DEVELOPMENT OF AN ANTHER CULTURE PROTOCOL FOR BRINJAL VARIETIES *(Solanum melongena* L.*)* BY VARYING THE HORMONE COMPOSITION OF THE INITIATION MEDIUM

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ABSTRACT

Brinjal *(Solanum melongena)* is an important solanaceous crop cultivated extensively in tropical and subtropical regions for its nutritional and economic value. The development of pure homozygous lines through conventional breeding is laborious and time-consuming; therefore, anther culture provides an efficient alternative for the rapid production of doubled haploid plants. This study aimed to develop an efficient anther culture protocol for selected brinjal varieties by optimizing the hormonal composition of the initiation medium. Sterilized anthers from three hybrid brinjal varieties (SA-07, Amanda, and HORDI Hybrid 04) were cultured on Murashige and Skoog (MS) medium supplemented with varying concentrations of BAP, NAA, and kinetin, forming four treatments (T1-T4). The interaction between treatments and varieties was not statistically significant at the 5% level ($p > 0.05$) for any measured parameter, indicating that variation was primarily due to the individual effects of genotype and medium composition. Among the treatments, T3 (3 mg L^{-1} BAP + 1 mg L^{-1} NAA + 3 mg L^{-1} kinetin) resulted in the highest anther size enlargement (2.33 ± 0.33%) in SA-07, while no enlargement was observed in T2 and T4 of HORDI Hybrid 04. The highest callus formation (16.70 ± 10.50%) occurred in T1 (2 mg L^{-1} BAP + 1 mg L^{-1} NAA + 2 mg L^{-1} kinetin) for SA-07, confirming its superior androgenic response. Although treatment effects were not statistically significant for callus formation ($p = 0.133$), varietal effects were significant ($p = 0.041$), highlighting the influence of genotype on in vitro response. Contamination levels did not differ significantly among treatments or varieties ($p > 0.05$). Overall, the results demonstrate that hormonal balance and genotype are critical determinants of success in brinjal anther culture. The MS medium supplemented with 2 mg L^{-1} BAP, 1 mg L^{-1} NAA, and 2 mg L^{-1} kinetin proved most suitable for callus induction in SA-07, suggesting its potential use in developing a standardized protocol for rapid doubled haploid production in brinjal breeding programs.

Keywords: Anther Culture, Androgenic, Callus Formation, Doubled Haploid, Genotype, Homozygous Lines, *Solanum melongena*, Size Enlargement.

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