Ⅱ-8

Aldose Reductase Inhibitory Activity of Rutin from Tartary Buckwheat

Department of Applied Palnt Science, Chung-Ang University, Anseong 456-756, Korea: So-Youn Mok, Jeong Min Lee, Hye Min Kim, Sanghyun Lee*
Department of Food Science and Nutrition, Pusan National University, Busan 609-735, Korea: Eun Ju Cho
Highland Agriculture Research Center, National Institute of Crop Science, Pyeongchang 232-955, Korea: Young-Ho Yoon

쓴메밀의 주성분인 루틴의 알도즈 환원효소 억제효과

중앙대학교 식물응용과학과: 목소연, 이정민, 김혜민, 이상현*
부산대학교 식품영양학과: 조은주
국립식량과학원 고령지농업연구센터: 윤영호

Objective

AR, the key enzyme in the polyol pathway, acts an important role in the pathogenesis of diabetic complications. AR inhibitors (ARI) can prevent or reverse early abnormalities in diabetic complications. Nevertheless, none of ARI has achieved worldwide use because of limited efficacy or undesirable reaction. So then, evaluating natural sources for ARI potential may lead to the development of safer and more effective agents against diabetic complications. This study focuses on AR inhibition of rutin from tartary buckwheat.

Materials and Methods

○ Materials

Rutin (quercetin-3-rutinoside) is a major compound of tartary buckwheat.

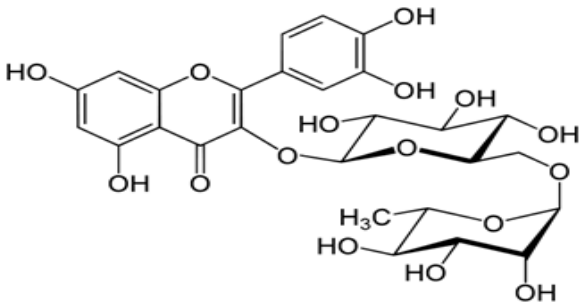
○ Methods

Rat lenses were removed from Sprague-Dawley rats (250-280 g) and preserved by freezing it until use. These were homogenized and centrifuged at 10,000 rpm (4°C, 20 min) and the supernatant was used as an enzyme source. AR activity was spectrophotometrically determined by measuring the decrease in absorption of β-NADPH at 340 nm for a 4 min period at room temperature with DL-glyceraldehydes as a substrate. The assay mixture contained 0.1 M potassium phosphate buffer (pH 7.0), 0.1 M sodium phosphate buffer (pH 6.2), 1.6 mM NADPH, and test sample (in DMSO) with 0.025 M DL-glyceraldehyde as substrate in quartz cell.

* Corresponding author: Sannhyun Lee Tel: 031-670-4688 e-mail: slee@cau.ac.kr

Results

Rutin (quercetin-3-rutinoside) is a major compound of tartary buckwheat.



The rat lens AR inhibition of rutin from tartary buckwheat was 64.29% at 1.0 mg/ml. Quercetin known as a very strong AR inhibitor (IC_{50} value, 0.19 mg/ml) in natural constituents was used as a positive control. The IC_{50} value of rutin was 0.66 mg/ml.

Table 1. IC_{50} of rutin from tartary buckwheat on rat lens AR inhibition

Compounds	Concentration (mg/ml)	AR inhibition[1] (%)	IC_{50}[2] (mg/ml)
Rutin	1.0	64.29	0.66
	0.5	49.44	
	0.1	16.31	
Quercetin[3]	0.5	73.32	0.19
	0.1	47.91	
	0.05	35.68	

[1] Inhibition rate was calculated as percentage with respect to the control value.
[2] IC_{50} value was calculated from the least-squa resregression equations in the plot of the logarithm of at three graded concentrations *vs* % inhibition.
[3] Quercetin was used as a positive control.

[Grant: Agenda Project (20100901-030-001-001-03-00), RDA, Korea]