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Impact of consumption of probiotic lactobacilli-containing yogurt on microbial composition in human feces

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Abstract

An *in vivo* study was carried out to determine the effect of consuming probiotic lactobacilli-containing yogurt on the composition of microbiota in the human gut. Fifteen healthy adults ingested a daily serving of one of three commercial yogurts (two of the products contained a probiotic lactobacilli strain) for 20 days. Fecal samples at defined time points before, during, and after the period of yogurt ingestion were collected and analyzed. The fecal population of lactobacilli was determined by a culture-based method and subsequent colony PCR for the identification of species. Six predominant bacterial groups in the fecal samples were quantitatively determined based on a sequence-specific SSU rRNA cleavage method coupled with a suite of oligonucleotide probes, which was optimized for the target-specific detection of bacterial groups inhabiting human feces. In the ingestion period, one probiotic strain was detected in the feces of all five subjects who consumed the yogurt containing the strain, while the other strain was detected in three of another five subjects. The population levels of the two major groups (*Bacteroides* and *Prevotella*, and the *Clostridium coccoides*–*Eubacterium rectale* group) in the fecal samples tended to change in response to the ingestion but the change did not seem to be dependent on the product-specific property of each yogurt. These results suggest that the human fecal bacterial community could be altered by ingesting yogurt, although whether probiotic lactobacilli are present or absent in the yogurt does not seem to be a factor in this change.

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1. Introduction

The human gastrointestinal (GI) tract is one of the most complex ecosystems known in microbial ecology, usually containing 10^{10} – 10^{11} bacteria/g of luminal content. The overall activity of the commensal bacteria in the ecosystem includes protection against pathogens, development of the immune system, and positive effects on colonic health and host nutrition. Recently, there has been interest in probiotics (Rolfe, 2000; Fooks and Gibson, 2002; Isolauri et al., 2002; Rastall et al.,

2005), “live microorganisms which when administered in adequate amounts confer a health benefit on the host” (Sanders, 2003). The consumption of food or a dietary adjunct which contains probiotics has received considerable attention for its possible role in the maintenance of GI health. In particular, there is an increasing number of opportunities to eat yogurt which contains a probiotic strain. For a better understanding of the mechanism of probiotic function in the intestine, it is essential to reveal the influence of probiotics on the community of microbes inhabiting the intestine. Regarding yogurt containing probiotics, only one experiment targeting infants has examined the effect on the intestinal microflora (Guerin-Danan et al., 1998). No recent work has revealed whether the daily consumption of probiotic-containing yogurt by adults exerts any effect on the entire bacterial community in the human GI tract and/or on specific groups of bacteria inhabiting it.

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