

THE MAGIC OF KEFIR: A REVIEW

Vinayak Gaware*¹, Kiran Kotade², Ramdas Dolas³, Kiran Dhamak¹,
Sachin Somwanshi³, Vikrant Nikam³, Atul Khadse¹ Vivekanand Kashid³

1. Department of Pharmaceutical Chemistry, College of Pharmacy Chincholi, Sinnar, Nashik, M.S, 422101.
2. Department of Pharmacology, College of Pharmacy Chincholi, Sinnar, Nashik, M.S, 422101.
3. Department of Pharmaceutics, College of Pharmacy Chincholi, Sinnar, Nashik, M.S, 422101.

Summary

Kefir is a cultured(fermented) milk drink.It is a complex symbiosis of more than 30 microflora that form grains or cauliflower-like structures in the milk. In addition to beneficial bacteria and yeast it is rich in amino acids ,vitamins, minerals, amino acids and enzymes. Particularly calcium, phosphorus, magnesium, B2 and B12, vitamin K, vitamin A and vitamin D. It also has numerous antioxidant and therapeutic properties.In the present review we have discussed the origin, production, consumption and the health benefits of Kifer.

Keywords: Kefir, Probiotic, Yeasts, Yogurt

Address for correspondence:

Vinayak Madhukar Gaware

Department of Pharmaceutical Chemistry,

College of Pharmacy, Chincholi, A/P: Chincholi,

Tal: Sinnar, Dist: Nashik, 422101, (M.S), India

E-mail: vins_gaware1@rediffmail.com

Mobile No: 09423572791.

Introduction

Kefir (pronounced *kuh-FEER*) (alternately *kefirs*, *keefir*, *kephir*, *kewra*, *talai*, *mudu kekiya*, *milkkefir*, *búlgaros*), purportedly from either the Turkish "keyif" (joy/pleasure) or "kopur" ((milk) froth, foam), is a fermented milk drink that originated with shepherds of the North Caucasus region. It is prepared by inoculating cow, goat, or sheep's milk with kefir grains. Traditional kefir was made in skin bags that were hung near a doorway; the bag would be knocked by anyone passing through the doorway to help keep the milk and kefir grains well mixed. Dairy-free alternatives are available, such as coconut milk kefir and soy milk kefir. In addition to beneficial bacteria and yeast, kefir contains many vitamins, minerals, amino acids and enzymes. Particularly calcium, phosphorus, magnesium, B2 and B12, vitamin K, vitamin A and vitamin D. Tryptophan, one of the essential amino acids abundant in kefir, is well known for its relaxing effect on the nervous system. Because kefir also has an abundance of calcium and magnesium, also important minerals for a healthy nervous system, kefir in the diet can have a particularly calming effect on the nerves. The abundance of enzymes brings more health benefits, especially to lactose intolerant people, many of whom can tolerate kefir without difficulty, as long as the kefir is raw and not cooked (cooking destroys the enzymes)¹.

History of Kefir

“Kefir” itself is a word with a Turkish origin “keyif” means joy or pleasure and “kopur” means milk or froth. For the ancient shepherds of the Caucasus who originally discovered kefir, then, “kefir” was a pleasurable, frothy milk drink. The shepherds stumbled upon kefir because they carried milk with them in leather pouches. When the milk would ferment, it would become an effervescent and tasty drink. Eventually the shepherds started making kefir on purpose by adding kefir grains to a leather bag and hanging it near a doorway. Whenever someone walked through the doorway, they would often bump the bag, thus “stirring” the contents. Legend has it that kefir was protected from outsiders for centuries. Finally, however, a Russian lady by the name of Irina Sakharova convinced a prince in the Caucasus to give her a few kefir grains in the early part of the 20th century. She started making kefir in Moscow and ever since then it has been a Russian staple. In the last few decades, kefir has made its way west².

Production

Production of traditional kefir requires kefir grains which are a gelatinous community of bacteria and yeasts. Kefir grains contain a water soluble polysaccharide known as kefiran that imparts a rope-like texture and feeling in one's mouth. Kefir grains cannot be produced from scratch, but the grains grow during fermentation and additional grains are produced. Kefir grains can be bought or donated by other growers. Kefir grains appear white to yellow and are usually the size of a walnut, but may be as small as a grain of rice³.

Kefir Grains Preparation

Kefir grains preparation is described in the papers by and Semih Otles and Ozlem Çagındı (2003).A goat-hide bag, which was washed with sterile water, was filled with pasteurized milk and the intestinal flora of a sheep⁴. It was shaken every hour and was kept for 2 days at a temperature of about 25°C. During 12 weeks, each time the milk coagulated, three quarters of it was replaced with fresh milk. When a polysaccharide layer developed on the surface of the hide it was removed and propagated in pasteurized cow's milk where kefir grains developed. These were grown with fresh milk daily. The historical source of kefir grains is not really known today; despite the paper of M. Motaghi et al. has precise description of how to prepare kefir drinks from kefir grains in Iran.⁵

Different Milk Types

Kefir grains will successfully ferment the milk from most mammals and will continue to grow in such milk. Typical milks used include cow, goat and sheep, each with varying organoleptic and nutritional qualities. Raw milk has been traditionally used. In addition, kefir grains will ferment milk substitutes such as soy milk, rice milk and coconut milk, as well as other sugary liquids including fruit juice, coconut water, beer wort and ginger beer. However, the kefir grains may cease growing if the medium used does not contain all the growth factors required by the bacteria. Milk sugar is, however, not essential for the synthesis of the polysaccharide that makes up the grains (kefiran) and studies have demonstrated that rice hydrolysate is a suitable alternative medium.⁶ Additionally, it has been shown that kefir grains will reproduce when fermenting soy milk, although they will change in appearance and size due to the differing proteins available to them.⁷

The Science Behind Kefir's Claims

Manufacturers of kefir and consumers have believed in the benefits of kefir for a long time. These benefits are so promising that kefir has gone from an obscure beverage sold only in health-food stores to a mainstream drink now sold in many large grocery stores. Studies remain inconclusive about whether kefir actually has the power to fulfill some of its claims, such as being able to stave off diseases or significantly slow down the growth of cancer cells. More testing is needed to substantiate these claims. Preliminary evidence does support the hypothesis that drinking kefir regularly is beneficial to the body in many ways ⁸.

Vegetarian Protein Source

Kefir, along with yogurt, cottage cheese, milk, cheese and other dairy products, is a significant source of protein for vegetarians and may be appropriate for those who are lactose-intolerant. Because kefir has been fermented, the bacteria and active cultures in the beverage feed on much of its lactose during that process, making it easier for the body to break down and digest the remaining lactose ⁹.

Good Source Of Probiotics

Kefir contains beneficial probiotics; bacteria that thrive in the stomach and help the digestive system run smoothly. Research suggests that probiotics can prevent or even treat a host of maladies, such as irritable bowel syndrome, yeast infections and Crohn's disease. Because kefir is made from grain instead of typical probiotics made from dairy products, it's suitable for vegans ¹⁰.

Comparison Of Kefir And Yogurt

Yogurt also contains beneficial bacteria, but kefir contains several strains of friendly bacteria not found in yogurt - *Lactobacillus* *Caucasus*, *Leuconostoc*, *Acetobacter* species and *Streptococcus* species. Kefir also contains beneficial yeasts, which help to control and eliminate destructive pathogenic yeasts. If you suffer from *Candida* yeast overgrowth, you are suffering from these destructive pathogenic yeasts so kefir can help destroy these and replace them. These yeasts also strengthen the intestines so they become more resistant to pathogens such as *E.coli*¹¹. Another benefit of Kefir is that it is very easy to make your own at home, which saves you money. You can use milk, either whole, low-fat or non-fat, whichever you prefer. You can also make kefir from coconut milk, soy, goat, rice or almond milk. Just be aware that the fatter in your liquid, the thicker the finished kefir will be¹².

Consumption

Some find kefir too sour on its own and prefer to add flavors or sweeteners. Frozen fruits can be mixed with kefir in a blender to make a smoothie. Kefir is sold with different varieties of fruit and flavors already added, both in the organic/ecologic and non-organic varieties¹³. It is a breakfast, lunch and dinner drink popular across all areas of Russia, Belarus, Ukraine, Hungary, Romania, Poland (second largest producer after Russia, Norway, Sweden, Finland (especially with Russian and Estonian minorities), Latvia, Estonia and Lithuania where it is known as an affordable health drink. It is drunk the same way as milk, often accompanying pastries and other sweets. In Southern Slavic countries kefir is consumed at any time of the day, especially with zelnik (zeljanica:Serbian), burek and banitsa(gibanica:Serbian), as well as in cold summer soups¹⁴.

Delicious Ways To Use Kefir^{15, 16}

- You can eat kefir alone. You can season it with herbs and spices and spread it on such things as breads and biscuits,
- As a smoothie. You can make a chocolate or summer fruit smoothie, my favorite is making strawberry smoothies.
- In salad dressing. Just substitute kefir for yogurt in yogurt-based dressings.
- Add fruit, nuts and granola to your kefir milk for a delicious snack or meal replacement.
- As popsicles: Use the smoothie recipe provided in the link below. With an ice tray, insert toothpicks or Popsicle sticks into each square after pouring the smoothie in. place saran wrap over the sticks making sure each has stuck through the wrap to hold in place.

Health Benefits of Kefir^{17, 18, 19, 20, 21}

- **Skin care**
Kefir is a natural anti-oxidant. Therefore, it keeps the skin youthful and glowing. It is also said to prevent acne, psoriasis and wrinkles. So, having kefir daily will keep you looking young for a long time.
- **Brain-enhancement**
One of the important **kefir health benefits** is that it can enhance the functioning of the brain. It is considered as a brain-food and helps fighting the stress. It also improves the focus, reflexes and memory-retention power of the brain.

- **Digestion**

It is a wonderful cure for stomach-related ailments. A great health benefit of kefir is that it improves the digestion, preventing constipation. It helps in cleansing the intestines and regularizing the bowel movements.

- **Heart health**

Kefir also helps in maintaining the health of the heart. By drinking milk kefir, you will clear the vessels of the body and also regulate the blood pressure. This makes the heart healthy and fit.

- **Respiratory system**

Lungs too are protected by kefir. It is said to cure the respiratory problems right from the common ones to the more complicated ones like tuberculosis. It plays a vital role in the treatment of bronchitis and asthma.

- **Weight loss**

People who want to lose weight in a healthy way should thank kefir. It has probiotics which speeds up the body's metabolism. This, in turn, burns the fat quickly, leading to weight loss. Workout will be more beneficial if you have kefir milk along with it.

- **Stress-buster**

People who have busy schedule greatly benefit from the Kefir health benefits. It is said to be an excellent stress-buster. Just a glass of cold kefir milk or kefir water will detoxify your body and relax you. Not only this, if stress is keeping you awake at night, having the milk is a good idea.

- **The Lactose Intolerant**

Regular consumption of kefir helps people who lack the lactase enzyme to digest dairy products again. Some of the bacteria contained by kefir helps to break lactose down, so even those deficient in the lactase enzyme can digest dairy.

- **A Healthier Immune System**

Kefir makes the body more efficient at destroying harmful pathogens, including harmful bacteria and viruses. In addition, the study showed that the friendly bacteria in kefir can help destroy tumor cells. The study hasn't been repeated in the human body, but certainly there is good evidence that kefir helps to fight cancer.

- **Prevents against ageing**

Kefir is rich in antioxidants which help the aging process to slow down by neutralizing the free radicals by oxidizing them and reducing the impact of the damage caused to the body cells and tissues due to them.

- **As an Antibiotic And Antifungal**

Kefir has certain anti fungal properties; it proves helpful in treating conditions like psoriasis, candidiasis (yeast infection) and eczema. It may be useful in similar conditions, candidiasis (yeast infection), heart disease and HIV / AIDS.

- **Anticancer agent**

Kefir can inhibit the growth of cancerous cells and can prevent certain type of cancers like colon cancer, breast cancer etc. and reduce the size of tumors. A study published in the Journal of Medicinal Foods in 2007 showed that kefir extracts have components that specifically target and stop the growth of human breast cancer cells. For this reason, many women who have been diagnosed with breast cancer are adopting kefir as an alternative to milk.

- **Anti-inflammatory Agent**

Kefir is also beneficial in treating a number of disorders like pancreatitis, gastritis, irritable bowel syndrome (IBS) and ulcers etc. Treats gum related diseases like periodontitis and cures bad breath. Beneficial in treating bone related disorders like arthritis, gout, rheumatism and other inflammatory diseases.

- **Anti-Diabetic Agent**

Kefir is beneficial for diabetics as it reduces the level of glucose in the blood and maintains the normal blood sugar level.

- **Provides vitamins to the body**

Kefir contains rich amounts of vitamins like vitamin K, the B vitamins and important minerals like magnesium and calcium. These minerals and vitamins are important nutrients required by the body and regulate every internal organ in a proper manner.

- **Reduces the levels of cholesterol**

Regular us of kefir helps to reduce high cholesterol levels. It is thus beneficial for preventing the occurrence of many cardiovascular diseases like heart attack and stroke.

- **Prevention against toxins**

Kefir plays an important role in protecting the body against the harmful effects of radiation and other toxic pollutants. It thus helps to enhance the immune function. Regular intake of kefir protects against the ill effects of ageing and helps to look younger.

Side Effects²²

As beneficial as it may be, Kefir too can have side effects that vary in people. Some people may have mild side effects while others will only experience severe one. Side effects of Kefir include bloating, gas and gas pains, constipation, diarrhea, rash or even acne.

Some of the Known Kefir Health Benefits^{11, 12}

<ul style="list-style-type: none"> • Strongest natural remedy against any allergy • Strongest natural antibiotic without side effects • Treats liver disease • Treats gallbladder, dissolves gall bladder stones • Clears the body of salts, heavy metals, radionuclide and alcoholic products • Cleans the body of chemical antibiotics • Treats kidney stones • Good bacteria in kefir are able to fight off pathogenic microorganisms • Lowers level of LDL cholesterol • Cleans the gastrointestinal tract • Irritable Bowel Syndrome • Treats gastritis • Treats pancreatitis • Treats ulcers • Prevents and treats colon cancer • Improves digestion • Improves the body functions • Improves the human immune system • Cures Candida • Treats attention deficit hyperactivity 	<ul style="list-style-type: none"> • Cures hypertension • Stops growth of cancer cells • Speeds up healing process • Treats psoriasis • Treats eczema • Treats inflammatory diseases • Reduces size of tumors • Treats heart disease • Reverses calcination of blood vessels • Clears the blood vessels • Boosts the bodies energy • Natural “feel good” food • Treats lung infections • Normalizes metabolism thereby can be used as for weight loss • Cures acne • Has anti-oxidants and anti-aging properties • Nourishes hair • Treats the gum disease parodontosis • Lessens effects of medicines • Replenishes body of good bacteria after antibiotic • Balances the micro flora of the body’s digestive system • Regulates blood pressure
--	--

<p>disorder</p> <ul style="list-style-type: none"> • Improves the brains neuro functions like reflexes, memory retention, attention, the five senses • Reduces flatulence • Lactic acid fermentation enhances the digestibility of milk based foods. People who cannot otherwise digest milk, can enjoy the vital calcium rich Kefir. • Treats yeast infection • Eliminates vaginal odors • Cures wrinkles • Treats arthritis • Treats colitis • Treats gout • Cures migranes • Treats rheumatism • Treats other stomach disorders • Detoxifies the body • Improves protein quality of milk and enhances absorption and digestion • Good bacteria manufacture B vitamins such as B3, B6 and folic acid. 	<ul style="list-style-type: none"> • Lowers blood sugar • Lowers blood lipid levels or cholesterol and fatty acids • Treats diarrhea • Treats constipation • Promotes bowel movement • Anti-stress properties • Treats sleeping disorders • Treats depression • Treats stomach cramps • Treats chronic intestine infections • Treats liver infections • Treats asthma • Treats bronchitis • Treats sclerosis • Treats anemia • Treats hepatitis • Healing effects on catarrh, digestive nodes, astral nodes, bilious complaints • Treats leaky gut syndrome • Prevents metastasis • Cures bad morning breath • Aids in treating tuberculosis
--	---

Table 1: List of Some known benefits of Kefir

Conclusion

Kefir, the miracle food, is known as a superb probiotic source. With rich probiotic content, it automatically has a positive effect on our bodies. Kefir and Kefir grains have been around for centuries and centuries back and all for a good reason. The various health benefits of the Kefir makes it a magical health drink.

References

1. Lopitz-Otsoa, F; Rementeria, A; Elguezabal, N; Garaizar, J, "Kefir: A symbiotic yeast-bacteria community with alleged healthy capabilities" *Revista Iberoamericana de Micología* 2006, **23**: 67–74.
2. Kowsikowski, F. and V. Mistry.. Cheese and Fermented Milk Foods, F. V. Kowsikowski, L.L.C., Westport, Conn. 1997, 3(1): 221-224.
3. Farnworth, Edward R., *Handbook of Fermented Functional Foods*. CRC. 2003, ISBN 0-8493-1372-4.
4. Liu, Je-Ruei; Chen, Ming-Ju; Lin, Chin-Win, "Antimutagenic and Antioxidant Properties of Milk-Kefir and Soymilk-Kefir", *Journal of Agricultural and Food Chemistry*, 2005, **53** (7): 2467–2474
5. Kneifel, W; Mayer, HK, "Vitamin profiles of kefir made from milks of different species". *International Journal of Food Science & Technology*, 1991, **26**: 423–428.
6. Hertzler, Steven R.; Clancy, Shannon M. "Kefir improves lactose digestion and tolerance in adults with lactose maldigestion". *Journal of the American Dietetic Association*, 2003, 103 (5): 582–587.
7. Maeda, H; Zhu, X; Omura, K; Suzuki, S; Kitamura, S, "Effects of an exopolysaccharide (kefiran) on lipids, blood pressure, blood glucose and constipation". *BioFactors* (IOS Press), 2004, **22** (1-4): 197–200.
8. Maeda, H; Zhu, X; Suzuki, S; Suzuki, K; Kitamura, S, "Structural characterization and biological activities of an exopolysaccharide kefiran produced by *Lactobacillus kefiranofaciens* WT-2B(T)". *Journal of Agricultural and Food Chemistry*, 2004, **52** (17): 5533–8.
9. Abraham, Analía G.; de Antoni, Graciela L. "Characterization of kefir grains grown in cows' milk and in soy milk". *Journal of Dairy Research* , 1999, **66** (2): 327–333.
10. Prescott, Harley, Klein. *Microbiology* 7: 1040
11. Lisa Grier et al, Kefir and Its Benefits, ezinearticles, 2009, 3: 121-124.
12. Glenn Prescot et al, Kefir and Its Benefits, ezinearticles, 2009, 3: 134-139.
13. Lactic acid bacteria and yeasts in kefir grains and kefir made from them. *J Ind Microbial Biotechnol*, 2002;28(1):1-6

14. Inhibitory power of kefir: the role of organic acids. *J Food Prot* 2000;63(3):364-9
15. Antibacterial activity of milk-fermenting bacteria. *Vet Med (Praha)* 1990; 35(3):187-92.
16. "Tangy Tasting Kefir," *Alive: Canadian Journal of Health and Nutrition*, 2007, 114-115.
17. Daniells, Stephen, Probiotics Could Help Stress-Induced Gut Problems, *NUTRAingredients-usa.com*, April 25, 2006.
18. Davis, Jeanie Lerche, Kefir Helps Lactose Intolerance, *WebMD*, May 30, 2003.
Hertzler, Steven R. and Shannon M. Clancy, "Kefir Improves Lactose Digestion and Tolerance in Adults with Lactose Maldigestion," *Journal American Dietetic Association*, 2003, 103(5):582-587.
19. Lewis, Genevieve, "Probiotics: A Better Way to Treat Infections During Pregnancy," *Midwifery Today*, , Autumn 2006, 30-31.
20. Liu, Je-Ruei, Sheng-Yao Wang, Yuh-Yih Lin and Chin-Wen Lin, "Antitumor Activity of Milk Kefir and Soy Milk Kefir in Tumor-Bearing Mice," *Nutrition and Cancer*, 2002, 44(2), 182-187.
21. Lopitz-Otsoa, Fernando, Aitor Rementeria, Nataliz Elguezabal and Javier Garaizar, "Kefir: A Symbiotic Yeasts-Bacteria Community with Alleged Healthy Capabilities," *Revista Iberoamericana de Micologia*, 2006, 23:67-74.
22. Boerner, Heather, "Go with Your Gut," *Cronish, Nettie, Yoga Journal*, 2008, 49-52.