

Greenhouse evaluation on the performance of heat tolerant transgenic broccoli and genetic diversity analysis using inter simple sequence repeat (ISSR) markers

ABSTRACT

Background: Broccoli, *Brassica oleracea* subsp. *italica* is one of the many valuable *Brassica* species which is still less cultured under in vitro condition. Heat tolerant transgenic and non-transgenic broccoli cv. Green Marvel plantlets with well-developed root system obtained through in vitro culture were transferred into disposable plastic pots containing sterilized potting mixture consisting of (peatgro[®]) + coconut dust (2:1) and maintained in a growth chamber. Results: After one month, the hardened plantlets were transferred and maintained in a transgenic greenhouse. After four months of acclimatization in the transgenic greenhouse, the efficacy of HSP101 gene in increasing the heat tolerance of the transgenic broccoli was evaluated. Results showed that the transgenic plants could survive and performed normally, producing flower heads even at the highest tested temperature of 34°C. Seven transgenic broccoli lines with different gene copy number of the AtHSP101 gene as well as the control plant were assessed for genetic diversity using inter simple sequence repeat (ISSR) markers. Conclusions: ISSR results showed polymorphism and phylogenetic relationship between the transgenic and non-transgenic (control) *Brassica oleracea* cv. Green Marvel.

Keyword: AtHSP101 gene; *Brassica oleracea*; ISSR; Transgenic broccoli