

## عنوان مقاله:

Analysis of the Effect of Chimeric Chitinase Expressed by Synthetic Promoter in T<sub>2</sub> Generation of Transgenic Canola

## محل انتشار:

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## خلاصه مقاله:

The chitinase enzymes are known to play an important role in the plant defense system against phytopathogenic fungi. The effect of chimeric chitinase, which is chitinase- $\chi 2$  with a chitin-binding domain (ChBD), was previously analyzed in the T<sub>0</sub> generation of the transgenic canola. In this research, three homozygous lines (pGFC<sub>3</sub>, pGFC<sub>13</sub>, and pGFC<sub>26</sub>) containing a single copy of the transgene (chimeric chitinases) on the two homologous chromosomes were selected in the T<sub>2</sub> generation using a kanamycin-resistant marker (NPTII gene). The selected homozygous plants in T<sub>2</sub> generation were induced by chitin as an elicitor in the greenhouse. The results of the semi-quantitative RT-PCR, chitinase enzyme activity, and growth inhibition of phytopathogenic fungi demonstrated that the synthetic inducible promoter of transgenic plants was induced by chitin. The results of chitinase activity of extracted protein from all transgenic lines containing inducible promoters showed a ۳.۲-۵.۸-fold increase in chitinase activity compared to non-induced plants. The antifungal activity of the inducibly expressed chitinase was examined on *Sclerotinia sclerotiorum* and *Rhizoctonia solani*. The results showed that fungal growth inhibition increased via elicitor treatment of the inducible promoter, ۸۲% for *S. sclerotiorum* and ۶۲% for *R. solani*, respectively. The result of light microscopic observation demonstrated morphological changes in hyphae and that the expressed enzyme can lyse the mycelial cell walls of *R. solani*. Moreover, resistance to *S. sclerotiorum* in the intact leaves of transgenic plants (T<sub>2</sub>) was confirmed using bioassay analysis. Based on these results, it seems that the synthetic inducible promoter containing F cis-acting element driving chimeric chitinase is suitable for increasing the resistance of the canola transgenic plant when attacked by phytopathogenic fungi.

## کلمات کلیدی:

Cis-acting element, Phytopathogenic fungi, Chitinase activity, Transgenic canola, Inducible promoter

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