

Kefir and Kombucha for Rheumatic Disease: A Systematic Review

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Abstract Nutritional complementary therapy is increasingly reported as modulating rheumatic diseases' activities. Kefir-fermented milk products and kombucha tea have numerous beneficial effects on various human chronic conditions. The aims of the present systematic review are to screen the available literature for well-designed studies that evaluated kefir and kombucha in rheumatic patients. A thorough literature search in Pubmed, Scielo, and LILACS was conducted in accordance with PRISMA criteria, from January 1965 to April 2023. Only one study, using kefir supplementation in osteoporotic patients, fulfilled the screening criteria. Since many advantageous effects are attributed to the two additives, we hope that the present review will encourage further well-designed evaluations in rheumatic and other human chronic diseases.

Keywords: Kefir, kombucha, probiotics, rheumatic diseases, gut, inflammation

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1. Introduction

Kefir-fermented milk is a traditional food from the North Caucasus, and numerous studies have shown that it contains beneficial bacteria and yeast, acting as probiotics. In fact, it is called "a natural probiotic beverage" [1]. Its human health advantages include improved lactose intolerance, normalization of the intestinal flora, and enhanced immunological functions [2]. It has anti-microbial, anti-fungi, anti-viral, anti-hypertensive, anti-diabetic, and anti-hypercholesterolemic effects. Its anti-inflammatory, anti-cancer, anti-oxidant, anti-allergic and anti-atherosclerotic properties, are well described [2,3,4]. Intriguingly, the immunomodulatory roles of kefir fermented milk might be beneficial to fight covid 19 [5], for major depressive disorders [6] and as a starter to achieve bioactive gluten-free nutrients for gluten-dependent conditions [7].

Similarly, kombucha tea is an aerobically fermented beverage that was first consumed in northeast China around 220 B.C.B.C. It was later introduced to Japan as a medicine, then to Russia and Eastern Europe, and is currently gaining popularity in the United States as a

result of the functional food movement. Its popularity is probably a result of its alleged health advantages and the current scientific and fashionable inquiry into the probiotics' impact on human health [8]. kombucha tea contains a vast microbial and yeast diversity with multiple health effects [9,10]. Indeed, it is claimed that kombucha has anti-inflammatory, anti-oxidative, anti-postprandial hyperglycemic, anti-microbial, anti-diabetic, anti-tumoral, anti-hypertensive, hepatoprotective, hypocholesterolemic, and probiotic activities [11,12,13,14].

The majority of rheumatic diseases are linked to a significant systemic inflammatory organ-targeted inflammation, oxidant stress, characterized dysbiosis and loss of immune tolerances [15,16,17]. In view of the beneficial effects of kefir and kombucha it is logic to assume that the two nutritional additives may affect rheumatic disorders' activities. The gut-joint axis is well operative and various nutritional interventions or avoidances were suggested to patients with rheumatic conditions [18,19,20,21,22]. It's intriguing that ingestion of kefir or kombucha can have an effect on chronic human diseases and joint health [23,24,25]. It appears that intestinal symptoms, gut luminal eco-events, enteric and articular pathology of numerous rheumatic conditions, can be affected or even ameliorated by specific

diets and nutritional additives, whereby kefir and kombucha are some of them [18,19,20,21,22,23,24,25,26].

2. Material and Methods

A thorough literature search in PubMed, Scielo, and LILACS was conducted in accordance with PRISMA criteria without any language restriction, from January 1965 to April 2023. The following MeSH entry terms were used: "Kefir" OR "Kombuch" AND "rheumatic" OR "rheumatologic" OR "systemic lupus erythematosus" OR "lupus" OR "fibromyalgia" OR "rheumatoid arthritis" OR "spondyloarthritis" OR "Sjögren's syndrome" OR "myositis" OR "systemic sclerosis" OR "vasculitis" OR "Takayasu disease" OR "Wegener's disease" OR "granulomatosis with polyangiitis" OR "Kawasaki's disease" OR "polyarteritis nodosa" OR "Livedoid vasculitis" OR "Churg-Strauss" OR "eosinophilic granulomatosis with polyangiitis" OR "osteoarthritis" OR "gout" were used.

The reference lists of the selected articles were analyzed to identify additional publications.

Initially, three authors (JFC, MFLDSR and AL) performed the literature search and independently selected the study abstracts. In the second stage, the same authors independently read the full-text articles selected by abstracts. The authors followed PRISMA guidelines [27].

3. Results

Only one paper, investigating kefir, was chosen for this review after titles and abstracts were scrutinized [28]. As a result, there were no suitable reports on the use of kombucha for rheumatic diseases.

In that article, the scientists compared the effects of calcium supplements to 1,600 mg of kefir-fermented milk supplemented with calcium bicarbonate over a 6-month period in 40 osteoporotic patients. According to the article, taking kefir supplements significantly improved the dual-energy x-ray absorptiometry (DXA) density of the spine, total hip, and hip femoral neck. After three months of treatment, serum β C-terminal telopeptide of type I collagen (β CTX) drastically decreased. Additionally, after six months, the bone formation serum marker, namely, osteocalcin, went from being negative to positive levels.

Interestingly, kefir therapy increased serum parathyroid hormone (PTH) significantly, hence, decreased significantly in the control group. The authors concluded that kefir-fermented milk consumption is associated with short-term changes in bone turnover, a greater 6-month increases in hip bone mineral density and promoted bone remodeling among osteoporotic patients [28].

4. Discussion

Only one study fulfilled the inclusion criteria in the present systemic review [28]. A vast discrepancy exists between the numerous advantages allocated to kefir and kombucha, described in the literature, compared to the extreme paucity of the appropriately designed studies. However, the one present controlled report [28] should

encourage the clinical and the scientific communities to study those potential beneficial food additives in rheumatic conditions.

Several mechanisms can be suggested for the kefir's advantages in rheumatology.

1. Suppression of dendritic cell maturation. Recently, kefir peptides were shown to alleviate collagen-induced arthritis in mice [29].
2. Decreasing inflammation. Kefir peptides exert anti-inflammatory effects by reducing the levels of inflammatory cytokines and downregulation of matrix metalloproteinases in adjuvant-induced arthritis in rats [30]. Kefir induced suppressed bone erosion might be a potential therapeutic strategy for arthritis.
3. Polarization of CD4⁺ T cells. Kombucha was shown to reduce the severity of disease in an experimental autoimmune encephalomyelitis model through motivating polarization of CD4⁺ T cells by induction of TGF- β and IL-4 and inhibition of IL-17 and IFN- γ [31]. Figure 1 summarizes the potential clinical beneficial effects of kefir consumption and the suggested operating pathways.

The following three aspects make up the strengths of the current study: 1. utilizing international criteria for rheumatic disorders; 2. including all research on kefir in rheumatic diseases.; and 3. conducting a thorough literature search. Only one study, however, falls short of the requirements for systematic analysis, which is one of the constraints. Future research on the effects of kefir and kombucha on rheumatic disorders are highly encouraged, particularly in cases where the gastrointestinal tract is implicated, like entero-arthropathies and spondylarthritis [20,21,22,23,26,32,33].

In conclusion, reviewing the literature, only one study was found, demonstrating a positive role of kefir consumption in osteoporotic patients. The clinical benefits of adding kefir or kombucha to the conventional pharmacological therapy of rheumatic patients await further studies.

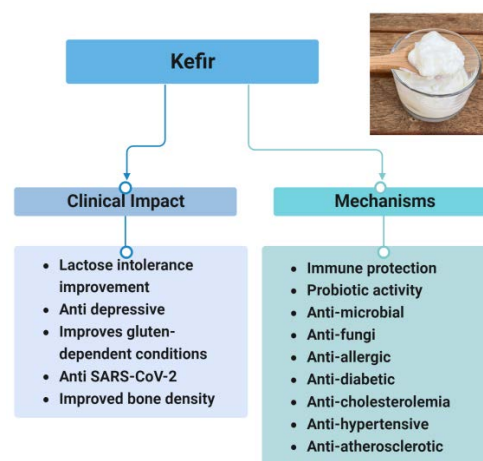


Figure 1. A summary of the potential clinical beneficial effects of kefir intake and the suggested operating pathways [2,3,4,5,6,7] [24,25,26] [28,29,30]

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Disclosure of Interest

The author has no conflicts of interest to declare.

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