

## Cheese Matrix Effect on Proteolysis of *P. freudenreichii* Immunomodulatory Proteins

Gwénaél Jan<sup>1\*</sup>, Houem Rabah<sup>1,2</sup>, Olivia Ménard<sup>1</sup>, Floriane Gaucher<sup>1,3</sup> and Fillipe Luiz Rosa do Carmo<sup>1,4</sup>

<sup>1</sup>STLO, INRA, France

<sup>2</sup>Pôle Agronomique Ouest, France

<sup>3</sup>Biodis, France

<sup>4</sup>Universidade Federal de Minas Gerais (ICB/UFMG), Brazil

*Propionibacterium freudenreichii* is an emergent probiotic, presenting several beneficial effects including anti-inflammatory properties, mediated by surface layer proteins (SLPs) belonged to the S-layer lattice, in particularly the protein SlpB. We hypothesize cheese matrix may be the best delivery vehicle for *P. freudenreichii*'s anti-inflammatory potential, by enhancing propionibacteria survival to digestive stresses, and by allowing undamaged SLPs to reach the digestive tract. Firstly, we compared the immunomodulatory effects of *P. freudenreichii* and intact SLPs, to SLPs digested by trypsin, i.e SLPs-peptides on HT29-cells. In contrast to *P. freudenreichii* and SLPs, SLPs peptides don't reduce pro-inflammatory cytokines expression during cells co-stimulation with lipopolysaccharide. This result confirmed the importance to protect SLPs from proteolysis to permit them to trigger gut immune system. Secondly, we evaluated propionibacteria resistance and slpB proteolysis during *in vitro* static digestion, in different delivery vehicles increasingly concentrated in dairy proteins: milk ultrafiltrate, milk and cheese. The experiment clearly showed the protective effect of the Slp proteins by the cheese matrix and better bacterial viability. Then, we carried out *in vitro* dynamic digestion using Didgi® system. We selected two matrices only: the milk ultrafiltrate and the cheese. We decided to apply fixed digestion parameters for both matrices: the digestive parameters of cheese. The results show a protective effect of the cheese matrix on the viability of the propionic bacteria and on SLPs against digestive proteolysis. Taken together, those results show that cheese is an adequate delivery vehicle for *P. freudenreichii* immunomodulatory proteins.

### Biography:

Dr. Gwénaél Jan completed his Ph.D. at STLO (INRA-Agrocampus Ouest), France. He did his Master degree at the University of Rennes, France. At present Dr. Gwénaél Jan is working as Directeur de Recherche INRA-Agrocampus Ouest Rennes.