

# The Tomato SHW1 Homolog, SlSHW1 is a Necessary Regulator of Plant Development and Stress Responses

Nisha Gupta and Utpal Nath

*Department of Microbiology and Cell Biology  
Indian Institute of Science, Bangalore, India*

---

**Abstract**—Light is an important factor for plant survival. Although many genes showing light signaling functions have been reported in *Arabidopsis*, similar information is not available in crop plants. SHW1 (Short hypocotyl in white light) encodes a serine-arginine-aspartate rich protein that acts as a negative regulator of photomorphogenesis, however plays a positive regulatory role in light-regulated gene expression and root development in *A. thaliana*. In this study, *Arabidopsis* SHW1 homologue (Solyc04g005120.2) was isolated from tomato (*Solanum lycopersicum* var. Pusa Ruby) mature leaf cDNA and named it SlSHW1. We determined the effect of light on the expression of SHW1 during early seedling development in tomato, it was highly expressed in white light (WL) also upregulation was found in blue light (BL). Spatial-temporal expression analysis of SlSHW1 revealed a clear preferential expression in flower and fruit, especially at early stages of fruit development, and a weak expression in vegetative organs. In addition, we found that SlSHW1 was differentially expressed under various abiotic stresses such as high salinity, oxidative, and drought. Moreover, we assessed the functional orthology of SlSHW1 by their ability to complement *Arabidopsis* loss-of-function mutants and results indicate that tomato protein is a true functional homolog of its *Arabidopsis* counterpart. This study provides evidence that SHW1 is a regulatory protein and it plays an important role in overall plant growth and development.