

**TITLE:** STUDY OF ANTIFUNGICAL ACTION OF A NON-THERMAL PLASMA JET OF HELIUM/ COMPRESSED AIR ON BIOFILMS OF YEAST OF THE GENUS *CANDIDA*

**AUTHORS:** Figueira, F.R.<sup>1</sup>, Doria, A.C.O.C.<sup>1</sup>, Redi, G.T.C.<sup>1</sup>, Gonçalves, R.C.<sup>1</sup>, Oliveira, A.L.<sup>1</sup>, Lima, J.S.B.<sup>1</sup>, Maciel, H.S.<sup>1,2</sup>, Pessoa, R.S.<sup>1,2</sup>, Khouri, S.<sup>1</sup>

**INSTITUTION:** <sup>1</sup>Laboratório de Biotecnologia e Plasmas Elétricos, Instituto de Pesquisa e Desenvolvimento, Universidade do Vale do Paraíba, São José dos Campos, São Paulo, Brasil  
<sup>2</sup>Departamento de Física, Instituto Tecnológico de Aeronautica, São José dos Campos, São Paulo, Brasil.

**ABSTRACT:**

*Candida* species are the major etiological agent of the life-threatening invasive infections in patients who are severely immunocompromised. In fact, these species are the fourth most common cause of hospital-acquired infections in the bloodstream. It is estimated that in Europe, the incidence of this type of infection by this pathogen varies from 6.7 to 54 per 1000 admissions in ITU. In the United States, this ratio varies from 0.28 to 0.96, and in Latin America of 1.2 and 5.3. Catheter-related infection occurs every time due to the formation of biofilm, consisting of the association of microorganisms adhered to a surface by means of an extracellular matrix of polymers, being thus more resistant to antibiotics and immune factors, when compared to planktonic cells. The conventional surface sterilization methods have some drawbacks: use of high temperature processing, making it impossible to sterilize heat sensitive materials; use of toxic chemicals; and or long sterilization times. These disadvantages have encouraged the search for new approaches, and sterilization by non-thermal plasmas has attracted the attention of researchers. In the biomedical area, atmospheric plasmas have shown great potential in multiple applications, however, of greater interest is the microbial inactivation, both in the form of biofilms, as in the form of planktonic cells of bacteria and fungi. It is believed that the effectiveness is due to plasma products, such as reactive oxygen species (ROS) and reactive nitrogen species (RNS). The properties and formation of products from the plasma can be modified according to the different types of plasma, source configurations, applied voltage, type and gas flow. The aim of this work was to conduct a comparative assessment of the efficacy of inactivation of biofilms of standard and clinical strains (CEP/UNITAU Protocol n° 542/11) of the species: *Candida albicans* and *Candida parapsilosis* on polyurethane substrate. For this, we used atmospheric pressure plasma jets of helium/air mixture, and operated in continuous or pulsed mode. Scanning electron microscopy images were used to visualize the biofilms on the substrate. The best treatment was for the group of 6 l/min of He and 4 l/min of air with 1 cm and continuous mode, for both investigated *Candida* strains. In overall, the investigated conditions of plasma jets presented an efficacy in the inactivation of biofilms, specially the clinical ones.

**Keywords:** *Candida spp*, biofilm, atmospheric plasma, scanning electron microscopy

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