

Assessment of Food Preservative Potassium Propionate (E283) Genotoxicity in Human Peripheral Blood Lymphocytes Using Micronucleus Test

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Aim of the study: Nowadays, food additives have important role for the society's nourishment. The most common additives to appear on food labels are antioxidants, colours, emulsifiers, stabilisers, preservatives and sweeteners. Potassium salt of propionic acid, used as preservative, is a natural acid present in small quantities in many foods. The purpose of this study was to evaluate the potential genotoxic effect of potassium propionate by using the cytokinesis-blocked micronucleus (CBMN) assay in human peripheral blood lymphocytes.

Material and Methods: The study was carried out on human peripheral blood samples taken from three healthy young donors, a man and two women. The peripheral lymphocytes were incubated at 37°C for 72 h and exposed to potassium propionate at 7.81, 15.62, 31.25, 62.50, 125.00, and 250.00 µg/mL concentrations during the last 48 h. The CBMN assay was carried out by adding cytochalasin B (final concentration of 5.2 µg/mL) after 44 h of the culture. A negative control (distilled water) and a positive control (mitomycin-C, MMC, 0.20 µg/mL) were also used. At the end of the 72-h incubation period, the cells were treated with hypotonic solution (0.075 M KCl) and fixed with cold methanol:acetic acid (3:1). Slides prepared from cell suspension were dried and stained in 5% Giemsa. Totally, 3000 binucleated lymphocytes (1000 binucleated cells per donor) were examined per concentration. Cell proliferation was determined utilizing the cytokinesis-block proliferation index (CBPI). Therefore, 500 lymphocytes were scored to evaluate the percentage of cells with 1, 2, 3, and 4 nuclei from each donor.

Results: Potassium propionate significantly increased the frequency of MN compared to the negative control at all the treatment concentrations (except 7.81 and 15.62 µg/mL) in a concentration-dependent manner ($r=0.98$). This food preservative did not induce cytotoxic effect that was evaluated by CBPI on human lymphocyte. The results of this study show that potassium propionate may have clastogenic effect to human lymphocytes *in vitro*.

Keywords: Potassium propionate, food preservative, cytokinesis-block micronucleus assay, human lymphocytes, genotoxicity