Atmospheric-Pressure Cold Plasma as New Strategy in Disinfection of *Fusarium spp*

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Fusarium is a widespread fungus distributed in soil, plants and many other organics. Recently, infections caused by *Fusarium* species have been increasing in frequency among human, especially invasive fungal infections in immunosuppressed patients. Cutaneous infection will lead to red or gray macules, papules, pustules and subcutaneous nodules, and it is even lethal to some patients with damaged immune function [1]. Most *Fusarium* infections fail to respond to clinical antifungal therapy, and some effective antifungal agents usually result in patient's neutropenia.

In this study, a direct-current, atmospheric-pressure, He/O2 (2%) cold plasma microjet (PMJ) was used to disinfect 10 clinical isolates of *Fusarium spp* (five isolates of the *F. solani* and five non-*F. solani* isolates: three *F. oxysporum* and two *F. proliferatum*), both in air and in distilled water. Effective inactivation was achieved both in air and in water within 6 min of plasma treatment. The inactivation was verified by a XTT test. Three kinds of strong reactive oxygen species, which were believed to be the lethal factors generated in the plasma treated distilled water, were detected by electron spin resonance (ESR) spectroscopy, namely hydroxyl radical (.OH), superoxide anion radical (.O2 -), and singlet oxygen (1O2). **.**O2 – is shown to be the precursor of .OH. The concentrations of 1O2 and .OH are evaluated by comparing the ESR signals from plasma microjet (PMJ) treated samples with that from different concentrations of 2,2,6,6-tetramethylpiperidine 1-oxyl (TEMPO) in water under identical experimental conditions. This study may provide a novel approach for clinical therapy for *Fusarium* cutaneous infection.

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References

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