016/A

Investigation of the antioxidant activity of a herbal decoction with anti-carcinogenic properties

B P Galhena[1], M I Thabrew[1*], M G Thammitiyagodage
[1]*Department of Biochemistry and Clinical Chemistry, Faculty of Medicine, University of Kelaniya, Ragama*
[2] *Medical Research Institute, Colombo 8*

Nigella sativa (seeds), *Hemidesmus indicus* (root), and *Smilax glabra* (rhizome) are three important medicinal plants used for anti-cancer treatment by a family of indigenous medical practitioners in Sri Lanka. Recent *in vivo* investigations have demonstrated that a decoction prepared from *Nigella sativa* (seeds), *Hemidesmus indicus* (root), and *Smilax glabra* (rhizome) can offer significant protection against diethylnitrosamine (DEN) induced hepatocarcinogenic changes in rats. According to published literature, antioxidant activity is one of the mechanisms by which many plants and plant compounds mediate their anti-carcinogenic action. The aim of the present study was to investigate the antioxidant activity of the decoction comprising of *Nigella sativa* (seeds), *Hemidesmus indicus* (root), and *Smilax glabra* (rhizome) in order to assess its claim for anti-hepatocarcinogenic effects. For experimental purpose, 6 weeks old healthy male Wistar rats (n=40) were randomly divided into four equal groups. Hepatocarcinogenesis was induced in two groups (group 3 and 4) by single intra-peritoneal injection of DEN (200mg/kg body weight). After two weeks of DEN induction, partial hepatectomy was performed under general anaethesia to promote the carcinogenesis. Animals in groups 2 and 4 were orally treated with the decoction at a dose of 6g/kg body weight/day for ten weeks, and they served as decoction control and test, respectively. Groups 1 and 3 were given 0.9% NaCl orally for ten weeks and they served as distilled water and DEN control, respectively. The levels of thiobarbituric reactive substances (TBARS), reduced glutathione (GSH), and activities of antioxidant enzymes were assessed in the haemolysate and liver homogenate of experimental animals by standard methodologies. In animals subjected to DEN induction, a significant increase ($P<0.05$) in liver TBARS was observed, while the levels of GSH and activities of antioxidant enzymes – superoxide dismutase, glutathione peroxidase and glutathione s-transferase decreased significantly ($p<0.05$). Altered TBARS, GSH and antioxidant enzyme levels were ameliorated significantly ($p<0.05$) by oral administration of the decoction at a dose of 6g/kg body weight/day (effective anti-hepatocarcinogenic dose as demonstrated in previous investigations) for a period of ten weeks. The present results suggest that antioxidant activity may be one of the mechanisms by which the decoction comprised of *Nigella sativa* (seeds), *Hemidesmus indicus* (root), and *Smilax glabra* (rhizome) exerts its chemopreventive effects during DEN induced hepatocarcinogenesis. Although each of the three plants used in the preparation of the decoction have been reported previously to possess antioxidant properties, the present study is the first to demonstrate that a combination of the three plants can enhance the antioxidant status of rats in which hepatocellular carcinogenic changes have been induced.

*irathab@hotmail.com Tel: 011 – 2961130