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Original Article

In Vitro Antidiabetic and *In Vivo* Hypoglycaemic Activities and Toxicity of *Canarium zeylanicum* Bark Extracts

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Abstract: Aqueous bark extract of *Canarium zeylanicum* (Retz.) Blume (Burseraceae) is an antidiabetic remedy in indigenous medicine. Its antidiabetic potential has not been scientifically evaluated. In this study, antidiabetic activity and toxicity of the bark of *C. zeylanicum* were evaluated using a selected *in vitro* and *in vivo* set of experiments. A hot water extract (HWE) and an organic solvent extract (OSE) of the bark and respective negative and positive controls were subjected to *in vitro* α-amylase- and α-glucosidase-inhibitory and brine shrimp lethality assays. *In vivo* hypoglycaemic activity and hepato- and nephro-toxicities were evaluated by twice daily administration of each extract and the controls to 8 groups (n=10) of normoglycaemic Wistar rats for 14 days. Data of *in vivo* studies were statistically analysed using Minitab 16 with P- <0.05. IC_{50} values of HWE, OSE and the positive control in the α-amylase-inhibitory assay were 65.3 ± 18.5, 8.4 ± 4.1 and 0.04 ± 0.1 µg/ml, respectively; corresponding IC_{50} values in the α-glucosidase-inhibitory assay were 2.9 ± 0.1, 21.6 ± 0.5 and 0.01 ± 0.0 µg/ml. Brine shrimp lethality assay revealed that the extracts were non-toxic. *In vivo* studies revealed that extracts possess hypoglycaemic activity with higher percentage reduction (38.2 ± 12.9) of fasting blood sugar by OSE, high glucose tolerance, and the extracts were neither hepatotoxic nor nephrotoxic. Lupeol is one of the counterparts for the antidiabetic actions while some active compounds could not be resolved further. Results indicate that *C. zeylanicum* is a potential source for developing effective non-toxic antidiabetic drugs.

Keywords: *Canarium zeylanicum* antidiabetic plants, glucose tolerance

Introduction

Diabetes mellitus is a chronic metabolic disorder characterized by increased blood glucose levels due to inefficient insulin secretion or activity [1]. Uncontrolled blood glucose levels for a long time lead to diabetic complications such as peripheral neuropathy, nephropathy, loss of vision, etc. It was estimated that globally, there were 463 million diabetics in 20-79 age group in 2019 and this number is increasing at an alarming rate [2]. International Diabetes Federation has projected that the number of patients would be 700 million by the year 2045 [2]. The total global expenditure estimated for treating diabetes in 2019 was USD

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