

Molecular cloning of 4-coumarate:CoA ligase and total phenolic content in garlic (*Allium Sativum*)

Department of Crop Science, Chungnam National University,
Pham Anh Tuan, Xiaohua Li, Nam Il Park and Sang Un Park[†]

Objectives

In this study, a cDNA encoding 4CL enzyme was first isolated from garlic and characterized. Total phenolic content was also determined in different organs by Folin-Ciocalteu method. The results obtained in this study might offer some references to understand the accumulation of phenolic compounds in garlic.

Materials and Methods

- Garlic (*A. sativum*) was grown from bulbs in a green house at the experimental farm of Chungnam National University (Daejeon, Korea).
- RNA Extraction and Quantitative Real-time Polymerase Chain Reaction
- Isolation of 4-coumarate:CoA ligase cDNA
- Measurement of total phenolic content by the Folin-Ciocalteu method

Results

A cDNA encoding 4-coumarate:CoA ligase (4CL) enzyme was isolated from *Allium sativum* and the amino acid sequence alignments showed high identity ranging 69% to 82% with its homologs in other plants. Expression level of *As4CL* was the highest in roots, but lowest in bulbils. Total phenolic content was abundant in leaves, but poor in bulbs, which is the commonly used part of garlic.

.....
* corresponding author: Tel. 042-821-5730, E-mail: supark@cun.ac.kr

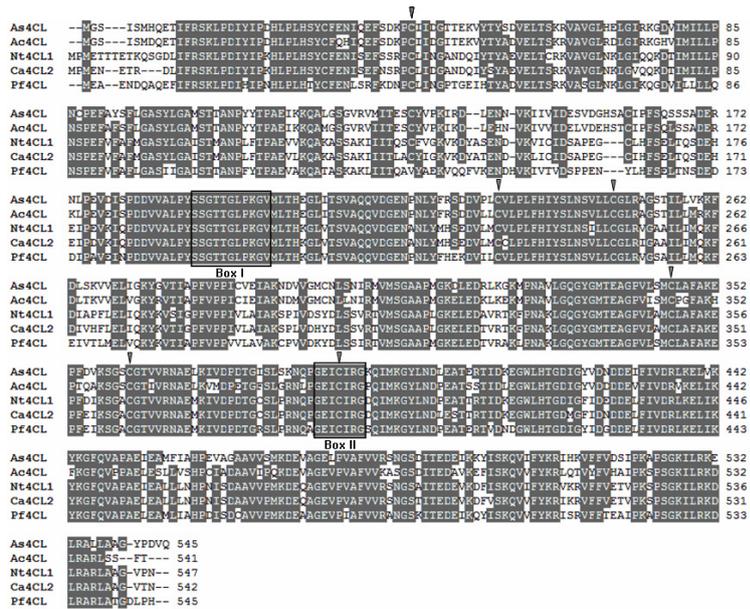


Fig. 1. Alignment of deduced amino acids of As4CL with 4CL from other plants. Box I and Box II are the two highly conserved motif of the 4CL. Conserved Cysteine residues are indicated by arrows. Ac4CL (AY541033) from *Allium cepa*, Nt4CL1 (U50845) from *Nicotiana tabacum*, Ca4CL2 (EU616540) from *Capsicum annuum*, Pf4CL (FJ230968) from *Paulownia fortunei*.

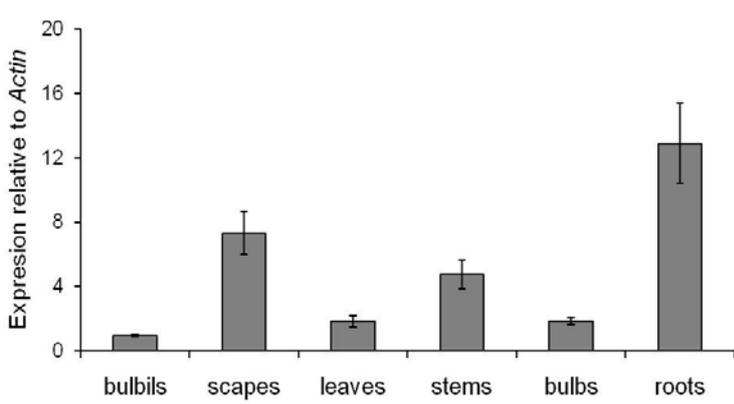


Fig. 2. Relative quantities of As4CL mRNA transcript in different organs of *A. sativum*. The values and the error bars indicated the average and the standard error from three independent reactions.

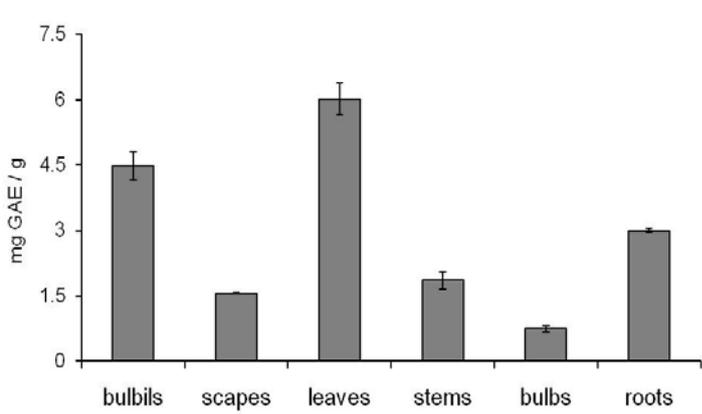


Fig. 3. Total phenolic content from different organs of *A. sativum* extracts. The values and the error bars indicated the average and the standard error from three independent determinations. GAE; gallic acid equivalents.

Acknowledgements: This work was supported by a grant (20080401-034-060-009-03-00) from BioGreen 21 Program, Rural Development Administration, Republic of Korea