TITLE: MOLECULAR CHARACTERIZATION AND PROBIOTIC POTENTIAL OF *KIMERE* LACTOBACILLI

M.Sc. FOOD SCI. NJERU, PATRISIO NJIRU **1. Berichterstatter: Prof. Dr. J. Schrezenmeir**

The objective of this thesis is to characterize lactobacilli from *Kimere* by microbiological and molecular methods as well as studying their probiotic potential. *Kimere* is a spontaneously fermented pearl millet (*Pennisetum glaucum*) dough from the Mbeere community of Kenya. Further goals were to isolate strains from the same species, demonstrate strain specificity with respect to immunomodulation (Th1/Th2) and to elucidate genomic differences that could account for the observed strain specificity among probiotic strains. To achieve this, *Kimere* samples were collected from 11 homesteads in Mbeere district, Kenya and the studies were carried out in MRI Kiel, Germany. Forty-eight lactobacilli isolates were isolated and characterized using physical and biochemical methods such as microscopy, Gram reaction, catalase reaction, API 50 CHL and growth temperature in combination with molecular methods, species specific PCR, amplified ribosomal DNA restriction analysis (ARDRA) and pulsed field gel electrophoresis (PFGE). The strains were identified as 46 *Lactobacillus fermentum* and one each *Lactobacillus plantarum* and *Weissella confusa*. High strain diversity was observed. A preliminary screening of all 48 strains for bile salt tolerance (up to 3%) led to selection of 9 *L. fermentum*, whose further probiotic potential was assessed by testing acid resistance and Th1 (IFN-γ) and Th2 (IL-4) cytokines production in human PBMCs. The strains demonstrated strain specific immunomodulation properties and led to selection of two strains, K1-Lb1 (Th1 shift) and K8-Lb1 (Th2 shift). Their SSH library revealed genes encoding for putative glycosyltransferase and enzymes of polysaccharide biosynthesis which are involved in cell surface structures, which the study concluded could play a major role in the observed strain differences in immunomodulation properties.