α-Glucosidase and α-amylase Inhibitory constituents of *Tinospora crispa*: Isolation and Chemical Profile Confirmation by Ultra-High Performance Liquid Chromatography-Quadrupole Time-Of-Flight/Mass Spectrometry

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ABSTRACT
Tinospora crispa has been used in Malaysia to treat diabetes mellitus. We evaluated the effects of compounds isolated from *T. crispa* vines on the starch digestive enzymes, α-glucosidase and α-amylase. Borapetoside C was the most potent α-glucosidase inhibitor (IC50 = 0.0527 ± 0.008 mg/ml), followed by 4-hydroxy benzaldehyde (IC50 = 0.557 ± 0.004 mg/ml), and the alkaloids lysicamine and liriodenine (IC50 = 0.562 ± 0.003 mg/ml). Borapetoside C also potently inhibited α-amylase inhibitory activity (IC50 = 0.775 ± 0.005 mg/ml). The relationship between compound activity and content in the extracts was determined by ultra-high performance liquid chromatography-quadrupole time-of-flight/mass spectrometry (UPLC-QToF/MS). These results suggest that borapetoside C is the main primary active component of *T. crispa* extracts, mediating α-glucosidase and α-amylase inhibition.

KEYWORDS: Fine chemicals; *Tinospora crispa*; Ultra-performance liquid chromatography; α-amylase; α-glucosidase

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