

Expected effects on carcass and pork quality when surgical castration is omitted: results of a meta-analysis study

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Alternatives to the common castration (C) practice of piglets are surgical castration under anaesthesia and rearing entire males (EM) or immunocastrates (IC). It is well established that boar taint hinders the breakthrough of these alternatives. Less is known how avoiding surgical castration would affect carcass and meat quality traits. The objective of this meta-analysis was to estimate the impact of lack of castration or immunocastration on these traits. In order to build the database 26 published and 2 unpublished studies containing results of carcass characteristics and meat quality from EM, C, IC and female (F) pigs were used. In all publications 1 group of EM was present which was used as the control group in the statistical analysis. The dataset included results from 2683 EM, 3427 C, 96 IC and 3736 F and 9 traits: lean meat-%, intramuscular fat-%, initial and ultimate pH, L*-value, drip loss-%, shear force and sensory tenderness. From the published treatment means and the pooled standard deviations, the empirical effect sizes of each study were computed as the difference between treatment means of C, IC, F and the EM means, divided by the pooled standard deviation. Data were analysed as multiple-treatment studies, which accounts for the correlation of the effect sizes as introduced by the common control group. The most marked effect of castration method and gender was found in lean meat and intramuscular fat percentage. Compared to EM, carcass leanness was estimated to be 2.69, 1.77 and 0.42% greater and intramuscular fat level 0.60, 0.30 and 0.25% lower than in C, IC and F, respectively. Although significant effect sizes were found for all meat quality traits, only the difference in shear force between IC and EM was of relevant magnitude (-0.33 kg). Contrarily, tenderness and juiciness assessed by sensory analysis are not expected to differ between EM and C, IC and F. This meta-analysis revealed that the implementation of IC and EM production should not be hindered by meat quality concerns.

Quantitative genetic opportunities to ban castration

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Boar taint, an unpleasant odour in pork of non-castrated male pigs, is mainly caused by higher levels of three compounds; androstenone, skatole and indole. The overall goal of this study was to investigate the genetic opportunities to reduce boar taint compounds. Fat samples and data on production traits were collected from 1,539 purebred entire males of a Duroc line for genetic parameters and correlation with production traits. In addition the fat samples were collected from 1,034 purebred entire males of 3 dam lines for genetic parameters and correlations with reproduction traits. The fat samples were analysed by HPLC for androstenone, skatole and indole. The average levels of androstenone, skatole, and indole in the boar line were $1.71 \pm 1.42 \mu\text{g/g}$, $75 \pm 80 \text{ ng/g}$, and $48 \pm 54 \text{ ng/g}$, respectively. The average values in the dam lines were similar for androstenone but higher for skatole (up to 300 ng/g). The heritability estimates were 0.64 ± 0.08 , 0.36 ± 0.07 , and 0.26 ± 0.06 for androstenone, skatole and indole, respectively in the boar line and similar values in the 3 dam lines. Genetic correlations among the boar taint compounds were very high, particularly between indole and skatole (0.83 ± 0.06). The preliminary results for correlations of boar taint compounds with daily gain and carcass traits were very low and all close to zero (e.g. -0.14 to 0.21). The preliminary correlations of boar taint components with reproduction traits were for most traits close to zero but not between androstenone and age at first mating (-0.24 ± 0.24) and weaning to oestrus interval (-0.44 ± 0.31). These results indicate that selection against the boar taint compounds is the most effective way of reducing the boar taint problem and should not have any significant adverse effect on daily gain, carcass traits and reproduction traits if selection against boar taint is done in a balanced way.