Inhibition of Carbohydrate Hydrolysing Enzymes, Antioxidant Activity and Polyphenolic Content of Beilschmiedia Species Extracts

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Abstract. The goal of the present study was to provide in vitro evidence for potential inhibition of carbohydrate hydrolysing enzymes and antioxidant activities of methanol and ethyl acetate extracts from barks of two different Beilschmiedia species. These extracts were tested on α-amylase and α-glucosidase inhibitory activities, mode of enzyme inhibition, total polyphenolic content (TPC) and antioxidant capabilities. Methanolic bark extract of Beilschmiedia insignis demonstrated optimum inhibitory effects against α-amylase and α-glucosidase with IC₅₀ values of 3.233 µg/mL and 12.357 µg/mL, respectively. Further analysis of inhibition mode revealed that the extract demonstrated a mixed inhibition against both enzymes. In comparison to other extracts, methanolic bark extract of Beilschmiedia insignis demonstrated the highest TPC content of 420.393 mg GAE/g extract, lowest IC₅₀ value of 12.103 µg/mL for DPPH radical scavenging ability and highest FRAP value of 1904.247 µM Fe (II)/mg extracts, indicating the antioxidant potential of the extract. A significant strong correlation coefficient was observed between TPC with FRAP (r = 0.994, p < 0.01) and TPC with DPPH (r = -0.860, p < 0.01), signifying that antioxidant activity and reducing capability were contributed by the polyphenolic compounds present in the crude extract. Collectively, methanolic bark extract of Beilschmiedia insignis possessed significant carbohydrate hydrolyzing enzyme inhibitory effects and antioxidant activity, suggesting its possible alternative application for diabetes and postprandial hyperglycemia treatment.

1. Introduction

In 2012, it was estimated that 1.5 million deaths worldwide were caused by diabetes mellitus (DM), causing it to be ranked number eight among the leading cause of death among both sexes and the fifth...