Potential role of Nigella sativa (NS) in abating oxidative stressi-induced toxicity in rats: a possible protection mechanism

ABSTRACT

The seeds of Nigella sativa (NS), have been widely used in herbal medicines worldwide. It has been shown to possess prophylactic effects against oxidative stress. However, there is a paucity of information regarding the protective role of NS against oxidative stress, in the absence of toxic agents. The aim of the study was to elucidate the anti-oxidative stress pharmacodynamics of NS. Eighteen, 12-week-old Sprague-Dawley rats, weighing about 300 ± 25 gm were divided equally into six groups. Four of the groups were supplemented with NS at 100 mg/kg b.w/day orally (P.O.) and labeled as, 1st, 3rd, 5th and 6th day groups. The PCx (positive control) group was given distilled water orally, and the NCx (negative control) group rats were provided with food and water ad libitum. Blood samples were collected, and rats were sacrificed on days 1, 3, 5 and 6 (2h) post-treatment. The blood was used for oxidative stress enzymes analysis (SOD, GSH-Px and MDA), liver (ALT) and kidney (creatinine) function assay, and the liver, kidney and spleen were dissected for histology. The results revealed that NS exhibited an anti-oxidative stress effect in the liver and kidneys as indicated by the low levels of ALT and creatinine. In response to antioxidant enzymes, especially that of the 3rd-day treatment group, an increase in SOD and GSH-Px indirectly caused an alleviation of oxidative stress, leading to a much lower level of MDA. It was concluded that treatment with NS at 100 mg/kg b.w/per day for three consecutive days, demonstrated the highest efficacy in abating oxidative stress in rats.

Keyword: Antioxidant; GSH-Px; Nigella sativa; Pharmacodynamic and prophylactic