

# Development of a Novel Anther Culture Protocol and Comparison of Four Commercial Potato Cultivars Under *In Vitro* Conditions

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## ***Abstract***

Haploid cell cultures play a crucial role in potatoes (*Solanum tuberosum* L.). However, in Sri Lanka, no protocol has been developed for obtaining potatoes through haploid anther cultures. Therefore, the objectives of this study were to establish a protocol for another culture that facilitates callus development and to identify the most responsive potato cultivar. Four potato varieties (Factor 1) were used: Granola (V1), SBM (V2), SGM (V3), and SEM (V4), with different stages of flower buds (Factor 2): Premature (S1), Mature (S2), and post-mature (S3). They were arranged as a two-factor factorial using a completely randomized design with thirty-six replicates. Surface sterilization of explants was performed following standard procedures. The culture media were prepared (1.0L) with MS nutrients, including 0.2mg/l of 2-4D and 0.5mg/l BA as supplements. The explants (5 anthers/petri dish) were introduced and incubated at 24±2 °C, 75% humidity for three weeks. Uncontaminated Petri dishes were placed at 25±2 °C, 75% RH, and 16h/8h photoperiod with 3000 lux of light for three weeks. Data were then recorded. The results indicated that Variety 2 (SBM) consistently exhibited lower callus percentage, fewer calluses, lower contamination, and higher non-responsiveness and browning compared to the other varieties. In contrast, Variety 3 (SGM) demonstrated the highest callus percentage, suggesting potential characteristics for mitigating tissue browning. Overall, the study emphasizes the importance of optimizing culture conditions to enhance the success and reliability of another culture experiments in potatoes. Further investigations and refinement of the culture protocols may lead to improved outcomes and contribute to the development of enhanced potato cultivars.

***Keywords: Anther culture, Browning, Contamination, Callus, Flower buds***