

Evaluation of Radio Protective Potential of Indian Bamboo Leaves

Authors : Mansi Patel, Priti Mehta

Abstract : Background: Ionizing radiations have detrimental effects on humans, and the growing technological encroachment has increased human exposure to it enormously. So, the safety issues have emphasized researchers to develop radioprotector from natural resources having minimal toxicity. A substance having anti-inflammatory, antioxidant, and immunomodulatory activity can be a potential candidate for radioprotection. One such plant with immense potential i.e. Bamboo was selected for the present study. Purpose: The study aims to evaluate the potential of Indian bamboo leaves for protection against the clastogenic effect of gamma radiation. Methods: The protective effect of bamboo leaf extract against gamma radiation-induced genetic damage in human peripheral blood lymphocytes (HPBLs) was evaluated in vitro using Cytokinesis blocked micronuclei assay (CBMN). The blood samples were pretreated with varying concentration of extract 30 min before the radiation exposure (4Gy & 6Gy). The reduction in the frequency of micronuclei was observed for the irradiated and control groups. The effect of various concentration of bamboo leaf extract (400,600,800 mg/kg) on the development of radiation induced sickness and altered mortality in mice exposed to 8 Gy of whole-body gamma radiation was studied. The developed symptoms were clinically scored by multiple endpoints for 30 days. Results: Treatment of HPBLs with varying concentration of extract before exposure to a different dose of γ - radiation resulted in significant ($P < 0.0001$) decline of radiation induced micronuclei. It showed dose dependent and concentration driven activity. The maximum protection ~ 70% was achieved at nine $\mu\text{g/ml}$ concentration. Extract treated whole body irradiated mice showed 50%, 83.3% and 100% survival for 400, 600, and 800mg/kg with 1.05, 0.43 and 0 clinical score respectively when compared to Irradiated mice having 6.03 clinical score and 0% survival. Conclusion: Our findings indicate bamboo leaf extract reduced the radiation induced cytogenetic damage. It has also increased the survival ratio and reduced the radiation induced sickness and mortality when exposed to a lethal dose of gamma radiation.

Keywords : bamboo leaf extract, Cytokinesis blocked micronuclei (CBMN) assay, ionizing radiation, radio protector

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