

## **Prebiotic effects of almonds and almond skins on intestinal microbiota in healthy adult humans.**

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### **Abstract:**

Almonds and almond skins are rich in fiber and other components that have potential prebiotic properties. In this study we investigated the prebiotic effects of almond and almond skin intake in healthy humans. A total of 48 healthy adult volunteers consumed a daily dose of roasted almonds (56 g), almond skins (10 g), or commercial fructooligosaccharides (8 g) (as positive control) for 6 weeks. Fecal samples were collected at defined time points and analyzed for microbiota composition and selected indicators of microbial activity. Different strains of intestinal bacteria had varying degrees of growth sensitivity to almonds or almond skins. Significant increases in the populations of *Bifidobacterium* spp. and *Lactobacillus* spp. were observed in fecal samples as a consequence of almond or almond skin supplementation. However, the populations of *Escherichia coli* did not change significantly, while the growth of the pathogen *Clostridium perfringens* was significantly repressed. Modification of the intestinal microbiota composition induced changes in bacterial enzyme activities, specifically a significant increase in fecal  $\beta$ -galactosidase activity and decreases in fecal  $\beta$ -glucuronidase, nitroreductase and azoreductase activities. Our observations suggest that almond and almond skin ingestion may lead to an improvement in the intestinal microbiota profile and a modification of the intestinal bacterial activities, which would induce the promotion of health beneficial factors and the inhibition of harmful factors. Thus we believe that almonds and almond skins possess potential prebiotic properties.