**UMR INRA 454 MEDIS (Microbiologie, Environnement Digestif et Santé), Université Clermont Auvergne (P. Peyret)**

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***Formulation of probiotic by innovative encapsulation systems for therapeutic purposes***

Two hundred thousand persons suffer from a chronic inflammatory bowel disease (IBD) in France. Crohn's disease and ulcerative colitis with a significant increase from 5,000 to 6,000 new cases each year. IBD results from a deregulated immune response to the gut microbiota in predisposed genetically persons. This anomaly would lead to an important secretion of TNF-α and IL-1 inducing an important inflammatory response.

Conventional therapies focuse to prevent the onset of relapse episodes, increase the phases of remission and limit symptoms, but they cause many side effects, which affect patients' quality of life. The administration of probiotics could constitute an alternative medicines but the dissemination risk must be prevented. The encapsulation of therapeutic probiotics within microparticles could increase their therapeutic properties while annihilating their potential undesirable effects.

The aim of this thesis consists to encapsulate probiotics inside microparticles composed to polymers allowing both their industrialization with soft process (without organic solvents, without high temperatures ...), in order to preserve viability and activity of probiotics, and to obtain a stable system to avoid any release of microorganisms into different physiological conditions (pH, mechanical stresses linked to peristalsis, enzymes).

 In addition to application in Health, this innovative encapsulation system could also applied to Environment or Food sectors.

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