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Cryopreservation of *in vitro* Grown Shoot Tips of Korean Potato Varieties by Droplet-vitrification

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Potatoes are the world's 4th major food crop after maize, rice, and wheat and also are a staple food for 1.3 billion people. Due to their wide adaptability to various environmental conditions, their yeild capacity, and high commercial value, potatoes have contributed to global food security. Many potato germplasms are commonly preserved as whole plants in fields or in storage to maintain their particular genetic combinations. However, field maintenance is expensive and has the risk of potential losses from diseases, pests, plant ageing and climate change. Over the past four decades, meaningful efforts have been made toward the safe long-term conservation of potatoes through cryopreservation methods such as droplet-vitrification. In this study, we tested 4 Korean potato varieties('Golden Egg', 'Golden Ball', 'Ja-Young' and 'Ha-Ryeong') with the modified potato droplet -vitrification protocol. Potato shoot tips are precultured in a sucrose-enriched medium(0.3 and 0.7M for 7 and 17hrs, respectively) and submitted to a loading step with C4 solution for osmoprotection. The treated explants were dehydrated with Plant Vitrification Solution(PVS)2 which is 80% A3 solution in ice for 30 minutes. Thawing and unloading steps were performed with 0.8M sucrose solution for 30 sec(40℃) followed by 30min(25℃, room temperature). In a potato post-culture medium(MS+0.1 mg·L^{-1} GA_3+0.1 mg·L^{-1} kinetin), we obtained a survival rates of post-thawed explants ranging 16.1-82.2%. The results suggest that modified and optimized protocols are required dependinig on every cultivar, genetic and ecological types. To achieve higher survival and regeneration rates, each step within the cryoprocedure must be carefully optimized.

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