

Acute Antihyperglycemic Activity of a Selected Medicinal Plant Extract Mixture in Streptozotocin Induced Diabetic Rats

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Abstract : Diabetes mellitus is an ever increasing global health problem which causes disability and untimely death. Current treatments using synthetic drugs have caused numerous adverse effects as well as complications, leading research efforts in search of safe and effective alternative treatments for diabetes mellitus. Even though there are traditional Ayurvedic remedies which are effective, due to a lack of scientific exploration, they have not been proven to be beneficial for common use. Hence the aim of this study is to evaluate the traditional remedy made of mixture of plant components, namely leaves of *Murraya koenigii* L. Spreng (Rutaceae), cloves of *Allium sativum* L. (Amaryllidaceae), fruits of *Garcinia queasita* Pierre (Clusiaceae) and seeds of *Piper nigrum* L. (Piperaceae) used for the treatment of diabetes. We report herein the preliminary results for the in vivo study of the anti-hyperglycaemic activity of the extracts of the above plant mixture in Wistar rats. A mixture made out of equal weights (100 g) of the above mentioned medicinal plant parts were extracted into cold water, hot water (3 h reflux) and water: acetone mixture (1:1) separately. Male wistar rats were divided into six groups that received different treatments. Diabetes mellitus was induced by intraperitoneal administration of streptozotocin at a dose of 70 mg/ kg in male Wistar rats in group two, three, four, five and six. Group one (N=6) served as the healthy untreated and group two (N=6) served as diabetic untreated control and both groups received distilled water. Cold water, hot water, and water: acetone plant extracts were orally administered in diabetic rats in groups three, four and five, respectively at different doses of 0.5 g/kg (n=6), 1.0 g/kg(n=6) and 1.5 g/kg(n=6) for each group. Glibenclamide (0.5 mg/kg) was administered to diabetic rats in group six (N=6) served as the positive control. The acute anti-hyperglycemic effect was evaluated over a four hour period using the total area under the curve (TAUC) method. The results of the test group of rats were compared with the diabetic untreated control. The TAUC of healthy and diabetic rats were 23.16 ± 2.5 mmol/L.h and 58.31 ± 3.0 mmol/L.h, respectively. A significant dose dependent improvement in acute anti-hyperglycaemic activity was observed in water: acetone extract (25%), hot water extract (20%), and cold water extract (15%) compared to the diabetic untreated control rats in terms of glucose tolerance ($P < 0.05$). Therefore, the results suggest that the plant mixture has a potent antihyperglycemic effect and thus validating their used in Ayurvedic medicine for the management of diabetes mellitus. Future studies will be focused on the determination of the long term in vivo anti-diabetic mechanisms and isolation of bioactive compounds responsible for the anti-diabetic activity.

Keywords : acute antihyperglycemic activity, herbal mixture, oral glucose tolerance test, Sri Lankan medicinal plant extracts

Conference Title : ICBMMP 2018 : International Conference on Botanical Medicine and Medicinal Plants

Conference Location : Sydney, Australia

Conference Dates : January 29-30, 2018