

HEALTH BENEFITS OF KEFIR; THE FERMENTED HEALTH DRINK

Fathima Sherin P

Postgraduate Student, PG Dept. of Home Science
KAHM Unity Women's College, Manjeri.

Bushaira V (Co- Author)

Assistant Professor Adhoc, PG Dept. of Home Science
KAHM Unity Women's College, Manjeri

Introduction

Fermentation-based processes have been of great interest for humans since the antiquity due to their potential applications. Probiotics are able to regenerate our digestive system with good microbes that will neutralize the harmful ones. Useful microbes will ferment food correctly and improve our health. During lives, the individuals are exposed to different types of microbes, which are unsuitable for our health. Antibiotic treatment could destroy our useful microflora. In such cases, Probiotics should be used to regenerate our microflora. If our daily food contains Probiotics, that will be the best and the cheapest way to recover any losses in our digestive system microflora and to improve our health. In olden civilizations, the public used to include food-containing Probiotics in their daily food.

Kefir is a symbiotic medium of microorganisms characterized by presenting a mass composed of proteins, lipids and a soluble polysaccharide called kefiran where its micro biota, a spectrum of lactic acid bacteria, yeasts, and acetic bacteria, is found. Kefir is produced by the fermentation of lactic acid

and alcohol by mesophilic bacteria and yeasts, respectively. The micro biota of kefir grains is formed by sugar-fermenting microorganism that produces lactic acid, alcohol, CO₂, B-complex vitamins, and other organic acids in their metabolism.

Characteristics of kefir

Kefir is traditional fermented milk product which has been produced and consumed for thousand years in the areas from Eastern Europe to Mongolia. It is believed that the name kefir derives from the mountain areas of Caucas or Caucasia where, according to the legend, the aboriginals got it directly from the prophet Mohammed. The name kefir most likely derives from the Turkish word kefy or keif meaning happiness, satisfaction. (Rattray, 2011). Kefir grains represent a unique ecosystem in nature, formed by a symbiotic relation between bacteria and yeasts. A complex microbial community of kefir grains contains more than 50 various species of bacteria and yeasts and, depending on their origin, several species of filamentous moulds.

Kefir is a specific dairy product from the group of fermented milks where lactose hydrolysis during fermentation occurs with the simultaneous action of bacteria and yeasts contained in kefir grains. Although lactic acid is a main metabolite, due to yeast activity kefir also contains significant quantities of CO₂ and variable alcohol quantity. Because of associative growth of various microbial species in kefir, during fermentation other organic compounds are formed, like bioactive peptides, exopolysaccharides, bacteriocins which are presumed to have a probiotic effect on human health (Hong et al., 2010).

A typical microbial population of kefir must contain *Lb. kefir* as well as species *Leuconostoc*, *Lactococcus* and *Acetobacter* (prepared from kefir grains) and yeasts which ferment lactose as well as yeasts which do not ferment lactose (*Saccharomyces cerevisiae* and *Saccharomyces exiguous*) when kefir grains are used for the culture. According to the same standard, a typical kefir must contain at least 2.8 % proteins, less than 10 % fat, at least 0.6 % lactic acid, while the alcohol percentage is not determined. The total number

of specified microorganisms from culture must be at least 10^7 cfu/mL, and the number of yeasts not under 10^4 cfu/mL. At the end of fermentation, which includes three days of cold ripening, the pH value of a typical kefir is between 4.2-4.7, it contains between 0.8-1.2 % of lactic acid, 0.5-0.7 % of ethanol and approximately 0.20 % of CO₂. Apart from these compounds, kefir also contains various aromatic compounds like acetaldehyde, diacetyl and acetoin, other organic acids like formic, acetic and/or propionic and isoamyl alcohol in traces (Wszolek et al., 2006). Also, many scientific studies confirm that apart from nutritive value kefir also has a strong pro-biotic effect

The microbial population of kefir grains consists of numerous species of lactic acid bacteria, acetic acid bacteria, yeasts and filamentous moulds which develop a complex symbiotic relationship within a microbial community. Also, the presence of certain microbial species within kefir grain is determined by the area of origin. However, due to numerous species and phenomenon of their associations, microbiota of kefir grains has still not been completely elucidated.

Health benefits of kefir

The complex microbiological consortium of kefir grains is responsible for the high numbers of produced metabolites that contribute to a wide range of health-promoting effects. The main established health benefits of kefir grains include antimutagenic, anticarcinogenic, hypocholesterolemic and anti-atherogenic effects, as well as antimicrobial and antioxidant activities, protection against *C. difficile* infection, and inhibition of tumor growth and β -galactosidase activity. Kefir grains can inhibit the development of undesirable and pathogenic microorganisms, since the microbes contained in grains are capable of producing lactic and acetic acids, ethanol, peptides (bacteriocins), and other biologically active components (Farnworth, E.R. et al., 2005)

Many studies have shown that species of lactobacilli contained in kefir grains can be successfully used in the treatment of vaginal infections, as they are able to produce a range of anti-microbial compounds. More specifically, it

has been reported that milk fermented with kefir grains exhibits antimutagenic effects against 2,3-dimethyl-4-aminobiphenyl (DMAB) and against N-methyl-N-nitro-N-nitrosoguanidine (MNNG). Both of them are of the most potent mutagenic chemicals known. In recent research data, the consumption of fermented yogurt and milk with kefir grains showed hypocholesterolemic and anti-atherogenic effects that protect against atherogenesis and the formation of plaques in arteries.

In addition, kefir grains can be successfully applied to a specific population suffering from lactose intolerance. The enzyme β -galactosidase is naturally present in kefir grains and reduces the lactose content, leading to a product suitable for lactose-intolerant persons. Likewise, the reduced lactose concentration and higher β -galactosidase activity in kefir make it suitable for lactose-intolerant persons by improving lactose digestion (Bolla PA et al., 2013).

Probiotics as a live microbial feed supplement that has beneficial effects on the host animal by improving its microbial bowel balance. Probiotics are living microorganisms which is useful for production of fermented beverage, include drugs, dietary supplement and food products. The meaning of probiotic is "For life" defined by expert committee. Probiotic microorganism is very useful for human body. They improve digestive system in human body. Dairy product manufacture by probiotic microorganism as a functional food which is provide health benefits to the human body to protect the body from the certain diseases.

In recent year, there are very growing interest in probiotic living microorganism to manufacture the good dairy product which is highly beneficial to the human body (Akin, 2005). Kefir grain have been reported good source of protein, vitamins, minerals, fat, ash with a content of protein (34.3 %), fat (4.4 %), ash (12.1 %), mucopolysaccharide (45.7%), vitamins B and K, calcium, phosphorous and magnesium is present in kefir grains.

Kefir is the fermented milk beverage which is produced by mixture of microorganism having a slight acidic in taste. Kefir having a various health benefit which is useful for, maintenance of human body. Kefir is useful to improve human digestion system. Main benefit of kefir is for lactose intolerance. Consumption of kefir helps to maintain diabetes disease. In developed countries kefir is regular distributed in hospital to patients for maintain the body.

Kefir is useful for skin diseases mainly in skin cancer. It is also playing important role in anti-allergic, antifungal, antibacterial, anti-inflammatory, anti-microbial, anti- carcinogenic, gastrointestinal tract health, immune modulation and also mental health. Kefir is also use for improve gut, lower serum cholesterol levels and also a reduction hypertension (Slattery et al., 2019).

Lactose Intolerance:

Regular consumption of kefir which is useful for build the lactose intolerance of patient body. There are high amounts of lactose in milk and dairy products. The hydrolysis of this disaccharide and its subsequent absorption into the small-intestinal mucosa are needed for intestinal absorption of lactose. In kefir grain β -galactosidase enzyme is already present and this enzyme lowers the lactose content of kefir during fermentation, rendering the final product suitable for people with lactose intolerance. Operation of β galactosidase that convert lactose into quickly digestible glucose and galactose (John and Deeseenthum, 2015). Fermented drink like kefir is characterized by a delayed gastric emptying mechanism that leads to the digestion of lactose. The use of kefir, which is similar to yoghurt, was able to enhance lactose absorption and resistance.

Anti Diabetic effect:

In diabetes patients, long-term injury, dysfunction, and loss of multiple organs, particularly eyes, kidneys, nerves, heart and blood vessels, is linked to

chronic hyperglycaemia. Probiotic food has anti-diabetic property. Kefir is useful as an anti-diabetic drink. The mixture of goat milk- soy milk kefir and soy milk kefir resulted in higher plasma glucose levels ($p < 0.05$) relative to goat milk kefir in diabetic rats. The decrease in plasma glucose in the goat milk-soy milk kefir mixture was higher than in the soy milk kefir group. This suggested that the bioactive components of goat milk and soy milk in kefir had a synergistic effect, which could lower plasma glucose levels.

Anti allergic properties

Kefir has been reported as an anti-allergic agent by various scientists. A difference in the Th1 / Th2 cell ratio, resulting in a high IgE reaction, is one of the key mechanisms behind food allergy. Consumption of dairy milk product kefir and soymilk-based kefir restrain the IgE and IgG response by the alteration of micro flora, we can achieve the prevention, food allergy (Liu et al., 2006).

Skin:

The rate of prevalence, morbidity and mortality of skin cancers is growing and is thus a major public health issue. Skin cancers, including basal and squamous cell carcinomas, are primarily classified into melanoma and non-melanoma skin cancers (NMSCs). Melanoma is responsible for the majority of mortality associated with cancer, and NMSCs are usually characterized as having a more benign path with locally violent characteristics. Milk beverage probiotic drink kefir have a good potential for prevention and treatment of skin cancer. They stated that, kefir is the best therapeutic natural ingredients for cancer and best anticancer agent in the new future world (Sharifi et al., 2017).

Kefir and breast cancer:

The impact of kefir extract on MCF-77 cell line and HMECs have shown that, kefir depressed in a dose dependent manner MCF-7 cell growth. In the

review of cytokines that are prevention on the murine control, kefir experimental breast cancer kefir, cell free fraction modulatory power on immune response, it has been shown that, memory gland and tumor are demonstrated. Kefir extracts because apoptosis, interrupt the cell cycle and decrease the development of tumors in breast cancer cells, so it may be sufficient to avoid or cure breast cancer (Sharifi et al., 2017).

Kefir and leukemia:

Kefir, which is one of the cytokines, has induced down regulation of TGF-alpha, Inducing proliferation and reproduction of cells. The natural mixture composed primarily of Lactobacillus kefir P-IF strain is Probiotics Fermentation Technology (PFT) on kefir grain commodity. PFT's apoptotic effect on human multidrug-resistant myeloid leukemia (HL60 / AR cell line) revealed that PFT caused dose-dependent apoptosis in the HL60 / AR cell line. Apoptotic induction was correlated with activation of caspase 3, down regulation Bcl-2 and lower polarization of MMPP potential mitochondrial membrane (Sharifi et al., 2017).

Provide vitamins Protein:

Kefir is a highly beneficial to human health. Kefir having a rich number of vitamins which is beneficial for development of body. Vitamin K and vitamins B (B1, B2, B5), vitamin C are occurring in kefir with these, minerals also occur like calcium and magnesium in kefir. These both are most important nutrient which is required by human body and disturbed all of the internal organ body. The consumption of vitamin in kefir is determine by the form of milk and microbiological flora used in its manufacture. Essential amino acid that are value for improving fitness the healing process and homeostasis (Gaware et al., 2011).

Kefir is high in threonine, serine, lysine, alanine, valine, methionine, isoleucine, tryptophan which play a critical role in the central nervous system. Kefir also involves partly digested protein such as casein that helps the body

digested and consumes it. Kefir abundant essential amino acid also control the synthesis of protein, sugar, lipid and have a beneficial effect on body weight management, immune system preservation and energy balance. Amino acid avoid impairment and extend the stable life expectancy of the elderly and the branched chain amino acid present in kefir promote the neurological rehabilitation of patients with serious traumatic brain injury (Farag et al., 2020).

Conclusion

Kefir is a fermented food or drink that contains live bacteria and yeast and millions of probiotics, which are bacteria with potential health benefits. The health is affected by many exogenous and endogenous factors that could change our microflora position. Useful microflora guarantees good health. One cannot hear the sound of the daily battles between the good and the bad microbes in our bodies or see how they enter our bodies with each breath, talk and with each food consumed. Actually, they are essential for our health. They build our immune system slowly to be ready for the pathogens.

References

1. Akin, M. S. (2005).” Effects of inulin and different sugar levels on viability of probiotic bacteria and the physical and sensory characteristics of probiotic fermented ice-cream”.*Milchwissenschaft*, 2vol. 60, no. 3, pp. 297-301.
2. Bolla , P.A, Carasi P, Serradell MdeLA, De Antoni GL. Kefir-isolated *Lactococcus lactis* subsp. *lactis* inhibits the cytotoxic effect of *Clostridium difficile* in vitro.*Journal of Dairy Research* 2013;80:96e102.
3. Farag, M. A., Jomaa, S. A. and El-Wahed , A. A.(2020) . “The Many Faces of Kefir Fermented Dairy Products: Quality Characteristics, Flavour Chemistry, Nutritional Value, Health Benefits, and Safety”. *Nutrients*. vol. 12, no. 2, pp. 346.
4. Farnworth, E.R .(2005).” Kefir - a complex probiotic. *Food Science and Technology Bulletin:Functional Foods* “. 2, 1-17.
5. Gaware, V., Kotade, K., Dolas, R., Dhamak, K., Somwanshi, S., Nikam, V. and Kashid, V.(2011). “The magic of kefir: a review”. *Pharmacology online*.vol. 1, pp. 376-386.
6. Hong, W.S., Chen, Y.P., Chen, M.J.(2010).”The antiallergic effect of kefir lactobacilli.*Journal of Food Science*” . 75, 244-253.

7. Liu, J. R., Wang, S. Y., Chen, M. J., Yueh, P. Y. and Lin, C. W. (2006) .”The anti- allergenic properties of milk kefir and soymilk kefir and their beneficial effects on the intestinal microflora”. *Journal of the Science of Food and Agriculture*.vol. 86, no. 15, pp. 2527-2533.
8. McFarland, L.V. From yaks to yogurt: the history, development, and current use of probiotics. *Clin Infect Diseases*, (2015). vol. 60, no. 2, pp. 85–90.
9. Ostadrahimi, A., Taghizadeh, A., Mobasser, M., Farrin, N., Payahoo, L., Gheshlaghi Z.B., Vahedjabbari M .(2015).”Effect of probiotic fermented milk (kefir) on glycemic control and lipid profile in type 2 diabetic patients: A randomized double-blind placebo-controlled clinical trial”. *Iranian Journal Public Health*. vol. 44, no.2, pp. 228–237.
10. Rattray, F.P., O’Connell, M.J. (2011): Kefir. *Encyclopedia of Dairy Science.*, Elsevier,Ltd. 518-524.
11. Sharifi, M., Moridnia A., Mortazavi D., Salehi M., Bagheri M. and Sheikhi A.(2015).”Kefir: a powerful probiotics with anticancer properties”. *Medical Oncology* vol. 34, no.11, pp. 183.
12. Slattery, C., Cotter P. D. and W O’Toole P.(2019). “Analysis of health benefits conferred by lactobacillus species from kefir”. *Nutrients*, vol. 11, no. 6, pp. 1252.
13. Wszolek, M., Tamime, A. Y., Muir D. D. and Barclay M. N. I.(2006).”Properties of kefir made in Scotland and Poland using bovine, caprine and ovine milk with different starter cultures”. *LWT – Food Science and Technology*. vol. 34, pp. 251–261.