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Research

The effect of a straw dispenser on behavior and lesions in weanling pigs



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ABSTRACT

Slatted floors and liquid manure–handling systems in intensive housing systems preclude the use of large straw quantities as enrichment material for pigs. Consequently, there is a need for alternative enrichment strategies, for example, by using suitable applications providing pigs with small straw quantities, which are associated with low straw waste. The aim of this study was to evaluate the effects of a straw dispenser filled with fully chopped straw on the behavior and lesions in weanling pigs. A total of 365 weanling pigs, housed in single-sex groups (gilts and intact boars), were randomly divided in 2 groups. Half of the pigs had access to a straw dispenser (straw; $n = 187$), and the other half had no access to straw (control; $n = 178$). They were housed in the weanling unit for a period of 7 weeks (7–20 kg) and received liquid feed. One straw dispenser was provided per pen, accessible to 3 pigs at a time of 10 to 15 pigs in the pen, and positioned above the feed trough. To receive straw, pigs had to manipulate the dispensing unit on the bottom of the dispenser. Behavioral observations were carried out twice a week, and present lesions were also scored on these days by the same observer. Data were analyzed using a logistic mixed model and a Fisher exact test. No differences were found for biting behavior toward different body parts between control and straw pigs. There was also no effect of gender. In boars, aggressive behavior occurred more in straw groups compared to control groups, which might be related to competition. This finding is also reflected in more lesions on the middle part of the body in straw groups. A lack of difference in lesion scores for tail and ears between the 2 groups suggests that the dispenser provided insufficient distraction for weanling pigs compared to a barren environment. However, the position of the straw dispenser must be kept in mind, as this caused pigs to perform straw-directed behavior mainly in the feed trough. In this study, based on behavioral observations and lesion scores, it seems that the straw dispenser did not provide pigs with more advantages compared to pigs in a barren environment. Moreover, competition was observed in pens with boars, which might be related to the fact that only one dispenser was provided per pen. It should, however, be taken into account that the position of the dispenser might not have been the most suitable as it possibly caused mixing of feed and straw.

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Introduction

In European production facilities, weanling and fattening pigs are housed in intensive housing systems with slatted floors, which

are often barren environments. Legislation, however, states that every pig should have access to materials which enable manipulation and explorative behaviors (Council Directive 2001/93/EC, 2001). When no material is provided, manipulation activities may be redirected toward pen fittings (Scott et al., 2006) or toward pen mates (Beattie et al., 2001). The manipulation of pen mates might result in harmful behavior such as tail and ear biting. In weanling pigs, enrichment materials might also be important for other reasons. At weaning, these pigs are challenged with different

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changes, such as separation from their mother, regrouping, environmental and diet changes. However, every pig will react differently to this situation. The first days after weaning are often characterized by fighting, as the social hierarchy must be determined (Jensen, 1994). Not only the ability of the pig to cope with these changes, but also the environment influences their behavior after weaning (Vanheukelom et al., 2011). When environmental enrichment is provided after weaning, pigs' interest might be more redirected from pen mates to the enrichment and the frequency of fighting might be reduced (Schaefer et al., 1990; Beattie et al., 2000).

Suitable enrichment material should be “complex,” “changeable,” “destructible,” “manipulable,” and “contain sparsely distributed edible parts” (Van de Weerd et al., 2003). Straw is considered to be a suitable enrichment material, but slatted floors preclude the use of long straw. Indeed, there is straw waste through the slats, and this might block the slurry system. Consequently, there is a need for alternative forms of biologically relevant enrichment which are practical when pigs are housed on slatted flooring. It must also be kept in mind that not all types of straw or applications are equally interesting for pigs (Zwicker et al., 2013). Although it has been shown that chopped straw is less-suitable enrichment material compared to long straw, the method of distributing this straw type might be an important factor. In previous research, a dispenser providing pigs with fully chopped straw was tested in sows housed in farrowing crates. Although the results showed that not all sows used the dispenser to the same extent, the dispensers had an overall positive effect on lying behavior in sows (Bulens et al., 2014). It was therefore decided to study the behavioral effects of such a straw dispenser with fully chopped straw in weanling pigs provided with liquid feed.

Materials and methods

Animals and housing

A total of 365 weanling Piétrain × (Belgian Negative × Finish Landrace) pigs from 3 batches on a commercial farm were observed. Pigs were moved from the farrowing crates to the weanling unit at the age of 28 days, weighing on average 7 kg. They were mixed and housed in this unit for 7 weeks and then moved to the fattening unit, weighing on average 20 kg. Weanling pigs (gilts and intact boars) were housed in single-sex groups in pens which were partly slatted (2.06 × 2.06 m) and had a solid lying area (2.06 × 0.58 m) in the middle of the pen. Stocking densities varied between 0.36 m² and 0.54 m² per pig (10–15 pigs per pen). Floor heating was provided on the solid lying area during the first days after weaning. The feed trough was along the length of the side of the pen, providing them with a standard commercial diet during the first 5 days after weaning, which was the same feed as during the farrowing period. Thereafter, pigs received liquid feed delivered to the trough. Feed was provided 3 times a day, at 5:00 hours, 11:30 hours, and 17:00 hours. A drinker nipple was provided above the feed trough. Ventilation and dry air temperature were automatically controlled. Tactile contact with pigs in neighboring pens was possible as pen partitions were fenced. None of the pigs had previous straw experience.

Treatments

A straw dispenser was chosen to distribute small amounts of chopped straw. This dispenser is a vertical pipe with a dispensing unit (60 × 60 mm). An opening is provided on top of the pipe. As this application was originally developed for use in the farrowing crate, it was provided with an adapted fitting system to fit in the weanling unit. The dispenser (length: 60 cm) was filled with 150-g

fully chopped wheat straw. One dispenser was provided per pen and was accessible to 3 pigs at the same time. To avoid straw loss through the slatted floors, the application was positioned above the feed trough. All dispensers were checked and refilled during the morning. Straw use was recorded per pen and per week. For analysis, mean straw use was calculated per pig and per week. The term “straw use” is used throughout the article and includes the total amount of straw used from the dispenser, as it was difficult to distinguish between straw consumption and straw waste.

The study was carried out in 3 replicates, and weanling pigs were randomly assigned to 1 group in each replicate:

- Control: no straw available (n = 178, spread over 15 pens with in total 94 gilts and 84 boars)
- Straw: piglets had access to the straw dispenser (n = 187 spread over 15 pens with in total 108 gilts and 79 boars)

Behavioral observations

To carry out individual observations, each piglet was marked individually with a color spray. These marks were reapplied twice a week at the end of the observations. Behavioral observations (Table 1) were carried out twice a week (Monday and Tuesday) during the whole observation period of 7 weeks, using the scan sampling method. The behavior of each pig within the first pen was scored; then, the observer moved to the next pen. This action was repeated until each pen was scored 10 times. All observations were carried out by the same observer, between 14:00 hours and 16:00 hours, as pigs were more active during this time period (Olsen et al., 2000).

Lesion scores

Lesions on the left and right side of the body (head, middle part of the body, ham, hoofs) were scored separately once a week after behavioral observations, according to the method developed by Barton-Gade et al. (1995). This method used a 4-point scale from 1 (no lesions) to 4 (severe lesions). According to Zonderland et al. (2008), each piglet's tail and ears were scored using 2 tail parameters: the visibility of the wound and the presence of blood (Table 2). Lesions were always scored by the same observer, using pictures displaying the different scores.

Statistical analysis

Data were analyzed using procedures available in SAS (Statistical Analysis System, version 9.3; SAS Inst., Inc., Cary, NC, 2008). Mean

Table 1

Description of the observed categories of behavior, based on Hay et al. (2003) and Vanheukelom et al. (2011)

| Behavior | Description |
|-------------------------|---|
| Eating feed | Manipulating or eating feed |
| Ear biting | Chewing or biting the ear of another pig |
| Tail biting | Chewing or biting the tail of another pig |
| Side biting | Biting the side of another pig |
| Manipulating pen | Sniffing, licking, or biting the walls or floor of the pen |
| Nosing | Sniffing a pen mate |
| Leg biting | Chewing or biting the leg of another pig |
| Head biting | Biting toward the head of another pig |
| Sleeping | Lying down with eyes closed |
| Aggressive | Fighting or pushing another pig violently with the head |
| Application interaction | Manipulating the application or manipulating straw in the feed trough |

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