

INVITED ARTICLE

Nutritional Enrichment of Maize through Molecular Breeding

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ABSTRACT

Malnutrition affects a large proportion of population, and has emerged as a serious health issue worldwide. Besides affecting growth and development in humans, malnutrition also contributes to poor socioeconomic development. Maize is one of the most important cereal crops, and used as an important source of food and feed, thereby provides valuable source energy. However, traditional maize is poor in nutritional qualities. Essential amino acids like lysine and tryptophan, vitamins such as vitamin-A and vitamin-E, and minerals like iron (Fe) and zinc (Zn) are present in low concentration in maize kernels. Recessive genes like opaque2 and opaque16 enhance lysine and tryptophan, while natural variants of crtRB1 and lcyE increase the concentration of vitamin-A in maize kernel. In addition, mutant vte4 gene causes enhancement in vitamin-E, while mutated versions of lpa1 and lpa2 reduce phytic acid thereby enhance the bioavailability of Fe and Zn in the maize grains. Availability of molecular markers provide opportunity to undertake molecular breeding for accelerating the breeding cycle and development of biofortified maize hybrids. Here, we presented the status of prospects of development of biofortified maize hybrids through molecular breeding with a special reference to India. We also presented various challenges and opportunities to popularize the newly developed nutritionally enriched maize hybrids.

Keywords: Biofortification, Maize, minerals, molecular marker , protein and vitamins.