



PLASTID ANALYSIS OF PIGMENTED UNDIFFERENTIATED CELLS OF MARIGOLD *TAGETES ERECTA* L. BY TRANSMISSION ELECTRON MICROSCOPY.

ABSTRACT

Marigold (*Tagetes erecta*) flowers are primarily used in industry for their high pigment content. Flower color development implies that chloroplast–chromoplast transition is associated with carotenoid biosynthesis. We report the recovery of undifferentiated pigmented marigold cells, various callus tissues, and their analysis by transmission electron microscopy in order to observe accumulating pigment and development of subcellular structures. Callus was generated from leaf explants and after several rounds of recurrent selection. Green-, yellow-, and brown-colored callus were obtained that showed distinct carotenoid profiles. For green material, violaxanthin, lutein, zeaxanthin, and β -carotene were produced, while yellow callus generated mainly lutein, as did the brown callus. Chloroplast–chromoplast transition was followed by measuring plastid size and shape in undifferentiated marigold cells by digital image analysis. Cellular alterations were evident in brown callus. Chloroplasts were the main structure in green callus, while yellow callus clearly showed the formation of plastoglobules, structures that are correlated with chloroplast–chromoplast transition. The high number of plastoglobules observed in yellow callus is possibly directly related to pigment synthesis and accumulation.

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