Investigation of antimicrobial properties of kefir prepared with camel, goat, water buffalo and cow milk and made with different kefir grains

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Kefir, which means "enjoyable" and believed to have originated in the Caucasus, is a fermented dairy product made from ancient times. Kefir is considered a natural probiotic, including microorganisms and metabolites of these microorganisms. In addition, kefir contains essential nutrients such as protein, fat, carbohydrates, vitamins and minerals necessary for human nutrition. Turkey and in the world increased interest in fermented food commercial kefir consumption increased with each passing day and for nutrition and public health kefir production quality and safety have gained importance. Kefir are produced with kefir grain particles in the appearance of 3-20 mm in diameter, small white or yellowish cauliflower or popcorn, are added to cow, goat and sheep milk and fermented under appropriate conditions.

Milk obtained from different animals has some important qualities in terms of food technology as well as nutritional and health characteristics of the nutritional elements and chemical properties. Kefir, concerning the antimicrobial property effects for ensuring the stability of some enteric pathogens, stomach and intestinal flora is still being investigated. It is expected that the antimicrobial effect will be different due to the different composition of kefir obtained from different animal milk. The aim of this study is to examine the in vitro effect of kefir made with different animal milks and three different kefir grains on some microorganisms.

Experimental kefir production was carried out in this study by using three different kefir grains (were named as M1, M2, M3) and cow, goat, water buffalo and camel milk with traditional method under laboratory conditions. Raw cow, water buffalo and goat's milk from farms located in Çatalca District Nakkaş Village (Turkey / Istanbul) and camel milk was obtained from the farms in Khorkhor Village of Tebriz (Iran/Tabriz). Two kefir grains (M1, M3) were provided by the people from Istanbul and one of the kefir grains (M2) was obtained from Iran-Tabriz. For experimental kefir production, under aseptic conditions, raw milk is heated by continuous stirring for 20 minutes at 85-90 ºC, cooled to 20-25 ºC and added 2-10% of each of the kefir grains, followed by 12 hours at 20-25 ºC (cow, goat, buffalo milk) and 72 hours (camel milk). Using the disk diffusion method, antimicrobial activity of kefir samples on *Listeria monocytoges ATCC 13932*, *Staphylococcus aureus ATCC 25923*, *Escherichia coli ATCC 25922*, *Salmonella enteritica ATCC 13076* and *Bacillus cereus ATCC 11778* were investigated.

The highest antimicrobial effect was found in kefir made with camel milk and two different kefir grains (M2 and M3). These kefirs showed antimicrobial activity at various rates on all microorganisms investigated. Kefir made with another one kefir grain (M1) and camel milk showed antimicrobial activity only on *Listeria monocytoges ATCC 13932*. In other kefir made with water buffalo, cow, goat milk, antimicrobial activity has been found to be significantly different among the kefir grain used.

In many studies has been reported kefir has on antimicrobial activity on many microorganisms and as treatment support for enteric infections. However, the activity on kefir

microorganisms made with different animal milks has not been investigated. In this study, the antimicrobial activity of kefir made with different animal milks was determined on some gram negative and gram-positive bacteria. The results obtained are thought to can help the use of kefir in support of the treatment of foodborne enteric pathogens.

Keywords: Antimicrobial, Bacteria, Camel, Kefir, microbiology, milk