Screening of various parts of Phaleria macrocarpa plant for α-glucosidase inhibitory activity

ABSTRACT

Phaleria macrocarpa is an herbal plant used in Malaysia to enhance vitality. The aim of this study was to screen the α-glucosidase inhibitory activity of different parts (fruit flesh, leaves and stem) of *P. macrocarpa*. Methanol (polar) and n-hexane (nonpolar) extracts, obtained by room temperature solvent extraction, were evaluated for *in vitro* α-glucosidase activity inhibition. The compounds were identified by using gas chromatography-mass spectrometry (GC-MS) according to their similarity index of >70%, which might be responsible for α-glucosidase inhibitory activity. The methanol extract of the fruit flesh had the highest yield ($25.6 \pm 0.5\%$), whereas the n-hexane extract of the stem is more effective against α-glucosidase activity (IC_{50} 0.8 ± 0.1 μg/mL). The fruit flesh ($IC_{50}1.3 \pm 0.2$ μg/mL) and leaves ($IC_{50}1.6 \pm 0.6$ μg/mL) had also well effectively. The identified metabolites are predominantly phenolics, carbohydrates, triterpenes and organic acids, such as D-fructose, squalene, α-linolenic acid and α-D-glucopyranoside. In-depth chemical profiling using GC-MS was performed for the first time for this plant to assess the likely compounds present in the extract that could be associated with anti-hyperglycemic activity. Of the three parts tested, every part indicates the potential α-glucosidase inhibitory activity and hexane extract of stem showed more inhibitory activity among all extracts. Thus, *P. macrocarpa* can attenuate hyperglycemia by potently inhibiting carbohydrate hydrolyzing enzymes, making it a viable plant as a source of natural compounds for the management of type 2 diabetes mellitus.

Keyword: Phaleria macrocarpa; Herbal plant; α-glucosidase inhibitory activity; Malaysia