

P 49 Expression of a Pn-ANP in Transgenic Tomato Plants Confers Disease Resistance against Non-Chitin-Containing *Oomycetes* fungus *Phytophthora capsici*

이보영 · 이옥선 · 박남미 · 김영희 · 윤대진*

경상대학교 대학원 응용생명과학부

Objectives

It has been thought that the antifungal activity of hevein-like proteins is due to the chitin-binding activity of the proteins. However, this hypothesis was inconsistent with our data from in vitro assays indicating that Pn-AMP1 and Pn-AMP2, two hevein homologs from *Pharbitis nil*, showed antifungal activity against both chitin-containing and non chitin-containing fungi (Koo et al., 1998). To verify in vivo biological activity of Pn-AMPs, we constitutively expressed a Pn-AMP cDNA in tomato (*Lycopersicon esculentum*) plants under control of the cauliflower virus 35S promoter.

Materials and Methods

- Biological materials: Tomato (*Lycopersicon esculentum*) Korean cultivars, Seo-Gwang
- Chitin binding activity
- Antifungal activity test
- Construction of transgenic tomato expressing Pn-AMP2
- Northern blot analysis

Results

1. Chitin Binding Activity of Pn-AMPs Are Not Related to In Vitro Antifungal Activity
2. Constitutive Expression of Pn-ANP in Transgenic Plants

Confers Disease Resistance against Both Chitin-Containing and None Chintin-Containing Fungi

The transgenic plants constitutively overexpressing the Pn-AMP showed enhanced resistance to *Phytophthora capsici*, a non-chitin containing *Oomycetes* fungus and *Rhizoctonia solani*, a chitin containing *Agonomycetes* fungus. These results collectively indicate that chitin-binding activity of the Pn-AMP is not directly associated with its antifungal activity and the protein can be used as a novel source of disease resistance against agronomically important phytopathogenic fungi.

Discussion

In this report, we demonstrate that the transgenic plants constitutively overexpressing the Pn-AMP2 show enhanced resistance to *P. capsici* and *R. solani*, two major phytopathogen which threatens the yields of tomato crops. This is the first evidence that a hevein-like protein, overexpressed in transgenic plants, has a role in plant defense against both chitin-containing and non-chitin containing fungal pathogens. Furthermore, Pn-AMPs can be used as a novel source of disease resistance since they have the broad and potent antifungal activity against agronomically important phytopathogenic fungi.

Reference

- Koo et al., (1998) Two hevin homologs isolated from the seeds of *Pharbitis nil* L. exhibit potent antifungal activity. BBA1382, 80-90