified for each configuration. The charge acquired by a 10,000 pf capacitor connected in series with the reactor in conjunction with the voltage across the reactor electrodes is used to measure the input power. The nitrate ion concentration as a function of time is measured and in combination with the energy input to the reactor is used to assess the energy efficiency of each reactor configuration.Based on the results obtained for the configurations considered here, recommendations are made for the optimal set-up for injecting nitrate in flowing water.

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