Nutrition

Effects of Naringin on hepatic paraoxonase activity and lipid metabolism in type 2 diabetic rats

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Abstract

Naringin is one of the citrus-derived flavonoids that have been reported for its antihyperglycemic, antihyperlipidemic and antioxidant properties. Although its usefulness as nutraceutical in the management of diabetes has been reported, there is a dearth of information on involvement of lipid-associated protein antioxidant like paraoxonase in its antidiabetic activity. In order to investigate this, high fat-low streptozocin model of type 2 diabetic rats were treated daily with 50mg/kg, 100mg/kg and 200mg/kg naringin orally for 21days. The levels of plasma insulin and dipeptidyl peptidase-4 (DPP IV) were determined using enzyme-linked immunosorbent assay while other biomarkers of T2DM, activity of paraoxonase and lipid profile were assayed spectrophotometrically. The levels of expression of hepatic 3-hydroxy-3-methyl-glutaryl-CoA reductase (HMGCR), scavenger receptor class B member 1 (SCARB1), Aryl Hydrocarbon Receptor (AhR), Lipoprotein Lipase (LIPL), and Lecithin—cholesterol acyltransferase (LCAT) were assessed using reverse transcriptase polymerase chain reaction technique. Naringin treatment resulted in a significant ($p<0.05$) decrease in levels of plasma glucose, insulin, free fatty acid, amylase and DPP IV. Naringin treatment was also associated with a significant ($p<0.05$) decrease in the levels of cholesterol and triglyceride in the plasma and liver in the dose-dependent pattern. In the liver, the activity of carnitine palmitoyltransferase was significantly increased ($p<0.05$) while the expression of HMGCR was only significantly ($p<0.05$) reduced by 200mg/Kg naringin treatment. Meanwhile, SCARB1, AhR, LIPL and LCAT were significantly ($p<0.05$) upregulated by naringin treatment. Although T2DM resulted in increased activities of PON in the plasma, HDL and VLDL, a decrease in activity was observed in the liver. These alterations in PON

activities were however significantly ($p<0.05$) reversed by naringin treatment. These results showed that PON is involved in the antidiabetic action of naringin.

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