

AN OVERVIEW OF WATER KEFIR, ITS BENEFITS AND APPLICATIONS

Abstract

Over the few years, people have started consuming water kefir. For lactose-free diets based on plants, water kefir is acceptable. People are more conscious of how important a good diet is to enhancing their wellbeing. As a result, there is a rising demand for wholesome probiotic meals, with traditional fermented drinks like water kefir drawing particular interest. Water kefir, often referred to as "aquakefir" or "sugary kefir," is a fermented beverage produced by hand that has a fruity, acidic flavour and a low alcohol content. Water kefir is more nutritious and offers greater health advantages. Sugar, vitamin, and mineral content are the main selling points of water kefir. Kefir, which has been shown to have anti-diabetic, anti-allergic, and anti-cancer characteristics, helps pregnant women's general health. Kefir has a variety of uses, including medical field, biopolymer, and control of food contamination.

Keywords: Vegan, fermented Beverage, lactose-free, biopolymer and aquakefir.

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I. INTRODUCTION

With the aid of microorganisms like yeast and bacteria, a substance can be fermented to create a simpler compound. Probiotics are live microorganisms that, when taken, improve or revive the microbiota in the stomach. The fermentation of water kefir grains produces the sour, alcoholic beverage known as water kefir. A traditional fermented beverage known as water kefir is a symbiotic culture of bacteria and yeast (SCOBY) that is kept in a polysaccharide biofilm matrix by the bacteria. Among other regional names, the fermented, filtered, and grain-free beverage is referred to as "water kefir," "sugary kefir," or "aquakefir". To avoid diseases or treat them with the least amount of harm, healthy and balanced diet is now more important than ever. Consuming functional foods, which are not medications or dietary supplements, is said to improve health continuity. (Altun kamarli et al., 2021). The probiotic beverage water kefir is made by dissolving water kefir grains in a sugar water solution. The grains are a symbiotic mixture of bacterial and yeast strains, and they require a sugar water environment to flourish. Water kefir's microbial strains consume the sugar in the water to create a somewhat sweet, pleasantly sour, carbonated beverage with hints of alcohol (Fuller Roy ., 2007). It is produced when water kefir grains digest sugar, and the fermentation process frequently allows for the inclusion of dried fruits. (Cufaoglu Gizem & Erdinc Ayse Nur., 2023).

Water kefir is a 2% lactic acid fermented beverage that has a little carbonation. It is made by fermenting sugar in kefir grains, which are translucent and white or yellow in colour. Depending on the sugar content, the carbon sources, and the fermentation conditions, several microorganisms can be found in water kefir. Lactic acid bacteria, acetic acid bacteria, and yeasts make up the majority of the microbiota. Sugar, fruit-derived substances, lactic acid, acetic acid, ethanol, carbon dioxide, mannitol, vitamins, and amino acids like arginine are among the metabolites found in fermented water kefir. Water kefir has traditionally been produced on a small scale, and defined starter cultures are not frequently used.

II. WATER KEFIR HEALTH BENEFITS

Evidence supporting the health advantages of drinking water kefir comes from centuries of human usage. The bacteria in water kefir and the organic acids they create have both been proved to be non-pathogenic at this point in time of intake. They have the ability to stop the growth of harmful bacteria including *Shigella* spp. and *Salmonella* spp. (Koroleva, 1988; Anselmo et al., 2001; Zavala et al., 2016), *Salmonella typhimurium*, *E. coli* and *Staphylococcus Aureus* (Romero-Luna et al., 2020) (Seydim Zeynep B.Guzel., 2021).

1. Rich In Beneficial Bacteria: The probiotic properties of water kefir are its main advantages. Kefir is regarded as a better source of probiotics since it offers a wide variety of bacteria and yeast. Probiotics are a sort of helpful bacteria found in the gut that play a crucial role in practically every aspect of health, from cancer prevention to immune function and beyond. According to some studies, kefir grains can contain up to 56 different yeast and bacterial strains. The beneficial bacterial families *Lactobacillus*, *Lactococcus*, *Streptococcus*, and *Leuconostoc* are some of the most often discovered families in kefir. (Ajmera Rachael., 2018).

2. **Scavenges Cancer Cells:** According to some research, water kefir may help slow the spread of some cancerous cells. A study demonstrated the effectiveness of kefir extract in preventing the spread of breast cancer cells. Kefir's probiotic content and ability to improve immune function have been linked to other research that suggest it may be helpful in the fight against colon and blood cancers as well. But additional investigation is required to determine how water kefir might affect the expansion and maturation of cancer cells in people. (Ajmera Rachael., 2018).
3. **Boost Immune Function:** The immune system gets a powerful boost from water kefir because of its high concentration of beneficial microbes. According to studies, some probiotic strains can lower the incidence of intestinal infections, shield women from recurrent urinary tract infections, and even protect against lung infections. Water kefir has been demonstrated to help decrease inflammatory responses in conditions like asthma and other conditions through tests on animals. Additionally, a brief six-week trial of 18 persons indicated that kefir consumption every day could reduce inflammation and boost immune cell counts. (Ajmera Rachael., 2018).

III.EFFECT OF WATER KEFIR ON ENTERIC BACTERIAL PATHOGEN

Kefir's antibacterial properties have been linked to a variety of processes, including the production of organic acids, hydrogen peroxide, acetaldehyde, carbon dioxide, bacteriocins, S-layer proteins, pathogen adhesion to yeast cell walls, competition for nutrients, and space. (Leite et al., 2013; Menezes et al., 2020; Mobile et al., 2009; Shen et al., 2018).

IV.ROLE OF KEFIR AGAINST FOOD CONTAMINATION

The prevention of food contamination is an international issue. For years, a variety of chemical and physical techniques have been used to reduce the amount of pollutants in food. (Randhawa, Asghar, Nadeem, & Ahmad., 2018). The use of biological techniques has grown recently. In this method, pollutants are changed into substances with lower or no toxicity by using microbes, extraction enzymes, or probiotic products. The fact that probiotic microbes don't create any toxic metabolites makes them harmless. The most significant probiotics that are frequently employed in the food sector are lactic acid bacteria and several yeast species. (Touranlou Fateme Asadi et al., 2023). Kefir grains contain a variety of bacteria and yeast, including lactose- and non-lactose-assimilating yeast, homo- and hetero-fermentative lactic acid bacteria. (Bahati et al., 2021). LAB or yeast can interact with food pollutants in a variety of ways. The type of contaminant, the strain of the microorganism, and the physical and chemical conditions all play a role in how it specifically occurs. (Touranlou Fateme Asadi et al., 2023).

V. KEFIR AS BIOPOLYMERS

The need for bio-based materials, such as biopolymers, has surged as a result of the need for an alternative to polymeric materials made from petroleum. The desire for clean-label products that may be used in the food, cosmetics, and pharmaceutical industries is driving growth in the market for natural polymers. Because they offer several positive effects in addition to technological advantages due to their antioxidant, antibacterial,

immunomodulatory, and anti-tumor capabilities, which are not present in more conventional plant-based polymers, EPS of microbial origin is a significant natural alternative. (Lucena Monalisa de Alencar et al., 2022).

Kefir has the potential to have anti-inflammatory, immunomodulatory, antibacterial, anti-mutagenic, and anticancer activities in its biological makeup. Exopolysaccharides (EPSs), a carbohydrate polymer that promotes cell adhesion and shields microorganisms from harsh environmental elements, are also produced by these grains. Dextran makes up the majority of the EPS made from water kefir grains. Dextran, which is formed by dextransucrase from sucrose and makes up the majority of the polysaccharide matrix of water kefir grains, typically has α -(1-6) bonds in its main chains, which account for 50% of the biopolymer's total linkages. Dextran is biodegradable and can be used as a thickener, emulsifier, viscosity modifier, and stabiliser.

VI. CONCLUSION

Consuming kefir frequently has advantages such as antibacterial, anti-inflammatory, lactose intolerance recovery, general GIT improvement, and immunomodulatory qualities. Studies have shown that water kefir and its components may be used to treat and prevent the spread of pathogenic enteric bacteria. Consumers today are more aware of the importance of a balanced diet for enhancing wellbeing. Traditional fermented drinks like milk kefir and water kefir are particularly popular due to the rising demand for healthful probiotic meals.

REFERENCE

- [1] Gut abraham majak,(2021),“kefir characteristics and antimicrobial properties-Potential application in control of enteric bacterial infection”, International dairy journal, <https://doi.org/10.3390/polym15122594>.
- [2] LagoAgastina (2023), “Multi component biodegradable materials based on water kefir grains and yeast biomass”, <https://doi.org/10.1016/j.ijfoodmicro.2021.1091283>.
- [3] Lynch Keiran M , WilkinsonStuart (2021), “An update on water kefir”Microbiology, production and composition” , International journal on food microbiology, <https://doi.org/10.1016/j.ijfoodmicro.2021.109128>.
- [4] Alencar Monalisa, (2022), “Biopolymer from water kefir a potential clean”, <https://doi.org/10.3390/molecules2712389>.
- [5] Edward R Farnworth, (2006), “Kefir—a complex probiotic”, Food Science and Technology Bulletin 2.1.
- [6] Kesenkaş H., et al., (2017), “Kefir- Fermented foods in health and disease prevention”. Academic Press : 339-361.
- [7] Stavros Kazakos m et al., (2016), “Production of low-alcohol fruit beverages through fermentation of pomegranate and orange juices with kefir grains”, Current Research in Nutrition and Food Science Journal.
- [8] Damiana D.Rosa et al., (2017), “Milk kefir: nutritional, microbiological and health benefits”, Nutrition Research Reviews.
- [9] Moretti Ana florencia et al., (2022), “Water kefir a fermented beverages containing probiotics micro organisms”,Elsevier Publication, <https://doi.org/10.1016/j.fufo.2022.100123>.
- [10] Tournlaou Fateme Asadi et al., (2023), “Application of kefir for reduction of food industry”, Current Research in International Dairy Journal, <https://doi.org/10.1016/j.idairyj.2023.105748>.
- [11] Owaga EE, Chen MJ, Chen WY, Chen CW, Hsieh RH., (2014), “Oral toxicity evaluation of kefir-isolated Lactobacillus kefirifaciens M1 in Sprague- Dawley rats”, Food Chem Toxicol. ;70:157. <http://dx.doi.org/10.1016/j.fct.2014.05.005>.
- [12] Jambhulkhar Atul bhojraj et al., (2020), “ Preperation and health benefits of kefir”, Current research in food technology and nutrition.

- [13] Guezel Zeynep B et al.,(2021), “Comparision of milk kefir and water kefir,physical,chemical, microbiological and functional properties”, Trends in food science and technology <https://doi.org/10.1016/j.tifs.2021.04.041>.
- [14] Lynch, K.M., Zannini, E., Coffey, A., Arendt, E.K., 2018, “Lactic Acid Bacteria Exopolysaccharides in Foods and Beverages: Isolation, Properties, Characterization, and Health Benefits” , Annu. Rev. Food Sci. Technol. <https://doi.org/10.1146/annurev-food-030117-012537>.
- [15] Marsh, A. J., O’Sullivan, O., Hill, C., Ross, R. P., & Cotter, P. D., (2013), “Sequence-based analysis of the microbial composition of water kefir from multiple sources”. FEMS Microbiology Letters, <https://doi.org/10.1111/1574-6968.12248>.