

High rate monitoring CH₄ production dynamics and their link with behavioral phases in cattle*Y. Blaise^{1,2,3}, F. Lebeau^{1,2}, A.L.H. Andriamandroso^{1,2,3}, Y. Beckers³, B. Heinesch² and J. Bindelle^{1,3}**¹University of Liège, Gembloux Agro-Bio Tech, AgricultureIsLife, Passage des deportes 2, 5030 Gembloux, Belgium, ²University of Liège, Gembloux Agro-Bio Tech, Biose, Passage des deportes 2, 5030 Gembloux, Belgium,**³University of Liège, Gembloux Agro-Bio Tech, AGROBIOCHEM, Passage des deportes 2, 5030 Gembloux, Belgium; yblaise@ulg.ac.be*

Microbial fermentation in the rumen produces methane (CH₄) which is a loss of energy for ruminants and also contributes to global warming. While the respiration chamber is the standard reference for CH₄ emissions quantification, daily CH₄ production dynamics can be measured only by steps of 30 min and measurements on pasture are impossible. The alternative method using SF₆ as tracer gas can be applied for grazing animals but provides average CH₄ production values over at least several hours, making it impossible to measure short term dynamics of rumen CH₄ production with changing animal behavior along the day. Newly developed methods using CO₂ as internal tracer gas extrapolate CH₄ emissions from few short measurements. However, both CO₂ and CH₄ emissions fluctuate during the day depending on the behavior and the post-feeding times questioning the validity of this method. Therefore, an innovative device was developed to monitor at a high rate CH₄ and CO₂ emission dynamics in order to investigate the link between CH₄ dynamics and the animal behavior on pasture. Preliminary results showed the ability of the device to record differences in CH₄:CO₂ ratios and eructation frequencies according to the individual and the behavior. Results from complementary experiments in barn with animals fed contrasting diets regarding CH₄ production (with and without linseed) and on pasture with different forage allowance will be presented in order to highlight how post-feeding time and grazing behavior impact CO₂ and CH₄ emission dynamics along the day.