

Molecular Mechanism on Inflammation and Antioxidant Role of Pterocarpus Marsupium in Experimental Hyperglycaemia

Authors : Leelavinothan Pari , Ayyasamy Rathinam

Abstract : Diabetes mellitus (DM) is a major and growing public health problem throughout the world. Pterocarpus marsupium (Roxb.) (Family: Fabaceae) is widely used as a traditional medicine to treat various diseases including diabetes. However, the molecular mechanism of Pterocarpus marsupium has not been investigated so far. Two fractions (2.5% and 5%) of extract from the medicinal plant, Pterocarpus marsupium (PME) were conducted in a dose dependent manner in streptozotocin (45 mg/kg b.w.) induced type 2 diabetic rats. Each fraction of PME was administered to diabetic rats intragastrically at a dose of 50, 100 and 200 mg/kg b.w for 45 days. The effective dose 200 mg/kg b.w of 5% fraction was more pronounced in reducing the levels of blood glucose (95.65 mg/dL) and glycosylated hemoglobin (HbA1c) (0.41 mg/g Hb), and increasing the plasma insulin (16.20 μ U/mL) level. Moreover, PME (200 mg/kg b.w) significantly ameliorated lipid peroxidation products (thiobarbituric reactive substances, lipid hydroperoxides) enzymatic (superoxide dismutase, catalase and glutathione peroxidase) and non-enzymatic antioxidants (Vitamin C, Vitamin E and reduced glutathione) levels. The altered activities of the key enzymes of lipid metabolism along with the lipid profile in diabetic rats were significantly reverted to near normal levels by the administration of PME 5% 200 mg/kg b.w fraction. PME (200 mg/kg b.w) has the ability to reduce the inflammatory cytokines, such as TNF- α , IL-6 mRNA, as well as protein expression and apoptotic marker, such as caspase-3 enzyme in diabetic hepatic tissue. The above biochemical findings were also supported by histological studies such as improvement in pancreas and liver. Pterocarpus marsupium could effectively reduce the hyperglycemia, oxidative-stress, inflammation and hyperlipidemia in diabetic rats; hence it could be a useful drug in the management of diabetes without any side effects.

Keywords : diabetes mellitus, streptozotocin, Pterocarpus marsupium, lipid peroxidation, Antioxidants, inflammatory cytokines

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