

Antioxidative and anti-inflammatory effects of taxifolin in H₂O₂-induced oxidative stress in HTR-8/SVneo trophoblast cell line

Abstract

Oxidative stress has been implicated in numerous pregnancy-related disorders. Biologically active plant secondary metabolites, which are present in everyday diet, could prove effective therapeutic agents in preventing these disorders. This study evaluated effects of taxifolin (dihydroquercetin) on ROS production, markers of oxidative damage to lipids and proteins, activity of antioxidant enzymes and production of pro-inflammatory cytokines in H₂O₂-induced oxidative stress in trophoblast HTR-8/SVneo cells. Taxifolin in 10 μM and 100 μM concentrations attenuated oxidative damage to lipids and proteins, as evidenced by a decrease in MDA content, extracellular LDH activity, carbonyl groups and nitrite contents. A reduction in the activity of antioxidant enzymes SOD, CAT and GPx in cells pre-treated with taxifolin, prior to H₂O₂ exposure, was also observed, along with a reduction in intracellular ROS production. Both evaluated concentrations of taxifolin showed anti-inflammatory activity in trophoblast cells, by reducing production of pro-inflammatory cytokines IL-1β and IL-6. In this model of H₂O₂-induced oxidative stress, taxifolin showed marked antioxidative and anti-inflammatory activities in trophoblast cells, adding further evidence of its protective effects and showing potential as a therapeutic agent in preventing adverse pregnancy outcomes.