Characterization of plasma-treated gooseberry (Physalis Peruviana L.) seeds using photoacoustic techniques

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Climate change has altered hydrological patterns generating drought problems in agricultural production systems, such as decreased production yields, reduction of arable areas, crop loss, physiological and biochemical changes in plants [1, 2]. On the other hand, seed treatment with plasma has been used to improvement the plant´s antioxidant defense system and counteract the negative effects of Reactive Oxygen Species that are produced in drought stressful situations, as well as to improve its physiological variables [3]. Many techniques have been used to evaluate the changes produced in the seeds due to plasma treatments; however, it is necessary to use non-invasive sustainable techniques to avoid destroying samples, such as photothermal techniques, which consist of generating and detecting thermal waves in the study materials to obtain their thermal properties, absorption spectra, permeability, photosynthesis, among others [4]. In this research, gooseberry seeds were treated under three conditions: control, vacuum, and plasma at different exposure times, then they were characterized by photoacoustic microscopy (PAM), scanning the sample, and obtaining their thermal images. Fig 1 shows the thermal images obtained by means of PAM of the seed without treatment and treated with vacuum and the degradation that it suffers can be observed, this could make the seeds more permeable and reduce the imbibition time to achieve a successful emergence.

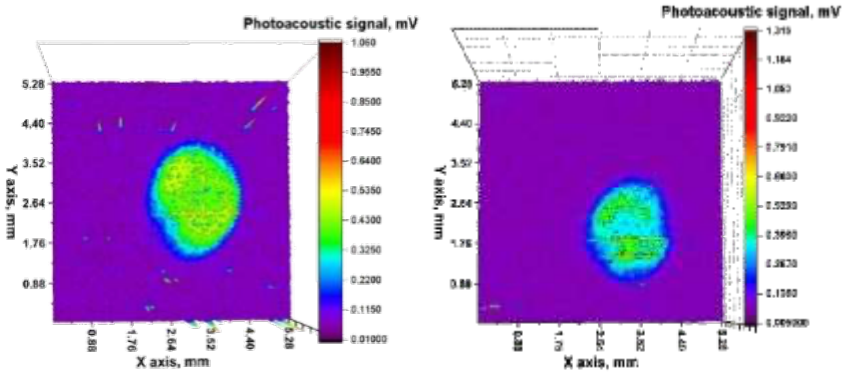

Fig. 1. Thermal images of gooseberry seeds (*Physalis Peruviana L.*) a) without treatments and b) vacuum treated.

References

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