

Abstract Submitted
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APNTP Inactivation of MS2 Bacteriophage: Effect of operating parameters on virucidal activity NID'A ALSHRAIEDEH, MAHMOUD ALKAWAREEK, SEAN GORMAN, School of Pharmacy, Queen's University Belfast, Belfast, BT9 7BL, UK, WILLIAM GRAHAM, Centre for Plasma Physics, Queen's University Belfast, Belfast, BT7, BRENDAN GILMORE, School of Pharmacy, Queen's University Belfast, Belfast, BT9 7BL, UK — Atmospheric pressure non-thermal plasmas (APNTP) provide a promising alternative method for surface decontamination. Norovirus is globally the most common etiological agent of acute non-bacterial gastroenteritis outbreaks. APNTP have proven to be effective in inactivation of MS2 bacteriophages, widely employed as surrogate for human norovirus. Here we explore the optimization of a helium-based kHz APNTP by varying the oxygen concentration (from 0 to 0.75%) in the feed gas and the operating frequency (from 10 to 40 kHz). It has been established that both these changes increase the reactive oxide concentration in the plume and we see a correlation between both increasing oxygen concentration and operating frequency and reduction in survival density of treated bacteriophages. For example increasing the O₂ concentration from 0 to 0.5 to 0.75% increased the log reduction from 4.98 to 5.93 to 7.06, respectively. These results will be discussed in the context of recent studies where singlet delta oxygen was shown to cause MS2 phage inactivation.^{1,2}

¹Q T Algwari, PhD Thesis QUB (2011).

²E M Hotze et al *Environ. Sci. Technol.* 43(17): 6639-6645.

Nid'a Alshraiedeh
Queen's University Belfast

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