


Article

Nootkatone, a Dietary Fragrant Bioactive Compound, Attenuates Dyslipidemia and Intramyocardial Lipid Accumulation and Favorably Alters Lipid Metabolism in a Rat Model of Myocardial Injury: An In Vivo and In Vitro Study

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Abstract: In the present study, we assessed whether nootkatone (NKT), a sesquiterpene in edible plants, can provide protection against dyslipidemia, intramyocardial lipid accumulation, and altered lipid metabolism in a rat model of myocardial infarction (MI) induced by subcutaneous injections of isoproterenol (ISO, 85 mg/kg) on days 9 and 10. The rats were pre- and co-treated with NKT (10 mg/kg, p.o.) administered daily for 11 days. A significant reduction in the activities of myocardial creatine kinase and lactate dehydrogenase, as well as non-enzymatic antioxidants, and alterations in lipids and lipoproteins, along with a rise in plasma lipid peroxidation and intramyocardial lipid accumulation, were observed in ISO-treated rats. ISO administration induced alterations in the activities of enzymes/expressions that played a significant role in altering lipid metabolism. However, NKT treatment favorably modulated all biochemical and molecular parameters altered by ISO and showed protective effects against oxidative stress, dyslipidemia, and altered lipid metabolism, attributed to its free-radical-scavenging and antihyperlipidemic activities in rats with ISO-induced MI. Additionally, NKT decreased the accumulation of lipids in the myocardium as evidenced from Oil red O staining. Furthermore, the in vitro observations demonstrate the potent antioxidant property of NKT. The present study findings are suggestive of the protective effects of NKT on dyslipidemia and the underlying mechanisms. Based on our findings, it can be suggested that NKT or plants rich in NKT can be promising for use as a phytopharmaceutical or nutraceutical in protecting the heart and correcting lipid abnormalities and dyslipidemia, which are risk factors for ischemic heart diseases.

Keywords: nootkatone; sesquiterpene; bioactive agents; fragrant molecules; essential oils; natural products



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