

Potential anticancer effect of red spinach (*Amaranthus gangeticus*) extract.

ABSTRACT

The objective of this study was to determine the anti cancer effects of red spinach (*Amaranthus gangeticus* Linn) in vitro and in vivo. For in vitro study, microtitration cytotoxic assay was done using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) kit assay. Results showed that aqueous extract of *A. gangeticus* inhibited the proliferation of liver cancer cell line (HepG2) and breast cancer cell line (MCF-7). The IC₅₀ values were 93.8 µg/ml and 98.8 µg/ml for HepG2 and MCF-7, respectively. The inhibitory effect was also observed in colon cancer cell line (Caco-2), but a lower percentage compared to HepG2 and MCF-7. For normal cell line (Chang Liver), there was no inhibitory effect. In the in vivo study, hepatocarcinogenesis was monitored in rats according to Solt and Farber (1976) without partial hepatectomy. Assay of tumour marker enzymes such as glutathione S-transferase (GST), gamma-glutamyl transpeptidase (GGT), uridyl diphosphoglucuronyl transferase (UDPGT) and alkaline phosphatase (ALP) were carried out to determine the severity of hepatocarcinogenesis. The result found that supplementation of 5%, 7.5% and 10% of *A. gangeticus* aqueous extract to normal rats did not show any significant difference towards normal control ($P < 0.05$). The exposure of the rats to chemical carcinogens diethylnitrosamine (DEN) and 2-acetylaminofluorene (AAF) showed a significant increase in specific enzyme activity of GGT, GST, UDPGT and ALP compared to normal control ($P < 0.05$). However, it was found that the supplementation of *A. gangeticus* aqueous extract in 5%, 7.5% and 10% to cancer-induced rats could inhibit the activity of all tumour marker enzymes especially at 10% ($P < 0.05$). Supplementation of anti cancer drug glycyrrhizin at suggested dose (0.005%) did not show any suppressive effect towards cancer control ($P < 0.05$). In conclusion, *A. gangeticus* showed anticancer potential in in vitro and in vivo studies.

Keyword: Anticancer effect; in vitro and in vivo studies; Red spinach.