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IMPROVING SEED NUTRITIONAL QUALITY BY BIOLISTIC TRANSFORMATION OF TROPICAL MAIZE

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Maize is an important crop that provides a significant amount of protein and energy for human and livestock nutrition. Brazil produces more than 30 millions tons of this cereal yearly in 13 million hectares. The major structure of the maize kernel, the endosperm, constitutes approximately 80% of the mature grain dry weight. The endosperm proteins of maize have a low percentage of several amino acids, such as methionine, tryptophan, and lysine, which are essential for humans and other monogastric animals. One of the major goals of this research at EMBRAPA/CNPMS is to improve endosperm protein quality by overexpression of a methionine rich protein, delta-zein in the endosperm using the gamma zein gene promoter. This promoter, the delta-zein coding sequence and its polyadenilation site were isolated by PCR from genomic DNA using primers designed in according with known sequences and confirmed by sequencing analysis. The binary vector pC3301 containing the gamma-zein gene promoter directing the expression of the delta zein was used in biolistic mediated maize transformation. For the biolistic transformation, helium pressure, microcarrier flying distance, type of microcarrier particle, microcarrier concentration and DNA concentration, were optimized analyzing the transient expression of GUS and anthocyanin. These reporter systems proved to be useful for protocol optimization of tropical maize lines. Resistant calli were selected in a N6 based medium supplemented with 2mg/L Dicamba and either 3mg/L PPT or 30 mg/l hygromycin. Putative transformed maize plants were regenerated and are growing in the greenhouse. Further DNA, RNA and protein analysis will confirm transformation.

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