

# Possible reasons for the high variability of the digestible energy content of field peas in pigs

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The reason why the digestible energy (DE) content of field peas is variable in pigs is unclear. No acceptable relationship has been established so far between chemical composition and energy value. We suspect that starch hydrolysis could be partly responsible for the variation. Therefore, the kinetics of starch hydrolysis of 15 pea samples of high and low quality were studied *in vitro*. The rate of fibre fermentation in the large intestine was also studied.

A sequential *in vitro* hydrolysis of starch was carried out to mimic digestion in the stomach and small intestine of the pig (pepsin 120 min + mixture of pancreatin, isomaltase and maltase for 240 min). Samples were taken at different times and analyzed for glucose. The rate of fermentation of the residues of hydrolysis was measured after incubation in a solution containing bacteria collected from pig large intestines and estimation of the amount of gas produced after fermentation. Differences in starch hydrolysis were observed after 140 min of incubation. The Camry and Cooper pea cultivars presented the highest rate of hydrolysis (98 and 91%, respectively) and Midas and Montero the lowest (75 and 74 %, respectively;  $P < 0.001$ ). A negative correlation was observed between the rate of starch hydrolysis and the NDF content of peas ( $r = -0.55$ ;  $P = 0.036$ ). The residues of hydrolysis of the Midas and Montero cultivars presented the highest rates of fibre fermentation ( $P < 0.001$ ) in the large intestine, expressed by the total amount of gas produced after fermentation (252 and 254 ml, respectively;  $P < 0.001$ ) and Sage, the lowest (232 ml of gas produced). The latter cultivar had also the highest NDF content (205 vs 132-186 g/kg DM for the other cultivars).

**Implications:** Differences in *in vitro* hydrolysis and fermentation were observed among the pea cultivars and could explain some of the high variability in DE content found among pea cultivars in growing pigs.