

## Inhibitory Effects of Flavonoids from *Lespedeza cuneata* on Aldose Reductase

Norman Quilantang<sup>1</sup>, Ju Sung Lee<sup>1</sup>, Young-Sok Yun<sup>1</sup>, Carlo Limbo<sup>1</sup>,  
Sang Woo Yoo<sup>2</sup>, Seong Lee<sup>3</sup> and Sanghyun Lee<sup>1\*</sup>

<sup>1</sup>Department of Integrative Plant Science, Chung-Ang University, Anseong 17546, Korea

<sup>2</sup>Research & Development Center, Natural Way Co., Ltd., Pocheon 11160, Korea

<sup>3</sup>Dankook University Hospital Research Institute of Clinical Medicine, Cheonan 31116, Korea

Inhibition of aldose reductase (AR) has been shown to prevent the onset and progression of many diabetic complications wherein several AR inhibitors were isolated from plants abundant in polyphenolic compounds. *Lespedeza cuneata* (Fabaceae), a perennial plant indigenous in East Asian countries, is shown to be abundant in these polyphenolic substances such as flavonoids and tannins. However, there are no studies to date regarding its effects on AR. In this study, the inhibitory activity of the methanol extract and stepwise polarity fractions of *Lespedeza cuneata* on AR was investigated. The bioactive compounds purified from *L. cuneata* by repeated column chromatography were also tested for AR inhibition. Results show that the ethyl acetate and *n*-butanol fractions of *L. cuneata* exhibited potent inhibition against AR with IC<sub>50</sub> values of 0.57 and 0.49 µg/mL, respectively. Further analysis led to the isolation of acacetin (**1**), afzelin (**2**), astragalín (**3**), kaempferol (**4**), and scutellarein 7-*O*-glucoside (**5**). The AR inhibitory effects these five compounds were also determined in which compounds **2**, **3**, and **5** showed potent AR inhibitory effects with IC<sub>50</sub> values of 2.20, 1.91, and 12.87 µM, respectively. Quantitative analysis of astragalín (**3**) by HPLC-UV was also performed in the leaves and roots of *L. cuneata* (0.626 and 0.671 mg/g, respectively). This study reports that the flavonoids isolated from *L. cuneata* show promising AR inhibitory activities which can be further developed as natural therapies for treating and managing diabetic complications.

**Key words:** Aldose reductase, Astragalín, *Lespedeza cuneata*

[본 연구는 iPET(816004-02-1-SB010) 사업의 지원을 받아 수행되었습니다.]