



Plasma: a new technology to control seed contamination

Sorge C¹, Brandão J¹, Doria A², Khouri S², Rodrigues B¹, Pessoa R^{1,3}

¹Universidade Brasil, São Paulo, Brasil

²Universidade do Vale do Paraíba, São José dos Campos, Brasil

³Instituto de Tecnologia da Aeronáutica, São José dos Campos, Brasil
cah.sorge@gmail.com

Background, Motivation and Objective. The yield of the food crop is of paramount importance and is directly related to the various chemical, physical and environmental factors. Consequently, is strongly related to the financial importance of agribusiness in the national economic scenario. Plasma technology has become a versatile and promising treatment technique, which usually leads to positive results when applied for biomedical ^[1] and agriculture pursuits ^{[2][3][4]}. In this context, we evaluated in this work the influence of different plasma compositions on the germination of onion seeds.

Methods. For this study, commercial onion seed samples were randomly selected and irradiated with plasma source. These onion seed are naturally contaminated with *Penicillium* sp ^[5]. For irradiation of the samples, a gliding arc reactor was used, with gas exhaustion in a reverse vortex and plasma generation by a direct current source (10 kV). The plasma was generated by using argon, helium and air, pure or their mixtures. The treatment periods were fixed in five, ten and fifteen minutes. After irradiation, the samples were then incubated in Petri dishes for 10 days and evaluated daily, for counting germinated seeds. This incubation aimed at simulating germination chambers, with natural photoperiod and periodic watering.

Results. During the treatments, different discharge voltages depending on the gas chemistry provided were observed. High temperatures were also verified during containing plasma composed of air, which have positively influenced to control of the onion seeds contamination. Although the period of exposure of the samples did not exceed 15 min, the effects were permanent. Conversely, plasma treatments using pure helium and argon showed no effect in the microbiological development on the seeds.

Discussion and Conclusions. The fact that the association of air in the plasma generation system and its positive effects on the control of microbial growth may be related to the high rate of generation of reactive species of oxygen and nitrogen ^[6]. In this way, plasma treatments can be promising depending of the composition and conformation of equipment. Even though the action mechanisms of plasma cannot be elucidated with precision, these results open new possibilities for the development of others irradiation protocols and, thus, should be further studied for different samples and methods of treatments.

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Keywords. Plasma, gliding arc, decontamination, seeds, onion.

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