

Fermented Foods: Kefir¹

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Kefir is a fermented dairy beverage made from milk and kefir grains containing yeast and bacteria. Unlike yogurt, kefir goes through multiple fermentation processes and is often described as tangier and thinner. This publication describes how kefir is made and its potential health effects for consumers.

What is kefir?

Dating back thousands of years, humans have consumed milk despite the lack of refrigeration. Fermentation has been used as a processing technique to increase the shelf life of milk (Azizi et al., 2021). Kefir, often described as “sippable yogurt,” is a fermented dairy beverage that is produced from kefir grains. Despite the name, kefir grains are not actually grains; rather, they are named for their similar appearance (Baker, 2023). It is a mixture of mutually beneficial bacteria and yeast (Rosa et al., 2017). Kefir can be prepared using a range of milks, including goat, buffalo, sheep, and camel, although cow’s milk kefir is most popular in the United States as a trendy food product (Farak et al., 2020; Nielsen, Gürakan, & Ünlü, 2014).

What is the difference between kefir and yogurt?

You may find kefir next to yogurt at your local grocery store and wonder how the two products differ. While kefir is referred to as “sippable yogurt,” its viscosity is not the only feature that distinguishes it from yogurt; they are very

different dairy products with distinct production methods (Baker, 2023). Both are made with milk and fermented foods, but yogurt is made with cultured bacteria, typically *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus*. This means that specific mixtures of bacteria are added to milk, and with the warming of the milk, lactic acid and minor levels of other fermentation products, such as acetic acid, are produced. This process decreases pH (i.e., the substance becomes more acidic), which causes the milk protein to thicken into what we know as yogurt (Nagaoka, 2019). Kefir, conversely, is made with kefir grains which contain a mixture of lactic acid bacteria such as *Lactobacillus*, *Streptococcus*, and *Lactococcus*, acetic acid bacteria, and yeast (e.g., *Saccharomyces*) needed to ferment the milk; no warming is required (Farak et al., 2020). Another key difference is that kefir goes through multiple fermentation processes to achieve the right texture, while yogurt only goes through one. Both dairy products have similar flavor profiles, although kefir has been characterized as tangier. Note that the taste of commercial products varies according to the flavoring, additives, and sugar contents (Baker, 2023).

How is kefir made?

The production methods used to make kefir vary depending on the quantity and intended use. Small-scale production of kefir allows for the use of the traditional fermentation method: kefir grains are directly added to pasteurized milk cooled to 20°C to 25°C. With production

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on a larger scale, such as for commercial sale, commercial starter cultures are either directly added into milk, or a “backslopping” procedure is utilized (Azizi et al., 2021; Dong-Hyeon et al., 2018). This means that kefir, which has already been fermented from the grains, is added to raw milk as the starter culture to initiate the fermentation. The quality of milk impacts the final product. Thus, it should have low bacterial counts and no pathogens or antibiotics (Azizi et al., 2021).

What are the potential health benefits of kefir?

Throughout history, kefir has been considered an antidote for many diseases and conditions. Potential benefits are primarily attributed to the content of microorganisms (Azizi et al., 2021), some of which may be considered probiotic (i.e., live microorganisms that confer a health benefit) (Hill et al., 2014). Research suggests that consumption of kefir may improve lactose digestion (Hertzler & Clancy, 2003), fasting blood glucose (Salari et al., 2021), and blood pressure (Bellikci-Koyu et al., 2019), and may possibly reduce inflammation (Zhang et al., 2023). Human research studies are needed to confirm any possible protective effects against cancer and chronic diseases.

Regardless of its potential probiotic effects, consumers of kefir reap the benefit of the nutrient content. Kefir is an excellent source of calcium, and a one-cup serving of standard kefir has 10 grams of protein, 10 grams of fat, 11 grams of carbohydrates, and only about 170 calories (U.S. Department of Agriculture, 2023). The term kefir comes from the Turkish word “keyif,” which loosely translates to joy or pleasure, after the positive effect it is speculated to have on the consumer. A recent human study showed benefits to memory with kefir intake but not to mood (Cannavale et al., 2023).

Is kefir an appropriate fermented food choice for everyone?

Because kefir is typically made from cow’s milk dairy, there are a few populations who may avoid or limit their intake of the beverage. Intake of dairy kefir beverages is unsuitable for consumers who are vegan and for those who have allergies to cow’s milk. Lactose-free alternatives are available for those who display symptoms of lactose intolerance (Azizi et al., 2021). Regarding heart disease risk, kefir consumption has been shown to have no effect on blood cholesterol levels (Yahyapoor et al., 2023).

Manufactured kefir and other cultured milk are regulated by the U.S. Food and Drug Administration (FDA); fat and milk protein content, acidity, added vitamins, sweetener, and other allowable ingredients are outlined (Food and Drug Administration Department of Health and Human Services, 2024). However, kefir may contain alcohol produced during the fermentation process (Rahmatullah et al., 2023) and, if so, it would not be appropriate for children and pregnant women. Additionally, kefir must not contain any alcohol for Halal certification (Kim, Shim, & Lee, 2022).

Kefir, like any other fermented food product, poses possible food safety risks (Farag et al., 2020). Fermented kefir with a pH < 4.5 suppresses many pathogens, but *E. coli*, *Listeria*, and *Salmonella* can survive (Dias et al., 2012). Care must be taken in the fermentation of kefir to prevent contamination with and the growth of these harmful microorganisms during and after production. To ensure food safety, kefir should be made with pasteurized milk and quality kefir grains and refrigerated after fermentation ($\leq 41^{\circ}\text{F}$). Because of the risk of pathogen growth, those with compromised immune systems (i.e., infants, pregnant women, elderly, or those who are chronically ill or have autoimmune disorders) may want to avoid homemade kefir (U.S. Department of Health and Human Services, 2023).

Summary

Consuming kefir may have health benefits such as improved lactose digestion (Hertzler & Clancy, 2003), fasting blood glucose (Salari et al., 2021), and blood pressure (Bellikci-Koyu et al., 2019), and may help to reduce systemic inflammation (Zhang et al., 2023). Those with allergies to cow’s milk need to avoid kefir, and those with compromised immune systems may want to avoid consuming homemade kefir due to the risk of foodborne illness (U.S. Department of Health and Human Services, 2023).

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