MICROBIOLOGY OF WATER KEFIR BASED ON LEMON AND PEPPERMINT: POTENTIAL PROBIOTIC PROPERTIES

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ABSTRACT

Water or sugary kefir is an alternative non-dairy kefir beverage fermented by a symbiotic culture of bacteria, primarily lactic acid bacteria and yeast, which are designated as primary microbial members of so-called water kefir grains. Unlike conventional milk-based kefir products, the starting medium for obtaining water kefir is mainly an aqueous sugar solution. Its nutritional and sensory properties could be significantly improved by the addition of different fresh or dried fruits. In addition, aromatic and health-promoting plants or their extracts combined with diverse varieties of dried fruits could represent an excellent combination, since the nutritional quality and sensory acceptability of kefir beverages by consumers has been remaining a principal challenge. Further, due to its specific composition of the present aforementioned microbial species, water kefir could have a positive effect on achieving the general well-being of the human body. Since literature data often characterize water kefir as a product with functional probiotic benefits, many authors have extensively studied the potential ability to change the gut microbiota composition and activity. Namely, according to the recommendation of the World Health Organization (WHO) and the Food and Agriculture Organization (FAO), kefir should contain a minimum of 10^7 CFU/ml microorganisms, and the final product should contain at least 10^4 CFU/ml of yeast. As part of this research, water kefir samples based on sugar water solution with the addition of dried lemon slices and fresh peppermint leaves or its evaporated alcoholic extracts were examined after 72 h of spontaneous fermentation to determine the total number of lactic acid bacteria and yeast (CFU/ml). A sample based on aqueous sugar solution without the addition of any other ingredients was designated as a control sample and the total number of lactic acid bacteria and yeast in this kind of ready-to-drink water kefir was approximately 10^6 and 10^4 CFU/ml, respectively. In the case of the other two samples with the addition of lemon and peppermint, an increase in the number of microorganisms was observed, so the measured number of lactic acid bacteria was around 10^7, while the counted value of yeast was approximately 10^6 CFU/ml. By previously mentioned recommendations of WHO and FAO in terms of accomplishing the potential probiotic properties, it could be concluded that all tested samples of water kefir achieved the minimum required number of living microorganisms at the end of the fermentation process.

Keywords: water kefir, fermentation, microorganisms, probiotic properties