



Category: Molecular Genetics

RNAi mediated down regulation of *BADH2* gene for expression of 2-acetyl-1-pyrroline in non-scented *indica* rice IR-64 (*Oryza sativa* L.)

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Abstract

Fragrance of rice is one of the most valued grain quality character thus, fetches much higher market price. 2-Acetyl-1-Pyrroline (2AP) is major aroma compound found in all parts of plant except root in scented rice. Classical and molecular genetics analyses revealed that a single recessive gene *betaine aldehyde dehydrogenase 2* (*Osbadh2*) is responsible for expression of 2AP in scented rice. Present study was aimed at inducing expression of 2AP in non-scented indica rice cultivar IR-64 by silencing *OsBADH2* via RNAi technique. The regeneration protocol for IR 64 was optimised, 2, 4-D (MS + 2 mg/L) for callus induction, BAP (2.5 mg/L) for shoot induction and half MS supplemented with 0.1 mg/L NAA was found optimum for rooting. A vector pBSK was used for construction of RNAi cassette and pRI101-ON as a binary vector. *Agrobacterium* (GV3101) mediated transformation was done using embryogenic calli of IR-64 and transgenic calli were selected on MS medium containing kanamycin (250 mg/L). Gas chromatography analyses showed significant amount of 2AP (0.05 ppm) production in RNAi callus. The content of precursors, proline and methylglyoxal were not varied but GABA content was found to be reduced in RNAi callus (5.1±0.03 µg/g) than control (6.4±0.05 µg/g). Further transgenic calli showed 7 fold reduction in expression of *BADH2* transcript. The transgenic calli have been regenerated and transformed plants are under observation for further transcriptome analysis and 2AP quantification in seeds. The study demonstrated that RNAi approach could be successfully used for imparting pleasant aroma character in non-scented rice cultivars.

References

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