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PREDICTION OF ANTI-DIABETIC ACTIVITY OF FLAVONOIDS TARGETING α -GLUCOSIDASE

Marisa Freitas^a, Adelaide Sousa^a, Daniela Ribeiro^a and Eduarda Fernandes^a^aUniversity of Porto, Portugal

The limitations of currently available oral antidiabetic agents in what concerns the efficacy/safety, together with the global development of the diabetes, have stimulated the scientific community to find alternative therapies. The inhibition of α -glucosidase, the most important enzyme in the gut for the breakdown of carbohydrates before monosaccharides absorption, has been recognized as the most effective measure in reducing post-prandial hyperglycemia (PPHG) from all available anti-diabetic drugs. Some flavonoids, have been shown to exhibit inhibitory effects against α -glucosidase enzymes. Nevertheless, the information found in the literature is disperse and variable, thus hindering comparisons and consequently conclusions about their efficacy against α -glucosidase activity. Thus, our aim was to establish a structure - activity relationship of a panel of flavonoids against α -glucosidase activity, covering a solid set of different structures. The evaluation of α -glucosidase activity was performed in vitro by monitoring the α -glucosidase-mediated transformation of the substrate p-nitrophenyl- α -D-glucopyranoside (pNPG) into p-nitrophenol. The inhibitory kinetic analysis was made by using nonlinear regression Michaelis-Menten enzyme kinetics and the corresponding Lineweaver-Burk plot. We concluded that the flavonoid structure, and the position and number of OH groups are determinant factors for the intended effect. The most active compound was quercetin, showing a competitive inhibition, which indicates that hydroxylation at 3, 5, 7 positions of the A-ring and at 3' and 4' positions of the B-ring, as well as the 2,3 double bond in the C-ring, are important for the inhibitory activity of flavonoids.

Biography

Marisa Freitas currently is Research Assistant at the Department of Chemical Sciences of Faculty of Pharmacy, University of Porto, and member of the Free Radical and Antioxidants Unit of this Department. She has built her scientific career on the evaluation of the antioxidant and anti-inflammatory activities of various natural and synthetic compounds, namely flavonoids. Her expertise on the anti-inflammatory effects of flavonoids have evolved to new horizons related the evaluation of flavonoids as interesting new anti-diabetic agents.

marisafreitas@ff.up.pt

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