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Dicamba Growth Regulator Promotes Genotype Independent Somatic Embryogenesis from Immature Zygotic Embryos of Tropical Maize Inbred Lines

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Abstract: Maize is one of the most important cereal crops in Sub-Saharan Africa and an important source of energy for humans. However, the difference in the dedifferentiation frequency of immature embryos among various genotypes indicates that callus induction and genetic transformation is dependent on the genotype. This phenomenon is an impediment in the fundamental process of improving tropical maize germplasm especially through genetic engineering. Here, five tropical maize (*Zea mays* L.) genotypes, CML 216, CML 144, A 04, E 04 and TL 21, were evaluated for callus induction on MS medium supplemented with the growth regulator dicamba. Embryogenic and non embryogenic callus induction was independent of genotype when young immature embryos, 12 days after pollination (DAP) were used for tissue culture in combination with dicamba. The optimal concentration of dicamba for induction of embryogenic callus in all the genotypes was 3 mg/L, which was also the concentration at which non embryogenic callus formation was lowest. The frequency of embryogenic callus induction ranged from 35% to 79% among the five genotypes and somatic embryos regenerated R_0 shoots that produced normal R_1 progenies. This regeneration method is expected to facilitate the development of a more efficient genotype independent *Agrobacterium*- mediated transformation system for tropical inbred lines.

Key words: Tropical maize, genotype independent, dicamba, somatic embryogenesis.

1. Introduction

Tropical maize is a major commodity in sub-Saharan Africa and Latin America agriculture and a major source of income for the poor resource populations [1]. Though protocols are available for embryogenic calli-mediated tropical maize regeneration, they are mostly variety-dependent [2-5], a phenomenon that has been an impediment to the elemental process of efficient regeneration and breeding of tropical maize lines for agronomic traits through genetic engineering.

During dedifferentiation of the maize immature embryos into callus tissue, the cells acquire high energy charge due to enrichment of pyruvate, glycolysis and gluconeogenesis metabolic pathways [6]. The improvement in embryo cell number and quality as a result of ectopic expression of *Brassica napus* Shoot Meristemless (STM) (BnSTM) was linked to the increased pyrimidine and purine salvage activity

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