Transformation of a high-molecular-weight (HMW) glutenin subunit Dy10 gene into maize

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ABSTRACT

Particle bombardment has been used to transform maize genotype Hi-II. Immature embryos were co-transformed with a plasmid containing the selectable and scorable marker genes (bar and uidA, respectively) and a plasmid containing the high-molecular-weight glutenin subunit Dy10 gene. Eight transgenic events (T_0) were recovered from 1000 bombarded scutella (transformation efficiency thus 0.8%). T_1 generation was produced by cross pollination between T_0 plants and non-transgenic plants of the Egyptian inbred line Sd63. Integration of trangenes has been confirmed in the genome of T_0 plants by PCR and Dot blot hybridization analysis. Expression of marker genes was detected in T_0 plants by leaf painting and histochemical staining for bar and uidA genes, respectively.

***Keywords**: glutenin, transformation, maize, uidA, bar,PCR.*

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INTRODUCTION

Wheat flour is different from other cereal flours, including maize, because it contains gluten that gives it the elasticity and extensity required for bread making (Barro *et al.*, 1997). Gluten consists mainly of two types of seed storage proteins, the glutenins and the gliadins. Glutenins are classified into high-molecular-weight (HMW) subunits and low-molecular-weight (LMW) subunits. Although the HMW glutenins contribute only about 5% of the total protein in mature wheat kernels (Shewry *et al.*, 1989), the elasticity of wheat dough depends mainly on the HMW glutenins, so they are important in bread industry (Payne *et al.*, 1981) but the mechanism by which this is done is still unclear (Payne *et al.*, 1979).

Cloned HMW glutenin genes have been shown to be functional when introduced into *Eschericia coli* (Galili, 1989), tobacco (Roberts *et al.*, 1989), wheat (Alpeter *et al.*, 1996; Blechl and Anderson, 1996; Barro *et al.*, 1997; Alvarez *et al.*, 2000), tritordeum (Rooke *et al.*, 1999) and maize (Sangtong *et al.*, 2002).

Dough made from maize flour lacks elasticity and extensibility (Santong *et al.*, 2002). A probable cause of this is that maize endosperm lacks the proteins responsible for this trait. The HMW glutenin gene could be used to develop maize with novel dough characteristics. Our goal was to transform Egyptian maize with a number of HMW glutenin genes to develop novel maize dough characteristics. These novel dough characteristics could increase the content of