

## Determination of Effect of Pretreatment and Best Medium for Anther Culture for Selected Potato Varieties (*Solanum tuberosum* L.)

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### Abstract

Potato (*Solanum tuberosum* L) is a starchy, tuberous crop and extensively cultivated in Nuwara Eliya and Badulla districts. Among the cultivated varieties in Sri Lanka, Granola was introduced variety and variety Golden Star was developed by Agriculture Research Station, Sitha Eliya. Vegetatively propagated potato using seed tubers are highly susceptible for diseases. Because anther culture can ensure that potato plants are disease-free, objectives were to determine the effective pretreatment, best medium and best performing variety for anther culture to develop a protocol for anther culture. Under glass house conditions during May to September, Golden Star and Granola are the only varieties produced flowers. Flower buds (4 to 6 mm long) of Golden Star and Granola were kept in refrigerator under 4 °C for 24 hours and 6 °C for 48 hours for pretreatment. Anthers were inoculated in six media in first stage. Number of contaminated petri dishes, number of days taken to anther enlargement, days taken to color change, difference of anther length, callus percentage and average diameter of calli were recorded after 8 weeks from explant establishment. In second stage after callus induction, developed calli will be transferred to a recommended regeneration media containing MS medium + 0.2mg L<sup>-1</sup> BAP + 0.1mg L<sup>-1</sup> GA<sub>3</sub> + 0.01mg L<sup>-1</sup> NAA. Number of days taken to calli regeneration, regenerated calli percentage and total number of shoots were recorded after 6 weeks from transferred. The lowest contamination percentage (16.6%) was observed on anthers pretreated at 4 °C for 24 hours. Days taken to anther enlargement, days taken to color change and difference of anther length are not differed significantly. The number of minimum days taken to callus formation (11 days) resulted at 6 °C for 48 hours pretreated anthers in MS medium supplemented with 6% sucrose, 2 mg L<sup>-1</sup> 2, 4-D, 1 mg L<sup>-1</sup> BAP, 0.1 mg L<sup>-1</sup> IAA and 0.5% activated charcoal. The significantly highest callus percentage (21.388%) and maximum average diameter of calli (4.375 mm) at 5% resulted from anthers in MS medium supplemented with the 6% sucrose, 1 mg L<sup>-1</sup> 2, 4-D, 2.5 mg L<sup>-1</sup> BAP, 0.1 mg L<sup>-1</sup> IAA and 0.05% activated charcoal in Golden Star variety. Number of days taken to calli regeneration, regenerated calli percentage and total number of shoots resulted none on transferred regeneration medium. In order to develop a protocol for anther culture, the best pretreatment is 4 °C for 24 hours. MS medium supplemented with the 6% sucrose, 1 mg L<sup>-1</sup> 2, 4-D, 2.5 mg L<sup>-1</sup> BAP, 0.1 mg L<sup>-1</sup> IAA and 0.05% activated charcoal is the best culture medium for callus induction. Golden Star is the best variety for the anther culture in this May to September season.

Keywords: Potato, pretreatment, callus induction, anther culture, regeneration