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A new dairy product fermented exclusively by dairy propionibacteria: a new tool to study probiotic potentialities *in vivo*

Cousin Fabien^[a,b,c], Louesdon Séverine^[a,b], Maillard Marie-Bernadette^[a,b], Madec Marie-Noëlle^[a,b], Gaillard Loïc^[d], Le Normand Laurence^[d], Boudry Gaëlle^[d], Jan Gwénaél^[a,b]

^[a] INRA, UMR1253 Science et Technologie du Lait et de l'Œuf, F-35042 Rennes, France

^[b] AGROCAMPUS OUEST, UMR1253 Science et Technologie du Lait et de l'Œuf, F-35042 Rennes, France

^[c] CNIEL/Syndifrais, 42 rue de Châteaudun, F-75314 Paris 09, France

^[d] INRA, UMR1079 SENAH, F-35590 Saint Gilles, France

fabien.cousin@rennes.inra.fr

Dairy propionibacteria are commonly used as ripening starters in the cheese industry. They are also consumed as probiotics under a freeze-dried form. Their probiotic effects include beneficial modulation of the gut microbiota and associated enzymatic activities, and of the gut proliferation/apoptosis equilibrium [1]. These effects require high populations of live and metabolically active propionibacteria in the gut. In this context, the probiotic vector is a determinant key of probiotic efficacy. Fermented dairy products are widely considered to protect bacteria against digestive stresses. Emmental cheese and yoghurt supplemented with dairy propionibacteria are efficient to deliver live and metabolically active *Propionibacterium* strains to the human gut but contain a complex mixture of lactic and propionic acid bacteria [2, 3]. This does not allow dairy propionibacteria specific beneficial effects' identification. Our aims were 1) to develop a milk exclusively fermented by a dairy propionibacterium and 2) to study propionibacteria survival during cold storage and digestive stresses in this dairy product. As dairy propionibacteria do not generally grow in milk [4], we determined their nutritional requirements concerning carbon and nitrogen by supplementing milk ultrafiltrate with different concentrations of lactate and casein hydrolysate. Milk supplemented with 50 mM lactate and 5 g/L casein hydrolysate allows growth of all dairy propionibacteria species and subspecies studied, which reached at least 1E+9 cfu/mL. In this fermented milk, dairy propionibacteria remain viable and stress-tolerant *in vitro* during minimum 15 days at 4°C. Besides, the best tolerant *P. freudenreichii* strain was used in an *in vivo* trial. Pigs were fed with 1E+10 cfu/day and we evaluated the survival and metabolic activity of *P. freudenreichii* in the faeces and colon contents. This work results in the design of a new food grade vector which will allow preclinical and clinical trials.

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