Characterization of New Activated Miniature Inverted Repeat Transposable Elementin Chinese cabbage

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Miniature inverted repeat transposable elements (MITEs) are non-autonomous DNA transposable elements. It has been reported that the MITEs activation is induced during tissue culture and activated MITEs play an important role in genome evolution. In this study, the candidates of activated MITEs in Chinese cabbage inbred line ‘CT001’ were investigated using Next-Generation Sequencing (NGS) and P-MITE database. From the P-MITE database, A01-643 element belonging to hAT MITE superfamily was mapped to A01 chromosome of ‘CT001’ pseudomolecule and showed transposition activity in IGA Chinese cabbage transgenic line using in silico analysis. PCR analysis with flanking primers for A01-643 element was conducted on Chinese cabbage inbred line ‘CT001’ and transgenic lines. IGA, BT, BTTP, and PPi transgenic lines showed transposition activity of A01-643 element while it was inactivated in ‘CT001’ inbred line. By sequencing the PCR product, consensus sequence of A01-643 element has been identified and the structure with 7-bp target site duplications (TSDs) and 8-bp terminal inverted repeats (TIRs) was confirmed. The results suggest that A01-643 element is activated during transformation process including tissue culture, and the structure of A01-643 element is similar to previous MITE element, PTE-1, containing the structures of TSDs and TIRs.

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