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Alpha-Glucosidase inhibitory effect of psychotria malayana Jack Leaf: A rapid analysis using infrared fingerprinting (Article) (Open Access)

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Abstract

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The plant Psychotria malayana Jack belongs to the Rubiaceae family and is known in Malaysia as “meroyan sakat/salung”. A rapid analytical technique to facilitate the evaluation of the P. malayana leaves’ quality has not been well-established yet. This work aimed therefore to develop a validated analytical technique in order to predict the alpha-glucosidase inhibitory action (AGI) of P. malayana leaves, applying a Fourier Transform Infrared Spectroscopy (FTIR) fingerprint and utilizing an orthogonal partial least square (OPLS). The dried leaf extracts were prepared by sonication of different ratios of methanol-water solvent (0, 25, 50, 75, and 100% v/v) prior to the assessment of alpha-glucosidase inhibition (AGI) and the following infrared spectroscopy. The correlation between the biological activity and the spectral data was evaluated using multivariate data analysis (MVDA). The 100% methanol extract possessed the highest inhibitory activity against the alpha-glucosidase (IC_{50} 2.83 ± 0.32 µg/mL). Different bioactive functional groups, including hydroxyl (O-H), alkenyl (C=C), methylene (C-H), carbonyl (C=O), and secondary amine (N-H) groups, were detected by the multivariate analysis. These functional groups actively induced the alpha-glucosidase inhibition effect. This finding demonstrated the spectrum profile of the FTIR for the natural herb P. malayana Jack, further confirming its medicinal value. The developed validated model can be used to predict the AGI of P. malayana, which will be useful as a tool in the plant’s quality control. © 2020 by the authors.

Author keywords

Fingerprint | Infrared spectroscopy analysis | Orthogonal partial least square | Psychotria malayana | α-glucosidase inhibition

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