milk is considered a complete food from the nutritional point of view. Milk can be exposed to various types of contamination, such as mycotoxins. These metabolites are naturally occurring toxic compounds produced by fungi. Several studies on milk have reported the presence of aflatoxin B₁ (AFB₁) and M₁ (AFM₁), due to the high incidence in samples intended for human consumption, carcinogenicity proven AFB₁ and resistance of the contaminants to the process of digestion, making them available for intestinal absorption. Considering these aspects, the objective of this study was to evaluate the genotoxicity of milk samples contaminated by AFB₁ and AFM₁ before and after the action of lactic acid bacteria using Caco-2 intestinal human cells.

Material and methods

The pasteurized milk samples were spiked with AFB₁ (10 µg.mL⁻¹) and AFM₁ (2 µg.mL⁻¹) and subjected to fermentation with 4 different lactic acid bacteria (LAB) (Lactobacillus delbruecki subs. bulgaricus, Bifidobacterium lactis HN019 and Streptococcus salivarius ssp. thermophilus) in separate and in combined form totaling twenty four fermentation tests beyond the Positive Control (only milk and mycotoxin) and Negative Control (only milk). The samples were incubated at 37°C and fermented milk products (4.4 to 4.9). The samples were digested. The digestion model a model of in vitro digestion based in an initial saliva processing for 5 min at 37°C, to simulate the mouth compartment and the gastric conditions for 2 h, followed by simulated small intestine compartment for 2 h at 37°C. The digested samples were lyophilized to use in cell culture.

Exposure of Caco-2 cell's culture

The AFB₁+AFM₁ before and after digestion and AFB₁ and AFM₁ before digestion, did not show cell viability before and after fermentation, and therefore genotoxicity could not be assessed. AFB₁ after digestion induced in exposed Caco-2 cells 1.3 MN and 0.5 NBUDs, and AFM₁ exposed cells presented 2.57 MN and 0.571 NBUDs. According to this results, AFM₁ seems to have more genotoxic potential in Caco-2 cells in comparison with AFB₁, however limitations due to cellular viability did not allow to take more robust conclusions. The use of lactic acid bacteria in fermentation of milk contaminated with aflatoxins and M₁, promoted decreasing genotoxicity of the two mycotoxins, especially when contaminated with AFB₁.