A balanced intestinal microflora is considered to contribute to the well-being of an individual by, among other things, protecting against infections by pathogenic bacteria. Functional food science aims at influencing the microbiota in a beneficial way by stabilizing the intestinal flora, promoting resistance to pathogens and alleviating symptoms of lactose intolerance and intestinal disorders. Probiotics are live microbial food ingredients with such functional properties. The most commonly used bacteria for probiotic applications are lactobacilli and bifidobacteria. These bacteria are able to transiently colonize the human intestine and thereby exert probiotic effects when they are ingested. Viability and survival in the gastrointestinal tract are essential properties of probiotic bacteria.

In order to monitor the survival and colonization capability of a probiotic strain in the gastrointestinal tract, strictly specific methods have to be applied. The method must be able to identify the probiotic among the numerous endogenous bacteria of the host. The tools for identification of a probiotic include phenotypic and genotypic techniques. Techniques that scan the whole genome for DNA polymorphisms by means of arbitrary or semi-arbitrary PCR primers produce characteristic genomic fingerprints which can be used for identification purposes.

Prebiotics are substrates that can be utilized by probiotic bacteria, thereby increasing probiotic growth and/or activity. A prebiotic should be non-digestible by the enzymes of the host and persist digestion by bacteria present in the upper intestinal tract. In this way it can be fermented by bacteria in the lower intestine, the site of probiotic action. A prebiotic is preferably selective in action, stimulating multiplication of only certain bacteria. Non-digestible saccharides such as oligofructose and inulin have been used as prebiotics for bifidobacteria.

The transit and colonization capability of the probiotic *Bifidobacterium lactis* Bb-12 in the human intestine was investigated in this study. Volunteers were recruited for participation in a six-week feeding trial, during which subjects ingested the strain for two weeks by adding it to natural yoghurt. Fecal samples were collected before, during and after the feeding period. In addition, the potential of the commercial galacto-oligosaccharide Elix’or to function as a prebiotic for *B. lactis* Bb-12 was investigated. A randomly amplified polymorphic DNA (RAPD) fingerprinting protocol suitable for handling large numbers of samples was developed for identification of *B. lactis* Bb-12 and applied to cultured fecal samples. A strain-specific 16S rDNA amplification was used for confirmation of results. Alternative fecal sample handling procedures were compared for *B. lactis* Bb-12 selectivity.

The obtained RAPD results were used to quantitate *B. lactis* Bb-12 in the subjects’ fecal samples. It could be concluded that *B. lactis* Bb-12 was able to survive in the gastrointestinal tract and transiently colonize the intestine, occuring in high numbers after two weeks of ingestion, and decreasing to zero-level after return to a normal diet. The simultaneous consumption of the galacto-oligosaccharide Elix’or did not seem to increase colonization by the strain.

**Avainsanat Nyckelord Keywords**

probiotic, *Bifidobacterium lactis* Bb-12, genomic fingerprinting, prebiotic

**Säilytyspaikka Förvaringsställe Where deposited**

Muita tietoja Övriga uppgifter Additional information