

Characterization of a novel WRKY-type transcription factor associated with fruit maturation and plant defense against pathogens

Mi Yeon Lee, Sang Jik Lee, Min Jung, Soon Ho Choi, Phil Sik Lee,
Seung Gyun Yang and Chee Hark Harn

Biotechnology Center, Nong Woo Bio Co., Ltd., Yeosu, Jeonnam, Korea;

Objectives

The objective is to characterize a WRKY transcription factor associated with fruit maturation and plant defense against pathogens.

Materials and Methods

1. Pepper fruits (*Capsicum annuum* cv. SIRO and cv. SBV)
2. The subtraction was performed using the PCR-select cDNA subtraction kit. The cDNA library was prepared from mature red fruits.

Results and Discussion

We isolated a broad spectrum of ESTs differentially expressed during two different fruit maturation stages of pepper. One of the clones, encoding a putative WRKY DNA-binding protein, was characterized and named *CaWRKY1*. The *CaWRKY1* is 1.2 kb in length and contains a typical DNA-binding domain that specifically binds to W-box. Transcriptional activity of *CaWRKY1* was shown in yeast and the *CaWRKY1* was localized in nucleus indicating that the *CaWRKY1* is a transcription factor. Only one copy of the *CaWRKY1* gene was present in the pepper genome and it was highly expressed in red fruit and weakly in open flower. When the pepper leaves resistant against pepper mild mottle virus (PMMV) were exposed to PMMV, the *CaWRKY1* was expressed. In addition, the *CaWRKY1* was strongly expressed in ECW-20 pepper line that is resistant against *Xanthomonas campestris* pv. *vesicatoria* race 1, indicating that the *CaWRKY1* of pepper is related to defense mechanisms. This is the first report that WRKY may play roles in both fruit maturation and plant defense response against pathogens.