Establishment of Callus Induction and Regeneration Protocol for Anthers of Selected Bell Pepper (*Capsicum annuum* L.) Varieties

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Abstract
Efficient breeding programs aid in the creation of new varieties with higher productivity and improved fruit quality. Plant breeders can improve the efficiency of breeding programs by the production of homozygous line. Anther culture is the most efficient method for obtaining haploid and diploid plant in bell pepper(*Capsicum annum L.*). The present study was carried out with two distinct F1 hybrid genotypes of bell pepper, such as "Indra" and "Orobelle", to find appropriate callus induction and regeneration media. The present study was carried out at the tissue culture laboratory of Horticultural Crops Research and Development Institute, Peradeniya, Sri Lanka. This was carried out in completely randomized design with ten replicates. Anthers were selected based on microscopic observation, where the nuclear stage is late uni-nucleate or early bi-nucleate. Two culture media, MS medium supplemented by T1 – 2,4-D (2 mg/L) + BA (3 mg/L) and T2 – BAP (1 mg/L) + NAA (0.5 mg/L) were compared in this experiment to test the efficacy of inducing anther derived callus structures in tested genotypes. Data were collected on number of calli produced by anthers and number of days taken for callus induction. After callus induction, selected calli were transferred into a regeneration medium, which include MS medium with T1 – BAP (1 mg/L) + Kinetin (0.1 mg/L), T2 - BAP (1mg/L) and T3 - Kinetin (0.2 mg/L). Observations were taken for calli growth, appearance and greening of calli. There was no significant difference between the two anthers induced callus media on growth of calli. However, there was a significant difference ($P \leq 0.05$) for the number of days taken for callus induction for two different treatments. The maximum greening percentage (54%) of callus was recorded in MS medium with BAP (1 mg/L) with "Indra". Greening of callus was not recorded in "Orobelle". In the regeneration medium, calli behaved in different ways. Light brown and cream colored calli were responded well to the regeneration medium, and observed calli enlargement and greening. Regeneration ability of the calli has to be studied further to produce double haploid plants.

Keywords: Anther culture, Bell pepper, Callus induction medium, Regeneration medium

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