Thymoquinone Inhibits Inflammation in IL-1β-Stimulated SK-N-SH cells

Thymoquinone is a phytochemical antioxidant compound in the oil obtained from the seeds of *Nigella sativa* (black cumin seed oil). Studies have suggested that thymoquinone produces anti-inflammatory property. Previously, we have shown that thymoquuinone inhibited neuroinflammation in LPS-activated rat priamry microglia. However, nothing is known about its direct effect on neurons. In this study, we have investigated the effects of thymoquinone on inflammation induced in SK-N-SH neuroblastoma cells stimulated with interleukin-1beta (IL-1β). Cultured SK-N-SH cells were treated with thymoquinone (0.5, 1 and 2.5 μM) prior to stimulation with IL-1β. Levels of prostaglandin E_2 (PGE_2) production was measured using enzyme immunoassay (EIA), while ELISAs were used to detect levels of pro-inflammatory cytokines tumour necrosis factor-alpha (TNFα) and interleukin-6 (IL-6). Levels of cyclooxygenase-2 (COX-2, microsomal prostaglandin E synthase-1 (mPGES-1) were measured with western blot. Further experiments were carried out on IκB phosphorylation and degradation using western blots. Results showed that thymoquinone (0.5, 1 and 2.5 μM) produced concentration-dependent and significant inhibition of PGE_2, TNFα and IL-6. These concentrations of the compound also reduced protein levels of COX-2 and mPGES-1. At 1 and 2.5 μM, there was marked inhibition of IκB phosphorylation and degradation by this compound. Taken together, these results demonstrate that thymoquinone suppressed inflammation in neurons, suggesting its therapeutic potential in inflammation-mediated neuronal damage found in neurodegenerative disorders.