Survival of lactic acid bacteria from Traditional Mountain Malga (TMM) cheese after *in vitro* human gastrointestinal digestion

Ilaria Carafa*, Viola Framba, Kieran Tuohy, Elena Franciosi

IASMA Research and Innovation Centre - Fondazione Edmund Mach (FEM)- Italy

*ilaria.carafa@fmach.it

Objectives of this study were to investigate the ability of TMM-cheese resident LAB to survive to the digestion process and the influence of chemical-physical characteristics of the cheese, in particular the fat content, on this ability. The human gastrointestinal digestion of 18 TMM-cheese samples after 7 months of ripening was simulated *in vitro*. Microbial counts before and after the digestion showed a significant reduction of total bacteria, enterococci, mesophilic and thermophilic cocci counts. Mesophilic and heterofermentative rod-shaped bacteria showed a not significant count reduction. Coliforms were always less than 10 Log CFU/g before and after *in vitro* digestion. Thirty-six putative LAB (18 cocci-shaped and 18 rod-shaped) were isolated after the digestion and identified as belonging to *Lactococcus lactis* and *Lactobacillus paracasei* through partial sequencing of 16S rRNA gene. Three strains of *Lactococcus lactis*, three of *Lactobacillus paracasei* and a mix of them were inoculated in triplicate in whole pasteurized milk and digested after fermentation: a microbial reduction ranging between 3.3 and 3.8 Log CFU/g was observed, suggesting that TMM-cheese isolates are not naturally able to survive to the gastrointestinal digestion. The same strains were used to ferment milk with different fat content (about 0.5, 1.5 and 3.5%) and highest counts were registered in fermented whole milk (3.5 % fat), suggesting that a slight increase of fat percentage may determine a higher resistance to *in vitro* gastrointestinal digestion. Finally, samples of milk cream (fat content of 27%) were subjected to simulated digestion. Comparing the microbial counts of TMM-cheese, milk cream and fermented whole milk samples, a reduction of 0.8, 1.9 and 3.3 orders of magnitude was observed, respectively. In conclusion, both the fat content and the texture of TMM-cheese showed a effect of protection on lactic acid bacteria during transit in the gastrointestinal tract.