

The fungal spores survival under the low-temperature plasma

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Résumé

Microbicidal effects of low-temperature plasma generated in electrical discharges are a well established area of research and the mainstream of study of several laboratories in the world. This paper presents an experimental apparatus for the decontamination and sterilization of water suspension of fungal spores. The fungicidal effect of stabilized positive and negative flashing corona discharges on three fungal species *Aspergillus oryzae*, *Cladosporium sphaerospermum* and *Penicillium crustosum* was studied. Simultaneously, the slower growing of exposed fungal spores was observed. The obtained results are substantially different in comparison with those of the analogous experiments performed with bacteria. It may be concluded that fungi are more resistant to the low-temperature plasma.

Introduction

There are numerous works describing the biological effects of low-temperature plasma generated in electrical discharges, devoted mainly to the killing of prokaryotic bacteria (see reviews Laroussi 2005, Scholtz et al. 2007, Moreau et al. 2008) or various applications in human medicine (Fridman et al. 2008). Concerning fungi, only Akishev et al. (2008) mentioned the inactivation of *Aspergillus niger* and *Candida lipolytica* on agar surface after exposure with the plasma jet device. The possible application of plasma sterilization may be useful e.g. for treatment of fruits' surface, preventing the mould overgrow and bacterial putrefaction.

The low temperature plasma was generated using the previously described (Julák et al. 2006) simple point to plane apparatus of an open-air type. The ground electrode was realized by the surface of water suspension of microorganisms. All exposures were performed under laminar flow of HEPA-filtered air to prevent the airborne contamination; an air-conditioning of the laboratory controlled the ambient conditions. The suspensions of conidia were prepared immediately before the exposure to the positive and negative discharge and exposed for various time intervals. The effects of spores inactivation and dynamics of the micromycete growth after exposure were observed.

References

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