

**Abstract:**

Lactobacillus plantarum was the major species among the lactic acid bacterial strains isolated from traditional fermented milk of the Maasai in Kenya. Selected strains were characterized for their functional properties using in vitro standard procedures. All strains expressed acid tolerance at pH 2.0 after 2-h exposure of values that ranged from 1% to 100%, while bile tolerance of acid-stressed cells at 0.3% oxgal varied from 30% to 80%. In vitro adhesion to the mucus-secreting cell line HT 29 MTX and binding capacity to extracellular protein matrices was demonstrated for several strains. The four strains tested in a simulated stomach duodenum passage survived with recovery rates ranging from 17% to 100%. Strains were intrinsically resistant to several antibiotics tested. From these in vitro studies, a number of Lb. plantarum strains isolated from the Maasai traditional fermented milk showed probiotic potential. The strains are good candidates for multifunctional starter culture development.