

# Poster 2.6

## IN VITRO EVALUATION OF DIGESTIBILITY AND FERMENTATION CHARACTERISTICS OF TWO TYPES OF INSECTS USED AS POTENTIAL NOVEL PROTEIN FEEDS FOR PIGS

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### Abstract text:

**Introduction:** Novel protein sources such as insects are suggested for pig nutrition. Protein availability might be impacted by the nature of the insect and by the thermal treatment applied to sanitize this ingredient. The influence on protein availability and colonic fermentation is unknown.

**Material and Methods:** Plant proteins (beans, lentils, peas and soybean, raw and vapor-cooked) were compared to adult house crickets (*Acheta domesticus*) and mealworms larvae (*Tenebrio molitor*) that had been autoclaved, oven-cooked (150 and 200°C) or used raw. Ingredients were run in triplicate in an *in vitro* model of the pig gastrointestinal tract combining enzymes to simulate digestion in the stomach and the small intestine and subsequent fermentation by fecal microbes to simulate hindgut fermentation.

**Results and Discussion:** Protein digestibility (CPD) of insects decreased with thermal treatments ( $P < 0.01$ ) while that of plants increased (soybeans) ( $P < 0.05$ ) or was unaffected (peas, beans, lentils). Autoclaving insects reduced more digestibility than oven-cooking. CPD of raw mealworms (0.726) equaled that of the best plants (0.725 to 0.763) while crickets were less digestible ( $P < 0.05$ ). Consequences on fermentation metabolites were higher butyrate molar ratio in raw crickets against the heat-treated ones (0.133 vs. 0.109 to 0.115). Both insect sources displayed higher butyrate and branched-chain fatty acids (BCFA) (including valerate) and lower propionate than plants. Crickets produced 50% as much BCFA as mealworms (0.235 to 0.269 vs. 0.167 to 0.206,  $P < 0.05$ ). Feeding insect-sourced protein requires a careful choice of the species as well as the thermal treatment to avoid possible detrimental consequences on intestinal health in pigs.