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Presentation Type: Poster presentation

Abstract Title: Cryopreservation of switchgrass (*Panicum virgatum*) protoplasts

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Abstract (250 words or less): In recent years, the increased effort in genetic modification of plant cells and protoplasts has necessitated the need for methods to effectively store these materials with a reduced probability for genetic mutations. As such, cryopreservation allows the indefinite storage of plant cells and protoplasts with low cost, minimal effort, and a small space requirement. The two most common procedures for cryopreservation are slow-freezing and vitrification, which reduce the formation of ice crystals during freezing through application of a cryoprotectant. In this work, both vitrification and slow-freezing methods were evaluated for the cryopreservation of leaf mesophyll protoplasts from switchgrass. In total, 10 vitrification solutions were tested, along with 4 slow-freezing solutions. In all experiments, protoplasts were isolated from leaf tissue, and the density and viability were measured before and after cryopreservation using a hemocytometer and the viability dye, propidium iodide. The percent recovery was determined as the number of viable protoplasts divided by the total number of protoplasts in the initial solution. This allowed for measurement of not only the viability of the cells after cryopreservation, but also a measure of the efficiency of the procedure accounting for loss. The percent recovery after slow-freezing was as high as 50%, while vitrification achieved a maximum of 5%. It is hypothesized that the disparity between the methods is due to the high viscosity of the vitrification solutions, and the toxicity of these solutions relative to the slow-freezing solutions. In conclusion, slow-freezing can be considered an effective method to cryopreserve mesophyll protoplasts from switchgrass.