Evaluation of solvent effects on the extraction of phenolic compounds and in vitro antidiabetic potential of Stevia rebaudiana extracts

Apart from being well known to the world as herb-based sweetening additive, Stevia rebaudiana (S. rebaudiana) and its phenolic compounds are considered as natural antidiabetic alternative to replace synthetic drugs that possess numbers of side effects. Therefore, this study was conducted to evaluate the solvent effects on the extraction of phenolic compounds of S. rebaudiana using water, methanol, ethanol and acetone as well as in vitro antidiabetic potential of the extracts. Quantification of the total phenolic content (TPC) and total flavonoid content (TFC) of the extracts were conducted using Folin-Ciocalteu reagent and aluminium chloride colorimetric method, respectively, while the antidiabetic activity of the extracts were determined by α-amylase inhibitory assay. As a matter of interest, TFC was found to be present at the highest concentration in ethanol extract (10.91 mg QE/g), while the presence of TPC showed no significant difference between water extract (6.65 mg GAE/g), methanol extract (6.96 mg GAE/g) and ethanol extract (6.43 mg GAE/g). These hence make more polar solvent as the most potential solvent for phenolic compounds recovery. In relation to the antidiabetic potential, the effects of the extracts in inhibiting α-amylase activity were investigated in vitro. Interestingly, among all S. rebaudiana extracts, water extract exhibited the most significant α-amylase inhibitory activity with IC50=8.63 µg/ml, comparable to synthetic drug, acarbose IC50=13.73 µg/ml. In addition, all the extracts were further analyzed using HPLC and showed the abundance presence of steviol glycoside in the water extract, the principal compound suggested for treating diabetes. Furthermore, GC-MS analysis has shown the major compounds found in all extracts were phenol, benzofuranone, nerolidol, spathulenol, carophyllene oxide, indanone, phytol, α-amyrin and several long chain fatty acids. These findings demonstrated that phenolic recovery was highly dependent on extraction solvent and the promising water extract as the best α-amylase inhibitory potential with greatest steviol glycoside recovery.

Biography

Uswatun Hasanah Zaidan has completed her PhD at Universiti Putra Malaysia (UPM) in the Department of Chemistry, Faculty of Science in 2011. She was appointed as a Senior Lecturer at the Department of Biochemistry, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia in 2012. She has completed her Postdoctoral studies in the School of Biosciences at University of Nottingham, United Kingdom from 2013-2015. Her research interests include food and nutritional biochemistry and bioactive compounds. She is a Member of Malaysian Society for Biochemistry & Molecular Biology (MSBMB), Formulation and Applied Science Research Group, UPM and also an Associate Researcher of Halal Product Research Institute, UPM.

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