ISSN: 1391-8796
Proceedings of 8th Ruhuna International Science & Technology Conference
University of Ruhuna, Matara, Sri Lanka
February 17, 2021

Homeostatic model assessment of a Sri Lankan polyherbal mixture in streptozotocin induced diabetic rats

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The homeostatic model assessment of insulin resistance (HOMA-IR) and homeostatic model assessment of β-cell functions (HOMA-β) are being recognized as important indices in evaluating the preclinical efficacy of novel antidiabetic agents. The present investigation was aimed to evaluate the effect of hexane extract of a Ayurvedic polyherbal mixture made from *Allium sativum* L. (cloves), *Murraya koenigii* L. Sprengel (leaves), *Piper nigrum* L. (seeds) and *Garcinia queasita* Pierre (dried fruits) on insulin resistance and β-cell functions in streptozotocin (65 mg kg^{-1},ip) induced diabetic rats. Insulin resistance and β-cell functions were evaluated using HOMA-IR and HOMA-β indices respectively. Wistar rats(b.w: 220 ±20 g, 10-12 weeks of age) were divided into four groups (n=6/group). Group one and two were healthy untreated control rats, and diabetic untreated control ratsand received distilled water. Group three and four were diabetic rats and treated with glibenclamide (0.5 mg kg^{-1}) and hexane extract (25 mg kg^{-1}) daily for 30 days, respectively. On the 30th day, fasting (8h) serum glucose and insulin concentrations were estimated, HOMA-IR and HOMA-β were calculated and the results were compared with respect to the diabetic control, statistically by one-way ANOVA followed by Dunnett's post hoc test. An improvement was observed in HOMA-β index of hexane extract treated rats (75.9 %) and glibenclamide treated rats (79.5 %) ($p<0.05$). The HOMA-IR index of the glibenclamide and the hexane extract treated rats was lowered by 25.4 and 23.4 % respectively. In conclusion, the hexane extract of the polyherbal mixture possess potent preclinical efficacy as indicated by the glucose homeostasis model assessment by up lifting β-cell functions while lowering the insulin resistance in diabetes rats.

Key words: *Clinical efficacy, hexane extract, homeostasis model, diabetes mellitus, polyherbal mixture*

Acknowledgements: National Research Council (NRC/17/033) for financial assistance

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