

## The Inhibitory Effect on Aldose Reductase and Advanced Glycation End products by a *Prunella vulgaris* L. extract

Hong Mei Lee<sup>1</sup>, Jin Kyu Kim<sup>1</sup>, and Soon Sung Lim<sup>1,2\*</sup>

<sup>1</sup>Institute of Natural Medicine, Hallym University, Chuncheon 200-701, Korea

<sup>2</sup>Department of Food and Nutrition, Hallym University, Chuncheon 200-701, Korea

### Objectives

The current study aimed to evaluate the aldose reductase (AR) and advanced glycation end products (AGEs) inhibitory of *Prunella vulgaris* L. extract. These studies are important in understanding the inhibitory effects of *P. vulgaris* on diabetic complications.

### Materials and Methods

- Air dried *P. vulgaris* 1 Kg
- Extraction and isolation
- Determination of aldose reductase inhibition in vitro.
- Lens culture and intracellular galactitol measurement
- Blood culture and intracellular galactitol measurement
- Kinetics of recombinant human aldose reductase by active compound
- Effects on AGEs formation
- ABTS<sup>·+</sup> assay

### Results

The most serious problem in diabetes is that complications develop slowly and cause significant tissue damage before clinical signs appear. In recent years, the possibility of preventing the onset of diabetes using dietary supplements and herbal medicines has attracted growing attention. This is the first study to report that caffeic acid ethylene ester has AR inhibitory activity, potent AGE inhibitory activity, and antioxidant. This compound could potentially provide a new natural treatment for diabetic complications

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Corresponding author : Soon Sung Lim E-mail : limss@hallym.ac.kr Tel : 033-248-2133

Table 1. Inhibitory Effects of the Compounds Isolated from the *P. vulgaris* L. on rat lens aldose reductase (rAR) and human recombinant aldose reductase (rhAR)

Compounds	rAR	rhAR
	IC <sub>50</sub> (μM) <sup>a)</sup>	
Quercetin (Positive control)	5.66	19.23
caffeic acid (1)	—	—
protocatechuic acid (2)	—	—
p-hydroxycinnamic acid (3)	8.35	—
rosmarinic acid (4)	2.77	18.62
caffeic acid ethylene ester (5)	3.2	12.58
protocatechualdehyde (6)	—	—

Table 2. Inhibitory Effects of the compounds isolated from the *P. vulgaris* L. on advanced glycation end products (AGEs)

Compounds	Concentration (μg/mL)	Inhibition (%)	IC <sub>50</sub> (μM)
Aminoguanidine <sup>a)</sup>	196.08	66.85	
	98.04	37.39	1944.86
	19.61	3.96	
caffeic acid (1)	19.61	9.33	—
protocatechuic acid (2)	19.61	—	—
p-hydroxycinnamic acid (3)	19.61	—	—
rosmarinic acid (4)	19.61	20.67	—
	9.8	74.81	
caffeic acid ethylene ester (5)	4.9	33.94	33.16
	1.96	9	
protocatechualdehyde (6)	19.61	9.85	304.36

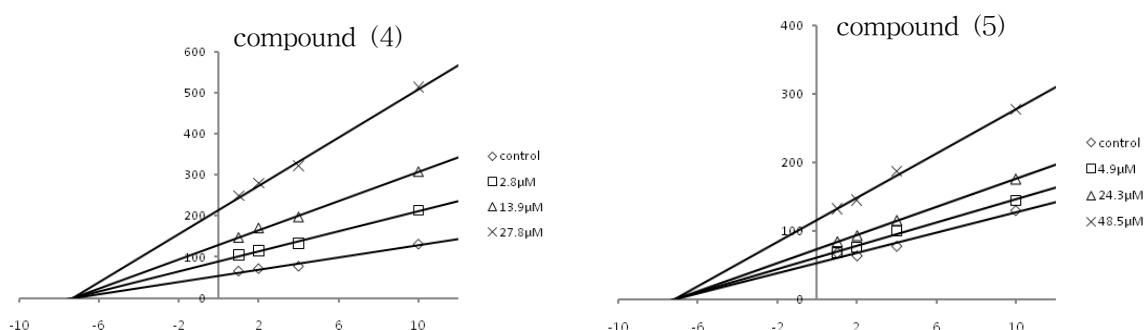


Fig. 1. Lineeweaver-Burk Plots showing the reciprocal of the velocity (1/v) of recombinant human aldose reductase versus the reciprocal of the substrate concentration (1/s) with DL-glyceraldehyde as the substrate concentration of 0.1 to 1 mM; rosmarinic acid (4), caffeic acid ethylene ester (5).