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Sommario/riassunto

"Recent advances in the genome editing methods especially the CRISPR-Cas system for the precise engineering of the target plant genes/genomes enabled numerous applications of this technology for crop improvement programs and functional genomics studies. In the last few years, several advances have been done in the CRISPR-Cas tool kit including the identification of new Cas proteins having a diverse range of PAM specificity, base editing technologies and prime editing without any stand break, trans-gene free editing, nano-particle mediated delivery of the CRISPR tool kit, development of various ready to use vectors for numerous purposes etc. These advancements make this system more efficient and effective for genome engineering, both in-vivo as well as in-vitro. The modified tool kit has been utilized in several agricultural and horticultural crop species including rice, tomato, banana etc., either for nutritional improvement or for stress tolerance. Further, it has been demonstrated that the CRISPR tool kit can also be utilized in the non-transgenic mode for trans-gene free editing, which has been recently deregulated by various regulatory bodies in several countries including India and USA. These announcements of deregulation have opened a new avenue and strongly boosted the research and developments by utilizing the genome engineering tools for numerous purposes in recent years. Nutritional improvement and stress tolerance have been of prime importance in the last few decades due to increasing nutritional deficiency in the various regions and changes in climatic conditions. The use of genome engineering methods has been efficiently demonstrated for nutritional improvement in various agricultural and horticultural crops including rice, tomato, potato, banana, etc. Development of carotenoids and flavonoids rich cereals, tomato and fruit crops like banana, iron-enriched rice, maize and wheat etc. are a few examples of successful utilization of technology. Further, it is being utilized for abiotic and biotic stress tolerance, disease resistance, virus resistance, and ultimately for the improvement of yield in numerous important crop species"--
