Chapter 15
Potential Probiotic Microorganisms in Kefir

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ABSTRACT
Probiotic microorganisms are defined as living microorganisms that provide health benefits on the host when administered in adequate amounts. The benefits include improvement of microbial balance immune system and oral health, provision of cholesterol-lowering effect, and antimicrobial activity against a wide variety of bacteria and some fungi. Kefir microbiota contains active living microorganisms. Many researches were carried out that potential probiotic bacteria such as Lactobacillus acidophilus, Lactobacillus plantarum, Lactobacillus kefir, Lactobacillus kefiranofaciens, Leuconostoc mesenteroides, or yeasts like microorganisms such as Saccharomyces cerevisiae, Kluyveromyces lactis, and Kluyveromyces marxianus were isolated from kefir grains. This chapter presents the data both on the probiotic bacteria isolated from kefir grains or kefir and the probiotic properties of kefir produced with these microorganisms.

INTRODUCTION
Kefir is a traditional fermented dairy beverage which was originated in the Caucasus (Kim, Chon, Kim, & Seo, 2015). It has a slightly acidic flavor and a creamy consistency that consumed all over the world but most commonly in Turkey. The world “kefir” originates from a Turkish world “keyif” which means good feeling and pleasure (Kabak & Dobson, 2011). Kefir can be produced in two ways; by using kefir grains or Direct Vat Set (DVS) cultures. Traditional kefir product is produced by kefir grains. Kefir grains are a cluster of microorganisms with yellowish-white colour and cauliflower-like shape. Microbiota of kefir

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grains is very complex which composed of lactic acid bacteria, acetic acid bacteria and yeasts (Pintado, Da Silva, Fernandes, Malcata, & Hogg, 1996). The microbiota of kefir grains strongly depends on the origin of the grains but not on the microbial composition of grains (Witthuhn, Schoema, & Britz, 2005).

Kefir is thought as a probiotic product because kefir grains provide potential probiotic microorganisms to kefir. Qualification of a microorganism as a probiotic mainly depends on determination of some properties they should possess. Some of these properties are; resistance to bile and gastric acids, ability to survive under the gastrointestinal conditions, exhibition of proven beneficial effects on human health such as showing antipathogenic or antiviral effects and enhancement of immune system.

In this chapter, the definition of probiotics that isolated from kefir and kefir grains were given and their properties were presented in detail.

**PROBIOTIC MICROORGANISMS**

Probiotic microorganisms are live microorganisms that provide a benefit on the human health. The term “probiotic” means “for life” in Greek and first used in 1965 to explain secretions of a microorganism that stimulate the growth of other microorganism by Lilly and Stillwell (Lee, 2009). In 1974, it was understood that there was a relationship between probiotics and host system. In addition, probiotics are described as “organisms and substances with beneficial effects for animals by influencing the intestinal microbiota”. Finally, probiotics are defined as “living microorganisms which upon ingested in adequate amounts provide health benefits beyond inherent general nutrition” by FAO/WHO (FAO/WHO, 2006).

Fermented dairy products are the most common foods containing probiotics. Among them yoghurt is the leading (Brown & Valiere, 2004). In 1907, it was first stated that bacteria in the intestines had a positive effect on human health. Lactobacillus delbrueckii subsp. bulgaricus which is a yoghurt bacteria, was determined to be responsible for a longer life and better health conditions (Brown & Valiere, 2004). In 1935, positive effect of Lactobacillus acidophilus on human health was shown by Retteger, Levy, Weinstein, & Weiss (1935). After that date, many microorganisms such as Bifidobacterium, Streptococcus, Enterococcus and Lactococcus have been identified as probiotic by different researches (Goldin, 2011).

In order for a microorganism to be evaluated as a probiotic, it must have certain criteria:

- Having a proven beneficial effect on human health,
- Being non-pathogenic and non-toxic,
- Maintaining the stability in the product,
- Containing an appropriate number of viable cells,
- Surviving in the gastrointestinal system,
- Having acceptable sensory properties.

**HEALTH EFFECTS OF PROBIOTIC MICROORGANISMS**

Many studies were performed about the health effects of probiotic microorganisms. Some of these effects are listed below: