Defatted insect meals: impact on *in vitro* ruminal fermentation and lipid biohydrogenation

Manuela Renna[1], Mauro Coppa[2], Carola Lussiana[3], Aline Le Morvan[4], Laura Gasco[3]*, Lara Rastello[1], Gaelle Maxin[4]

[1]*Department of Veterinary Sciences, University of Turin, Largo P. Braccini 2, 10095 Grugliasco (TO), Italy*
[2]*Independent researcher, Université Clermont Auvergne, INRAE, VetAgro Sup, UMR 1213 Herbivores, Saint-Genès-Champanelle, France*
[3]*Department of Agricultural, Forest and Food Sciences, University of Turin, Largo P. Braccini 2, 10095 Grugliasco (TO), Italy*
[4]*Université Clermont Auvergne, INRAE, VetAgro Sup, UMR 1213 Herbivores, Saint-Genès-Champanelle, France*
Contact: manuela.renna@unito.it

Ruminant diets are characterized by low amounts of lipids (<6%), hence defatted insect meals could be an interesting sustainable solution to provide both protein and energy to the rations. The residual ether extract (EE) content of defatted insect meals can vary widely depending on the applied defatting technology. In this study, we evaluated the effects of residual EE of defatted *Hermetia illucens* (HI) and *Tenebrio molitor* (TM) meals on *in vitro* ruminal digestibility and lipid biohydrogenation. Six EE levels for HI (26.9, 19.7, 12.8, 9.2, 7.0 and 4.7 g EE/100 g dry matter – DM) and three EE levels for TM (39.2, 8.1 and 5.7 g EE/100 g DM) were tested. Rumen fluid for the *in vitro* fermentations was obtained from four cannulated sheep. Fermentation parameters and fatty acids (FA) of rumen digesta after 24 h *in vitro* ruminal incubation of the insect meals were measured. A GLM ANOVA was performed to test the effects of the residual EE (regressive factor) and of its interaction with the insect species (fixed factor). We observed a decrease by 0.78 and 0.36% of DM digestibility per 1% increase of EE content for the HI and TM meals, respectively. Irrespective of insect species, a decrease by 12.90% in CH4 and 15.70% in CO2 production was also observed. On the contrary, for both HI and TM, the residual EE content had little effect on the FA profile of rumen digesta (e.g. C18:2 *c*9*t*11: +0.01 and +0.02% for HI and TM meals, respectively). One of the major effects in FA was observed for C18:1 *c*9, which decreased by 0.14% for HI and increased by 0.32% for TM. Thus, the use of defatting processes can simplify the inclusion of insect meals in ruminant diets by limiting the negative effects on nutrient digestibility related to a high EE content, with minor effects on lipid biohydrogenation.