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Effects of Silver Thiosulphate and Salicylic Acid on the long-term maintenance of the embryogenic callus of *Vitis vinifera*

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Abstract

New Plant Breeding Techniques (NPBTs) have the potential to revolutionize the genetic improvement of grapevine. However, the practical application of these techniques is limited by several challenges, such as the difficulty in generating embryogenic calluses, maintaining their competence during *in vitro* cultivation, and regenerating plants without defects. To overcome these challenges, we conducted a study to test the effect of two treatments on callus cultures derived from different grapevine varieties, with and without embryogenic competence. The tested substances were Silver Thiosulphate (STS) an ethylene inhibitor, and Salicylic Acid (SA), an elicitor with different effects depending on the concentration of use beyond the ethylene inhibitor activity. Our observations revealed a differential response to the treatments depending on the tested variety. In some varieties, STS treatment enhanced the embryogenic competence of the calluses, while also having a growth-depressing effect on the non-embryogenic calluses. In contrast, the effect of SA was more dose-dependent and varied across different varieties. In some cases, the highest tested concentration of SA had a growth-depressing effect on both embryogenic and non-embryogenic calluses, while in other cases, it only affected embryogenic calluses. Despite these variations, both STS and SA treatments showed promising results in enhancing embryogenic competence, and we are currently evaluating the regeneration of embryos from callus after these treatments and the combined effects of STS and SA. Our study highlights the importance of testing the efficacy of different treatments on multiple grapevine varieties to identify the most effective strategies for NPBT applications.

Keywords: embryogenic callus, ethylene inhibitor, silver thiosulphate, salicylic acid.