

## **Extraction and Isolation of Anti-hyperglycemic Compounds from *Cheilocostus speciosus* to produce sustained release formulations**

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Diabetes mellitus is one of the non-contagious diseases which has now become a major health problem all over the world. This study was conducted to identify a natural, safe, and reliable solution for “diabetes” with proper scientific validation. The objective of the study was to extract and isolate anti-hyperglycemic compounds from *Cheilocostus speciosus* leaves. For this, a successive extraction with diethyl ether, ethyl acetate, and ethanol using sonication at room temperature was performed to extract oven-dried (40 °C, 48 h) leaves of *C. speciosus*. Percentage inhibition of the enzymes and the IC<sub>50</sub> values were determined. But the extracts of diethyl ether and ethyl acetate did not exhibit proper percent inhibitions for both alpha-amylase and alpha-glucosidase activities. Porcine pancreatic alpha-amylase inhibitory activity was performed using the DNSA method and it was detected in ethanolic extract of *C. speciosus* leaves with an IC<sub>50</sub> of 17.12 mg ml<sup>-1</sup> and *Saccharomyces cerevisiae* alpha-glucosidase inhibitory activity was detected with an IC<sub>50</sub> of 21.20 mg ml<sup>-1</sup>. Both enzyme inhibitory activities were compared with that of commercial Acarbose (IC<sub>50</sub> values for alpha-amylase and alpha-glucosidase enzymes are 65.44 µg ml<sup>-1</sup> and 68.52 µg ml<sup>-1</sup>, respectively). When comparing with acarbose, a crude extract of *C. speciosus* leaves show promising nature to isolate antihyperglycemic compounds. Results also indicate that the alpha-amylase and alpha-glucosidase inhibition by the ethanol extract of *C. speciosus* are dose dependent. Therefore, this study proves that the ethanolic leaf extract of *C. speciosus* has enzyme inhibitory activities toward alpha-glucosidase and alpha-amylase which may helpful for the development of an anti-hyperglycemic formulation to reduce the postprandial glucose level. This will be carried out by bioassay-guided fractionation and isolated active compounds will be intercalated to montmorillonite, an aluminosilicate clay with high cation exchange capacity, and large specific surface area to produce sustained release formulation.

*Keywords: Cheilocostus speciosus, Alpha-amylase, Alpha-glucosidase, Diabetes mellitus*