


Abstract

# Association between Fermented Milk Consumption and the Gut Microbiome in Finnish Adults <sup>†</sup>

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**Abstract:** Background and objectives: The consumption of fermented milk products has been considered beneficial for health. The moderate use of fermented milk products can also be part of environmentally sustainable diets. Findings on fermented milk and gut microbiome associations, however, have been inconsistent, and studies conducted on population-based samples are scarce. We examined whether the consumption of fermented milk (e.g., yoghurt, buttermilk, curdled milk) is related to individual gut microbiota diversity (alpha diversity), compositional differences in gut microbiota (beta diversity), or bacterial species abundances in Finnish adults. Methods: We used data from the National FINRISK/FINDIET 2002 study (final n = 1273, aged 25–65 years, 55% women). Diet was assessed with 48 h dietary recalls. Gut microbiota were analyzed using shallow shotgun sequencing. In our statistical analyses, multiple linear regression, permutational multivariate ANOVAs, and multivariate analysis using linear models (MaAsLin) were utilized. Our analyses were adjusted for sex, age, smoking, BMI, energy intake, and potentially gut microbiota-altering medicines (metformin and psycholeptics/analeptics). Furthermore, those treated with antibiotics within the past six months or who were pregnant were excluded from the final sample. Results: The mean consumption of fermented milk was 107 (SD 145) g/day. Fermented milk consumption was not associated with individual microbial diversity (alpha diversity, beta = 0.02, sd = 0.01,  $p = 0.18$ ) or compositional variation between individuals' gut microbiota (beta diversity,  $R^2 = 0.001$ ,  $p = 0.57$ ). In species-level analysis, fermented milk consumption was associated with 15 bacterial species, of which 11 were positively associated, and 4 were negatively associated. The positive associations mainly included known lactic acid-producing/probiotic species such as *Bifidobacterium longum*, *Streptococcus thermophilus*, *Lactococcus lactis*, *Leuconostoc mesenteroides*, and *Lactobacillus delbrueckii*. The negative associations included species mainly from genus *Prevotella*, which has been associated with plant-rich diets. Discussion: No associations were found between fermented milk consumption and microbial diversity measures. In line with previous studies in the literature, however, our species-level findings indicated that fermented milk consumption was positively associated with the abundance of several beneficial genera, including *Lactobacillus* and *Bifidobacterium*, whereas findings regarding *Prevotella* species abundances have been inconsistent. Further studies are needed to explore the importance of these findings in relation to the role of fermented milk in healthy and sustainable diets.



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