

Selection for protein digestibility in pigs

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Protein efficiency in animal production will become increasingly important. Cost of protein as a feed ingredient will increase as will the cost for N-emissions. Genetic selection for improved apparent total tract protein digestibility (ATTD_p) might help in reducing feed costs and reducing the environmental impact of pig husbandry. ATTD_p can be calculated applying Near Infra-Red technology (NIR) on both feed and fecal samples and is a heritable trait. In a Norwegian study a strong genetic correlation between ATTD_p and feed intake from 40 to 120 kg was found (-0.54 ± 0.11), which raises the question what is the potential added value of genetic selection for ATTD_p?

At the central boar testing facility of Topigs Norsvin in Canada, 307 fecal samples were collected on selection candidates of a sire and dam line, prior to off-test. Together with a feed sample, these fecal samples were chemically analyzed and used to develop a calibration curve for NIR equipment to be able to define ATTD_p. This calibration curve was applied on fecal samples of 1705 animals in the same facility, with an average ATTD_p of 78.4%. Genetic parameters were estimated for ATTD_p, DFI and FCR.

Low-protein diets affect ileal amino acid digestibility in growing and finishing pigs, in such a way that animals become more efficient at limiting SID Lysine levels. A correction factor, based on estimated protein deposition and feed intake one week prior to fecal sampling, was developed

This study shows the potential of selection for increased ATTD_p because it is a moderately heritable trait ($h^2=0.27 \pm 0.07$) with reasonable genetic variance ($\sigma^2_A=5.97$). The genetic correlations with DFI and FCR were small (-0.15 ± 0.17 and -0.21 ± 0.19 respectively). A genetic variance of 5.97 indicates that mass selection could easily yield more than 1% improvement per generation. The low genetic correlations indicate that genetic selection on ATTD_p has the potential to add genetic gain over and above selection on DFI and/or FCR.

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