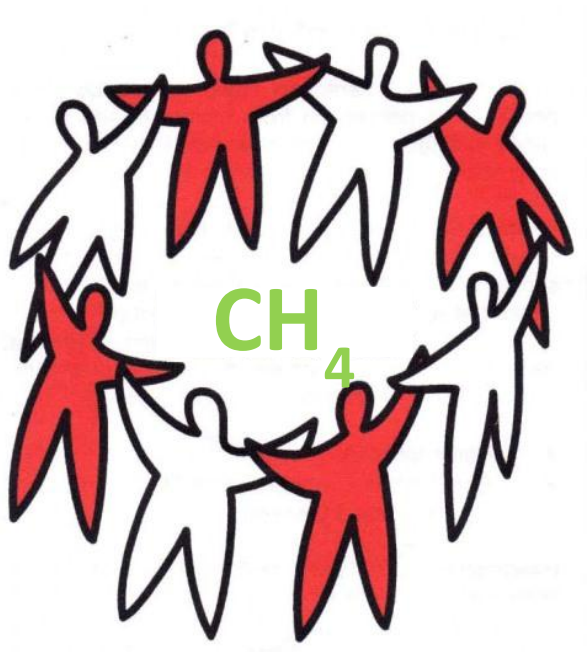
UMR1213 Herbivores

Microbial digestion and absorption Team (Dima)

The research consortium around methanogenesis in ruminants, a collaborative innovation between INRA and ten private partners

A consortium between INRA and ten private partners was created to design and conduct a common research project aiming at identifying and validating indicators of enteric methane produced by ruminants. This organization shall help quickly overcome bottlenecks both for research and the ruminant production sector.

Livestock systems face a major worldwide challenge: to meet the growing demand for animal products and to reduce at the same time the environmental impacts and the competition for food resources. Ruminant livestock systems are major producers of greenhouse gas (GHG) emissions including methane and less efficient transformers of food resources they consume than monogastric animals. By contrast they can use land and forage areas which could not been used for human nutrition. Producing knowledge to allow reducing the environmental impacts of ruminants while producing animal products both safe and socially accepted by the consumer and the citizen is one of the core objectives of the INRA Phase scientific division, and especially the UMR1213 Herbivores. Many operators involved at various steps of the animal productions sector (suppliers of additives, genetics, food manufacturers, service companies, processors) are also seeking for operational solutions to reduce GHG emissions, while maintaining an optimal level of production and improving the competitiveness of farms.



An innovative approach for the co-construction of a research program between INRA and ten private partners (Adisseo France SAS, Apis-Gene, Deltavit, DSM Nutritional Products AG, InVivo NSA, Lallemand, McKey Food Service, Techna France Nutrition, Valorex, Institut de l'élevage) was followed to build a common research project on the identification and validation of indicators of enteric methane production in ruminants. A consortium agreement was signed between the partners that agreed to self-finance the project over the period 2014-2018. The topic of this project is a hot scientific topic and at the same time has a high potential to result in intellectual property rights.

We will follow two approaches to investigate indicators of methanogenesis: (1) an approach focused on milk fatty acid previously identified as interesting in dairy cows. We plan to validate the relationships between methane emissions and different milk fatty acids under various nutritional and physiological conditions of the cow. (2) an exploratory approach (without a priori on markers) that can be applied to any type of ruminants, dairy or meat, productive or not. We will explore simultaneously the metabolomic profiles of different body matrices (rumen fluid, urine, milk, plasma, feces). The metabolic origin of the relevant indicators will be investigated thanks to genomic analyzes of the rumen microbiota.

This ambitious project requires the implementation and articulation of studies of different nature (methodological development, in vivo experimentation, data integration by meta-analysis) and at different levels (rumen microbiota, animal, herd). It is carried out by UMR1213 Herbivores in collaboration with UMRs Pegase and SAS (INRA Rennes), Mosar (INRA Paris), and Gabi (INRA Jouy-en-Josas). Two PhD students, one post-doctoral scientist and two 18-month temporary technicians will be recruited. Sharing human, technical and financial resources between partners for the realization of this unifying and standalone project will allow overcoming scientific bottlenecks in a relatively short time.

Contact : Martin Cécile, cecile.martin@clermont.inra.fr, UMR1213 Herbivores, F-63122 Saint-Genès-Champanelle, France
Vignon Xavier, xavier.vignon@jouy.inra.fr, Département Phase, BDR-Domaine de Vilvert, F-78532 Jouy-en-Josas, France