

### Biodiversity and beneficial features of the lactic acid bacteria

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#### Abstract

The biodiversity of the lactic acid bacteria (LAB) is reflected in the six families and presently more than 36 genera comprising this important group of Gram-positive, catalase-negative bacteria, and their distribution in most ecosystems. In spite of the general view on their fastidiousness, particular LAB representatives either tolerate or are adapted to extreme conditions of pH, salinity, chemical preservatives, gastro-intestinal ecology, and temperature (relative). Depending on the particular niche and substrate, their activities may either be beneficial, detrimental or neutral.

Positive perceptions of the LAB are based on their role in traditional food fermentations, and, more recently, on beneficial health effects of specific strains, some of which are also associated with fermented foods. Understanding mechanisms basic to their beneficial interactions in the gastro-intestinal tract (GIT) has become a major challenge. Some of the key issues also relate to precise identification of a beneficial strain, not only on species level. This is complicated by the fact that the genus *Lactobacillus*, the most important among all LAB genera, is considered to be polyphyletic and comprises around 200 species – tendency growing! Strains of *Lactobacillus plantarum* (genome size > 3 million bp) may be found in widely diverse ecosystems ranging from various fermented foods to the human GIT. A comparatively wide distribution has also been recorded for *Lactobacillus sakei*, a most interesting but hitherto neglected species, with a much smaller genome size ( $\leq$  2 million bp). Biodiversity of strains within these two species has been the subject of intensive studies in recent years, and has necessitated the search for specific functional genes by which potentially valuable strains may be selected for biotechnical applications. Examples of intraspecies diversity and the practical implications will be given.

#### Biography

Wilhelm Holzapfel is Chair Professor at the Institute of Advanced Green Energy and Environment (AGEE), at Handong Global University (HGU). He is President of the ICFMH under IUMS (International Union of Microbiological Societies) since 1996, and has formerly been Head (Director and Professor) at the Institute for Hygiene and Toxicology, BFE, Karlsruhe, Germany, and also Hon. Professor at the Technical University of Karlsruhe. Major Research Interests include the lactic acid bacteria, probiotics, food biotechnology and gut microbiota. He is author/co-author of > 325 scientific papers, about 70 book chapters, and editor or co-editor of 7 scientific textbooks.