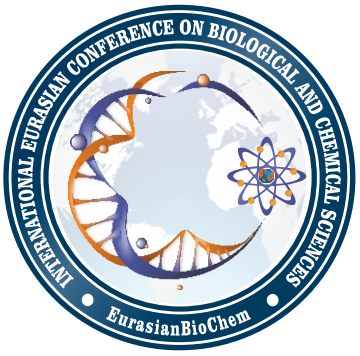


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ORAL PRESENTATION

Evaluation of the genotoxic and antigenotoxic effect of boric acid against mitomycin-c in human lymphocytes

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Abstract

Mitomycin C (MMC) is an alkylating chemotherapy agent used for the treatment of several cancers. Boron is a naturally occurring essential element. Boric acid, borax, sodium perborate, ulexite, and colemanite are among the common boron compounds used as food additives and anti-cancer agents. Boric acid (BA-H_3BO_3) is widely used in medicine as well as in industrial, cosmetics, and agricultural applications. Due to its interesting biological functions, BA is considered a crucial micronutrient. It can increase antioxidant defense *in vivo*. Therefore, this study aimed to investigate the genotoxic and antigenotoxic potential of BA against MMC-induced genotoxicity in human peripheral lymphocytes (HPLs) *in vitro* using the micronucleus-MN test. The lymphocytes were incubated with either different concentrations of BA (0.25, 0.5, 1, and 2.5 µg/mL) alone or simultaneously with MMC (0.20 µg/mL). Single treatment of MMC significantly increased the frequency of micronucleated binucleate cells (MNBC) compared to the negative control. While all the concentrations of BA increased the formation of MNBCs compared to the negative control, none of them were significant. On the contrary, BA attenuated the frequency of MNBCs induced by MMC in the simultaneous treatment at all concentrations. The ameliorative effect was significant at 0.5 µg/mL BA+MMC treatment ($P<0.01$). Nuclear division index (NDI), Cytokinesis block proliferation index (CBPI), and the frequency of nucleoplasmic bridges (NPBs) did not significantly change following MMC and MMC+BA treatments. On the contrary, BA treatments significantly decreased the formation of nuclear buds (NBUDs) induced by MMC alone at the three highest concentrations. The results demonstrate that BA seems to have antigenotoxic potential against MMC-induced genomic damage in HPLs *in vitro*. Besides, it has no genotoxic potential in single treatments. However, further investigations need to be conducted to conclude the antigenotoxic effects of BA against MMC.

Keywords: Boric acid, Mitomycin-C, Genotoxicity, Antigenotoxicity, Micronucleus assay, Human lymphocytes