



Long-term effects of straw blocks in pens with finishing pigs and the interaction with boar type



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ABSTRACT

This study verified the effect of straw blocks on the behavior and growth of finishing pigs and possible interactions with the genetic background (boar type). A total of 359 finishing pigs, which were offspring from different boar types, were housed in gender-mixed pens with slatted floors. Half of these pigs descended from sires selected for better carcass traits and lower growth rates (type C) and the other half from sires selected for better growth and poorer carcass traits (type G). The offspring of these two boar types were spread equally over control (only a chain) and treatment groups (chain and straw blocks in a dispenser). Direct individual behavioral observations were carried out once a week and the presence of lesions on the body was verified every two weeks. Individual weights were recorded at different weighing moments. Lesions on organs and carcass traits were obtained after slaughter.

A lower frequency of pen mate manipulation was observed in pens with access to straw blocks in type G pigs. For type C pigs however, no significant difference was present in pen mate manipulation between groups with or without straw. It has been shown that pigs selected for high lean tissue growth rate show higher frequencies of tail biting behavior and in this study, providing straw blocks does not seem to be sufficient to decrease this behavior. These pigs also showed more pen manipulation, which might reflect an increased foraging motivation or motivation to explore. Mounting and fighting were recorded more frequently at the start of the finishing phase and in this period significantly more in pens with straw blocks, which might be related to both competition for straw and introduction in a new environment. Growth was not significantly affected by the presence of straw blocks. Type G pigs however reached higher slaughter weights compared to type C pigs, but no interaction with the presence of straw was seen.

It can be concluded that in general, straw blocks decreased the manipulation of pen mates in finishing pigs, but this effect was only seen in pigs selected for better growth. Pigs predisposed to a higher lean meat percentage showed in general higher frequencies of this behavior and in these pigs, straw blocks did not reduce pen mate manipulation compared to more barren environments. In general, the presence of the straw blocks seemed to be associated with more competition related behavior in the beginning of the fattening period. The presence of straw did not affect growth or carcass traits.

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1. Introduction

Inadequate environments increase the risk of developing abnormal behavior in pigs. This behavior might be redirected towards pen mates, resulting in harmful behavior such as tail and ear biting

(Beattie et al., 2001; Scott et al., 2009). The provision of enrichment materials which can be explored and manipulated by pigs, plays a role in the prevention of the development of these harmful behaviors. Enrichment materials might also influence growth. Indeed, the absence of enrichment increases chronic stress and consequently reduces feed intake (Lyons et al., 1995), while in enriched pens feed intake might increase (Van de Weerd et al., 2006).

Habituation to enrichment might be seen and especially in point-source objects, it might occur rapidly (Apple and Craig, 1992; Van de Weerd et al., 2003). A full bed of straw meets the behavioral

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Table 1

Overview of the estimated breeding values of the six different sires used in this study, provided by the Flemish Pietrain Studbook.

Boar type	Growth	Carcass quality	Global index
Type C	−38	21.3	124.2
Type C	−23	19.7	124.3
Type C	+16	17.5	146.5
Type G	+57	−9.2	101.0
Type G	+45	−5.9	103.5
Type G	+62	−2.6	116.1

needs of pigs as it prevents the development of harmful behavior (Fraser et al., 1991; Van de Weerd et al., 2006). Van de Weerd et al. (2003) studied the characteristics of different materials and verified which characteristics determined attractiveness at the end of an exposure period of five days. Materials that were ingestible, destructible, contained, not attached, not rootable were explored most on the fifth day. These findings showed that enrichment materials should have specific characteristics in order to minimize habituation. Thus, straw bedding seems to be a suitable enrichment strategy, but it is hardly applied in pig farms due to its characteristics (costly and labor-intensive) and its incompatibility with slatted floors. Indeed, straw loss through the slatted floor might be associated with blockage of the slurry system. In order to avoid or mitigate this problem, straw might also be offered in other ways such as in a dispenser, and in different forms, such as chopped or compressed.

The development of harmful behavior in pigs is however not only related to the presence of enrichment materials. The genetic background of the pig might also play a role. Research has shown that there is a positive relation between the prevalence of tail biting and lean tissue growth rate (Breuer et al., 2005) but also with back-fat thickness (Moinard et al., 2003). A correlation has also been seen with other unwanted behaviors, such as belly nosing (Torrey et al., 2001). Based on the finding that leaner pigs seem to be more predisposed to tail biting, it has been suggested that feeding motivation and nutrient intake processes may be involved in genetic influences (EFSA, 2007). Indeed, increased foraging motivation might reflect dietary deficiencies and the latter might lead to increased tail biting behavior, when pigs redirect foraging motivation towards pen mates. There is however, to our knowledge, little information about the interaction between the presence of enrichment and the genetic background of the pig.

This study therefore aims to verify the long-term effects of straw blocks provided in dispensers on the behavior and growth of finishing pigs housed on fully-slatted floors. This study hypothesized that straw blocks affect the behavior of pigs but the effect might depend on the genetic background of the pig. Moreover, it was hypothesized that the effect would be more pronounced in leaner pigs.

2. Materials and methods

2.1. Animals

A total of 359 hybrid pigs from six sires with different breeding values were followed up during the finishing phase from ± 30 kg to ± 115 kg (slaughter) on three commercial farms. The sires (Pietrain) were selected based on their estimated breeding values and availability (Table 1). These breeding values are based on performance data such as daily growth rates, daily feed intake, feed conversion and carcass quality (based on lean meat percentage and conformation) of their offspring. Breeding values are shown as the deviation in genetic predisposition compared to corrected means. The global index is a global breeding value which is based on the values for daily growth, feed conversion and slaughter quality, and ranges from 0 to 200. These data were provided by the Flemish Pietrain



Fig. 1. The straw dispenser filled with compressed straw blocks, provided in “S” pens.

Studbook. Three sires were selected for better carcass traits and lower growth rates (type C), while the other three sires were selected for higher growth rates and poorer carcass traits (type G). On each farm, two different sires from each type were used, so that each sire was used on two farms. Half of the 359 pigs descended from type C sires ($n = 185$) and the other half descended from type G sires ($n = 174$). Pigs were raised separately per type (type C versus type G) and this from birth until slaughter. All pigs were housed in gender-mixed pens with fully slatted floors (± 0.75 m²/pig) and pens were gender-balanced, e.g., an equal number of males and females, as much as possible. A metal chain was attached to a wall of each pen as enrichment material. Pigs had no previous experience with straw or other rooting materials. They were fed twice a day with a commercial standard pig feed and water was freely available via a drink nipple located next to the feed trough.

2.2. Experimental design

At the start of the fattening stage, pigs were randomly assigned to “straw” (S) or “no straw” (NS) groups. They were kept in the same groups as during the weaning stage and type C and type G pigs were spread equally over both groups. Pigs in “no straw” groups ($n = 199$) only had access to a chain as enrichment material. Pigs in “straw” groups ($n = 196$) were offered both a chain and compressed straw blocks (MIK International, Germany) in a cylindrical dispenser, which was placed vertically against the sidewall of the pen. A metal pin on the bottom of the dispenser prevented blocks from falling out of the dispenser (Fig. 1). Straw blocks weighed on average 1.5 kg and consisted of compressed chopped wheat and rape straw, and molasses. The dispensers were checked routinely every two days and refilled when needed. Straw use was recorded per pen and per application during the whole observation period. One dispenser was provided per 5 pigs and all dispensers were positioned on one sidewall of each pen. Mean straw use per pig and per week during the whole finishing phase was ± 103 g.

2.3. Behavioral observations

Behavioral observations were carried out according to a scan sampling procedure. The observer recorded the behavior of each pig within a pen, moved to the next pen and repeated this until every pen was scored 10 times (Van Beirendonck et al., 2011). All

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