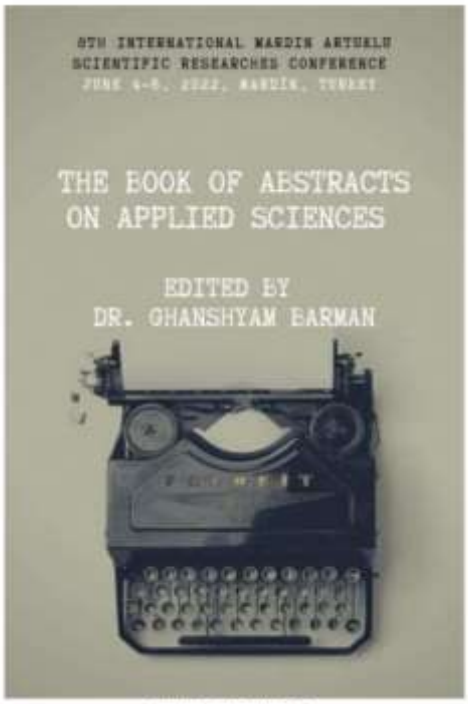


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June 4-6, 2022, Mardin, TURKEY

THE BOOK OF ABSTRACTS ON APPLIED SCIENCES

Edited by

Dr. Ghanshyam BARMAN

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DETERMINATION OF THE GENOTOXIC EFFECTS OF MANNITOL, A SUGAR ALCOHOL, IN HUMAN LYMPHOCYTES BY THE COMET ASSAY

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ABSTRACT

Sweeteners are food additives that provide a sweet taste like that of sugar while containing significantly less food energy. There are positive and negative opinions about their effects on human health. Polyols or sugar alcohols are the most used sweetener group and are natural sweeteners with nutritional value. Mannitol is a naturally occurring sugar alcohol or polyol, which has a wide variety of applications in the food industry. *In vitro* test systems are known to determine the possible genotoxic potential of any chemical. One of the most popular tools to evaluate the genotoxic effects of chemicals in cells by measuring DNA damage and repair is the comet assay. This test is a sensitive, fast and simple method that is widely used in genotoxicology studies. The aim of this study is to evaluate the genotoxic potential of mannitol by using comet assay in isolated human peripheral lymphocytes in *vitro*. For this purpose, this assay was performed on isolated human peripheral lymphocytes from two healthy, young, non-smoking donors. To determine cell viability in isolated lymphocytes, a viability test was performed using trypan blue. Cell viability was determined as ≥ 96%. Isolated lymphocytes were treated with five different concentrations of mannitol (500, 1000, 2000, 4000, and 8000 µg/mL) at 37 C for 1 hour. A negative and positive control (100 µM, H_2O_2) were also applied for each treatment. Mannitol was dissolved in distilled water. For each concentration, 200 cells (100 cells for each donor) were examined under a fluorescent microscope using the "Comet Assay IV" analysis system from Perceptive Instruments Ltd., UK. Three different parameters (comet tail length, tail intensity, and tail moment) were evaluated using the t-test with SPSS 22.0 software. According to the obtained results, mannitol did not cause a significant change in all comet parameters compared to control. These results showed that mannitol did not cause DNA damage, it may have no genotoxic effect on human lymphocytes *in vitro*. The results of other genotoxicity studies with mannitol in the literature also support this observation. However, other genotoxicity tests should also be applied for detailed analysis.

Keywords: Mannitol, Genotoxicity, Comet assay.