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Modulation of radiation-induced biochemical changes in cerebrum of Swiss albino mice by *Grewia asiatica*

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The present study evaluates the possible radioprotective effect of *Grewia asiatica* fruit (rich in anthocyanin, carotenes, vitamin C, etc.) pulp extract (GAE) on cerebrum of Swiss albino mice exposed to 5 Gy gamma radiation. For this, healthy mice from an inbred colony were divided into four groups: (1) Control (vehicle treated), (2) GAE treated – mice in this group were orally supplemented with GAE (700 mg/kg. b.w. /day) once daily for fifteen consecutive days, (3) Vehicle treated irradiated mice, and (4) GAE + Irradiated – Mice in this group received distilled water orally equivalent to GAE (700 mg/kg. b.w./day) for fifteen days consecutively. Mice were sacrificed at various intervals viz. 1–30 days. Radiation-induced augmentation in the levels of lipid peroxidation of mice cerebrum was significantly ameliorated by GAE pretreatment. Radiation-induced depletion in the level of glutathione and protein was prevented significantly by GAE administration.

Key words: *Grewia Asiatica*, antioxidants, cerebrum, radioprotection

INTRODUCTION

Synthetic protectors have toxicity, which limits their value in the clinical field. Therefore, now the search is on for some natural compounds that can quench the reactive energy of free radicals and eliminate singlet oxygen, one of the major participants in lipid peroxidation (LPO). A large number of compounds from various plant sources have been shown to possess antioxidant properties (Bhattacharya et al. 1996, Yen et al. 1996, Bhatia 1998). Antioxidants of plant origin are vitamin E, C, selenium, phenolic compounds, flavonoids, etc. (Chandha 1997). It has been assumed that nutritional intervention to increase intake of phyto-antioxidants may reduce the threat of free radicals. India has a rich heritage of medicinal plants, many of which have been explored for various bioactivities for ages, but the radioprotective potential of the plants have been hardly explored. In this context *Grewia asiatica* (Phalsa) cultivated on a commercial scale mainly in the northern and western states of India (Hays 1953, Sastri 1956) is known for its medicinal properties. The fruit is astringent and stomachic. Morton (1987) reported that unripe phalsa fruit alleviates inflammation and is administered in respiratory, cardiac and blood disorders, as well as in fever reduction. Furthermore, infusion of the bark is given as a demulcent, febrifuge, and treatment for diarrhea. *Grewia asiatica* has been reported to contain anthocyanin type cyanidin 3-glucoside (Nair et al. 2004), vitamin C, carotenoids, minerals and dietary fibers, etc. (Yadav 1999). The antioxidant properties of carotenoids and vitamin C are well known and anthocyanin has recently emerged as a powerful antioxidant. Therefore, *Grewia asiatica* may prove to be an efficient antioxidant.

Brain tissue is highly susceptible to oxidative damage due to its high utilization of oxygen (20% of the total oxygen inhaled by the body) that accounts for the increased generation of oxygen free radicals and reactive oxygen substrates. Reactive oxygen species (ROS) are capable of oxidation of proteins, lipids and DNA leading to cellular damage. Free radicals are potentially

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