

TITLE: Physicochemical characterization and antimicrobial activity of milk kefir

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ABSTRACT

Kefir is a fermented drink with acid flavor and slightly carbonated, produced by the fermentation of milk by kefir grains. The microbiological composition of kefir grains consists of lactic bacteria, acetic bacteria, and yeasts. Kefir is known worldwide for its health benefits, especially for its probiotic properties. The aim of this study was to evaluate the physical-chemical aspects of kefir, its antimicrobial capacity during the fermentation process, in addition to isolating its microorganisms to test antagonistic activity against potentially pathogenic strains. To produce kefir, the grains in the proportion of 5% (w/v) were inoculated in 100 mL of milk for 48 h. Physicochemical analyzes (lactic acid by titratable acidity, pH and reducing sugars by ADNS) were performed in triplicate and the results were expressed as a mean. Antimicrobial activity was performed during the kefir fermentation process against *S. aureus* ATCC 25923, *S. enterica* ATCC 14028 and *E. coli* ATCC 25922. The in vitro antagonism test of microorganisms isolated from kefir was performed according to the methodology described by Jacobsen et al. (1999), with adaptations. It was observed that during the kefir fermentation process, there was a decrease in the pH of the milk from 6.60 to 3.60 in the kefir, and an increase in the lactic acid concentration of the milk from 0.16% to 1.70% in the kefir. And there was a decrease in reducing sugars in milk from 5.12% to 2.73% in kefir. Regarding the kefir antagonist activity, the samples fermented in 48 h. completely inhibited bacterial growth of the tested microorganisms (*S. aureus*, *S. enterica*, *E. coli*), demonstrating a potent kefir antagonist activity. In the antagonism test of microorganisms isolated from kefir samples, part of the bacteria and yeasts showed antagonistic activity and the ability to inhibit both Gram-negative strains (*S. enterica*, *E. coli* and *K. pneumoniae*) and Gram-positive strains (*S. aureus*, *B. cereus* and *S. mutans*) tested in this study. Some microorganisms isolated from kefir (7 strains out of 29 in total) showed strong antimicrobial activity with zones of inhibition >30 mm from the potentially pathogenic bacteria tested. The result of the study showed that some strains isolated from kefir have potent antagonist activity, and nowadays, with the increase of pathogenic bacteria resistant to antimicrobials, it is extremely important to explore new antimicrobial alternatives.

Key words: kefir grains, antimicrobial activity, antagonistic activity, probiotic properties