

α -Glucosidase Inhibitory Activity of Isoflavones and Saponins from Soybean (*Glycine max* L.)

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[Introduction]

Soybean [*Glycine max* (L.) Merr.] belongs to the Leguminosae family has been used as a food and dietary supplement for a long time because of the importance of its nutritional properties and the functional characteristics. It is well established that isoflavones and saponins found in high concentrations in soybeans have received great attention due to their potential beneficial effects on human health. Especially, α -glucosidase inhibitors can retard the liberation of D-glucose from oligosaccharides and disaccharides from dietary complex carbohydrates and delay glucose absorption, resulting in reduced postprandial plasma glucose levels and suppressed postprandial hyperglycemia. This prompted us to investigate α -glucosidase inhibitory activity of seven isoflavones and ten soyasaponin derivatives.

[Materials and Methods]

A total seventeen isoflavone and soyasaponin derivatives isolated from soybean were provided by Division of Crop Foundation, NICS, RDA. In a spectrophotometric experiment, the initial rate of α -glucosidase was measured with a Spectra Max M2e spectrophotometer at 37 °C. The α -glucosidase activity assay was performed as below, 10 μ l of an ethanolic inhibitor solution was mixed with 200 μ l of 6.0 mM of *p*-nitrophenyl- α -D-glucopyranoside and 2,780 μ l of a 0.1 M phosphate buffer (pH 7.0) was added. Then, 10 μ l of a 0.1 M phosphate buffer solution (pH 7.0) of α -glucosidase (5 μ g/ml) was added. The resultant solution was mixed, and the enzyme activity was determined by monitoring the *p*-nitrophenol released from PNP-G at a wavelength of 400 nm.

[Results and Discussions]

Seventeen major isoflavone and soyasaponin derivatives were tested for their α -glucosidase inhibitory activity for beneficial effects on human health. Among them, daidzein and genistein inhibited α -glucosidase with IC₅₀ value of 13.7 and 8.8 μ M, respectively. The inhibition kinetic analysed by Dixon plot indicate that daidzein and genistein are noncompetitive inhibitor, and the inhibition constant K_i were calculated at 14.5 and 10.1 μ M, respectively. However, neither glucosides or malonyl glucosides inhibited α -glucosidase up to 100 μ M. Moreover, soyasaponin Ba and soyasaponin Bb were significant inhibitory effect with IC₅₀ of 24 and 32.2 μ M through simple reversible slow-binding inhibition.

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