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Chapter 4

CRISPR/Cas9: A powerful tool towards yield, quality and nutritional improvement in rice crop

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Abstract

Rice (*Oryza sativa* L.) feeds more than half of the world population. Besides yield, improvement of the quality and nutritional content of the grains is an important target for breeders. In last few decades, traditional breeding, mutational breeding and molecular breeding methods have contributed significantly to the understanding of genetic mechanisms of grain quality and production of new varieties. However, the ever increasing growing population and the adverse environmental conditionshas affected the yield and quality of rice production. Thus, researcher have adopted novel strategies to overcome the problems associated with conventional methods. CRISPR/Cas9 has emerged an efficient genome editing tool which has the ability to make specific and accurate edits in the target genome. Precise modifications have helped in improving the yield, quality and nutritional content of rice. The present chapter highlights the mechanism of CRISPR/Cas9 system and its applications in improving the yield and quality of rice grains. The chapter will also shed light on the recent advances in CRISPR system and the future implications of this novel technology towards rice improvement.

Keywords: CRISPR/Cas9, rice, genome editing, yield, quality, nutrition