

Effects of thymoquinone rich fraction and thymoquinone on plasma lipoprotein levels and hepatic low density lipoprotein receptor and 3-hydroxy-3-methylglutaryl coenzyme A reductase genes expression.

ABSTRACT

The hypocholesterolemic effect of thymoquinone rich fraction (TQRF) extracted from *Nigella sativa* seeds using supercritical fluid extraction (SFE) in comparison with commercial available thymoquinone (TQ) in male Sprague–Dawley rats was investigated. Rats were fed prepared diet supplemented with 1% (w/w) cholesterol and treated with TQRF at, 0.5, 1 and 1.5 g/kg and TQ at 20, 50 and 100 mg/kg for 8 weeks. Plasma total cholesterol levels (TC) and low density lipoprotein cholesterol (LDLC) were significantly decreased in the TQRF and TQ treated rats compared to untreated rats. mRNA level of low density lipoprotein receptor (LDLR) was significantly expressed and the mRNA level of 3-hydroxy-3-methylglutaryl-coenzyme A reductase (HMG-COAR) was significantly suppressed in the TQRF and TQ treated rats at different doses compared to untreated rats. These new findings identify TQRF and TQ as natural cholesterol lowering agents, and our study provides a molecular basis for the mechanisms of action through regulation of cholesterol in two main mechanisms first, uptake of LDLC via up regulation of LDLR gene and second, inhibition the synthesis of cholesterol via suppressing the HMG-COAR gene.

Keyword: *Nigella sativa*; Thymoquinone; Thymoquinone rich fraction; SFE; LDLR; HMG-COAR; Gene expression; Real time PCR.